TAMPA BAY ESTUARY PROGRAM
EMPLOYEE HANDBOOK
June 2017

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1.1 EQUAL EMPLOYMENT OPPORTUNITY

I. STANDARD: To provide a work environment free from discrimination. To prohibit discriminatory behavior based on race, color, religion, age, sex, pregnancy, national origin, marital status, or disability.

II. SCOPE: This standard applies to all employees of the TBEP and any external person(s) in contact with TBEP employees.


A. This guideline cannot resolve what unwelcome or offensive behavior may or may not be considered unlawful discrimination. In order to achieve a harmonious work environment, each employee should be considerate and sensitive to the diversity of other employee's national origin, color, race, religion, handicap, age, political opinions or affiliations, marital status, gender or pregnancy.

1. For the purposes of this guideline, behavior includes one’s conduct, speech or any other intentional act.

B. It is clearly unlawful for any TBEP supervisor/director to make a hiring/promotion/demotion decision, job assignment decision, or any other work related employment decision based all or in any part upon an employee's race, color, religion, age, sex, pregnancy, national origin, marital status, or disability.

C. Directors/supervisors have the responsibility to immediately notify the Executive Director of any discriminatory or perceived discriminatory behavior by other TBEP employees or outsiders.

D. An employee may advise another employee whose behavior is perceived to be discriminatory to stop the offensive behavior. If the employee is uncomfortable discussing the matter with the one(s) engaging in the perceived discrimination, they may report the matter directly to their supervisor, or Executive Director.

E. An employee who observes what they believe to be discriminatory behavior should report their observation to their supervisor, or the Executive Director.

F. Employees accusing discriminatory behavior have a responsibility to report the nature of the complaint.

G. An employee who is advised that their behavior is perceived as discriminatory to
another must immediately take steps to ensure this behavior is stopped and does not occur again.

H. TBEP will investigate all complaints of discrimination and will conduct the investigation as discretely as possible.

I. All documents created as a result of a complaint are exempt from public records disclosure, as provided for in Section 119.071(2)(g), Florida Statutes.

J. The registering of a valid complaint will in no way be used against the complaining employee, nor will it have an adverse impact on his or her employment.

K. Anyone who retaliates against an individual making such a complaint or anyone assisting in the investigation of a complaint will receive disciplinary action.

L. It is important for all staff to understand that management cannot stop harassment unless it is reported to someone who can do something about it.

M. For more specific information on Americans with Disabilities Act discrimination, please refer to Standard 4.2, Americans with Disabilities Act.
1.2  RECRUITMENT AND SELECTION

I. STANDARD: To provide for consistency in recruitment practices and ensure compliance with state and federal laws pertaining to employment.

II. SCOPE: This standard applies to TBEP employees who report to the Executive Director and are vested with the authority to recruit, interview and appoint applicants to TBEP positions.

III. GUIDELINES:

A. Applicants for TBEP positions will be recruited, interviewed and selected based on job related qualifications without regard to age, race, color, sex, religious creed, national origin, political opinions or affiliations, marital status, pregnancy, or handicap, except when a specific sex, age, or physical requirement constitutes a bona fide occupational qualification (BFOQ) necessary to perform the tasks associated with the position.

B. The recruitment and selection process is coordinated through the Executive Director with assistance from the Program Administrator, for all position openings within the TBEP.

1. A vacant position will be advertised by one or both of the following:
   a. Appointment from within - Position to be filled only with current TBEP employees will be advertised internally.
   b. Open to the Public Recruitment - Newspaper, Professional Journals, social media, websites, etc. Position will be advertised in one or any combination of the preceding, dependent on the position to be filled. At least one newspaper or electronic publication with region-wide coverage will be utilized.

2. All resumes received (electronic or hard-copy) will be forwarded to the Program Administrator for processing. The Executive Director with assistance from the Program Administrator reviews each resume to determine whether the applicant meets basic qualifications as advertised in the recruitment notice.

3. The Executive Director or her/his designee is responsible for selection of the applicants to be interviewed from the list of qualified applicants.

4. The Program Administrator is responsible for scheduling the interview appointments.

5. Following the interview(s), the Program Administrator will check employment references, and verify academic achievements (if applicable) of the top applicant(s).
6. Only the Executive Director will establish compensation and extend the job offer to the selected applicant.

7. The Program Administrator will notify persons interviewed that a selection has been made.
1.3 VETERANS PREFERENCE

I. STANDARD: It is the intent of the Tampa Bay Estuary Program (TBEP) to provide Veterans’ Preference to all eligible veterans and spouses of veterans.

II. GUIDELINES:

Special efforts shall be made to consider eligible veterans, and spouses of veterans, who have served on active duty in any branch of the United States Armed Services and qualify for preference based on Chapter 295, Florida Statutes, Section 55A-7, F.A.C.

A. The following persons shall be eligible to receive preference in appointment of positions:

1. Disabled veterans who have served on active duty in any branch of the Armed Forces and who:
   a. Have a presently existing service-connected disability which is compensable under public laws administered by the U.S. Department of Veterans’ Affairs (VA); or
   b. Are receiving compensation, disability retirement benefits, or pension due to public laws administered by the VA and the U.S. Department of Defense (DOD).

2. The spouse of any person:
   a. Who has a total and permanent service-connected disability and who, because of this disability, cannot qualify for employment; or
   b. Who is missing in action, captured in line of duty by a hostile force, or forcibly detained or interned in line of duty by a foreign government or power.

3. A wartime veteran who served during wartime period as defined below; or
   a. World War II
      December 1, 1941 to December 31, 1946
   b. Korean War
      June 27, 1950 to January 31, 1955
   c. Vietnam War
      February 28, 1961 to May 7, 1975
   d. Persian Gulf War
      August 2, 1990 to January 2, 1992
e. Operation Enduring Freedom  
    October 7, 2001 and ending on a date prescribed by Presidential Proclamation or by law

f. Operation Iraqi Freedom  
    March 19, 2003 an ending on a date prescribed by Presidential Proclamation of by law

4. The unremarried widow or widower of a veteran who died of a service-connected disability.

B. Selection decision shall be supported in the following manner:

1. Documentation will be provided explaining the steps taken to consider the Veterans' Preference applicants.
1.4 DISCIPLINE AND ADVERSE ACTION

I. STANDARD: To provide guidelines for the Executive Director and management in obtaining all the relevant information which pertains to a disciplinary matter, and to provide employees with a mechanism for response.

II. SCOPE: This standard applies to all TBEP employees who report to the Executive Director.

III. GUIDELINES:

A. Introduction

The TBEP operates on the principle that its personnel guidelines are intended to be firm, fair and flexible.

All TBEP employees are employed "at will." This means that TBEP employees have no legal "right" to keep a job enforceable in court or in an administrative proceeding. The TBEP does have the legal right to implement disciplinary measures, including discharge of employees where necessary, without having to prove to the satisfaction of any arbitrator, judge or other outsider that the disciplinary action was necessary, advisable, or justified. Such decisions remain within the discretion of management.

B. Progressive Discipline

"Progressive Discipline" is the practice of attempting to correct unacceptable behavior before that behavior becomes so severe as to require dismissal. The TBEP does not guarantee to its employees any progressive discipline preliminary to dismissal. In appropriate cases, in the discretion of management, the discharge of an employee may be effected without any prior verbal or written warning. As a general rule, TBEP recognizes that "progressive discipline" serves the interests of fairness to employees and stability of the TBEP's work force.

C. Verbal Counseling

All supervisors who, as a part of their responsibility, supervise other TBEP employees, are expected to engage in verbal counseling with their employees with respect to any job-related problems that do not warrant more extreme disciplinary action.

D. Written Reprimands

If informal verbal counseling does not have the desired effect, or if a problem is severe enough to warrant a written reprimand without prior verbal counseling, the supervisor should document the problem in the form of a written reprimand. All written reprimands are given to the employee for review and signature. The supervisor should fully discuss the reprimand with the employee involved. Written reprimands shall become a part of the employee's official personnel folder.
E. Authority

Only the Executive Director has the authority to hire and to terminate. Decisions with respect to (1) probation, (2) suspensions, (3) involuntary demotions, and (4) dismissal are final and become effective as determined by the Executive Director.

IV. Procedures for Implementing Adverse Action(s)

A. Preliminary Consultations

A supervisor who feels that an employee under his/her supervision should receive a suspension without pay, an involuntary demotion, and/or that employment with the TBEP should be terminated, should first review the individual's performance, prior warnings, work history, and any and all other factors that may fairly affect the disciplinary decision. If after such review, the Executive Director feels that an adverse action is appropriate, he/she will act accordingly.

B. Written Statement of Reasons

If after consultation with the Executive Director, it is determined that an adverse action is warranted, the Executive Director shall complete a Notice of Proposed Agency Action. The Notice should:

1. Specify the proposed effective date of the action in cases of proposed probation, suspension, involuntary demotion, and termination without pay.

2. Set forth the reasons for the proposed action. It should be specific as to dates, names, places, and most importantly, specific examples of the conduct and performance.

3. Place an employee on administrative leave in cases of proposed termination of employment, if the employee's continued presence on the job is undesirable.

4. Include a statement informing the employee that he/she may utilize the TBEP's complaint review procedure. This procedure gives an employee the opportunity to be heard on the proposed action by requesting an appointment for a meeting with the Executive Director. The statement shall also inform the employee that he/she may respond to the proposed action in writing.

5. Include a statement informing the employee of his/her rights, which includes a right to challenge stigmatizing information placed in the public record. The statement shall inform the employee that he/she has fourteen (14) days from receipt of the Notice in which to file with the TBEP a request for an appeal. The time frame in which to file an appeal shall run concurrent with the ten-day time frame in which to file a request to utilize the TBEP's complaint review procedure.
6. Be delivered to the affected employee by courier or hand delivered. If hand-delivered, a signed receipt must be obtained or hand delivery witnessed by at least one other person.

C. Employee Response

The employee will be given the opportunity to be heard with respect to the Notice, by making an appointment to be heard by the Executive Director. Such meeting is to occur, by appointment, no later than ten (10) days following receipt of the Notice Proposed Agency Action. The employee must request such a meeting in writing and the written request shall be received at least five (5) days prior to the meeting's occurrence. At the appointed time the Executive Director shall meet with the employee. The following points should be addressed during the meeting.

1. The Executive Director shall explain to the employee the nature of the problem resulting in the discipline, as set forth in the written Notice.

2. The Executive Director shall explain, as appropriate, the nature of the evidence which exists to support any charges which may underlie the Notice.

3. The employee will be given a full and complete opportunity to explain the facts as he/she sees them. If the employee states there are witnesses who will support his/her version of events, the employee shall be asked to state what he/she believes those witnesses would assert. If appropriate, the Executive Director may choose to speak to such witnesses, either during the meeting or afterwards.

4. The employee has the option to submit a written rebuttal. The written rebuttal should contain whatever points he/she feels should be brought to the attention of the Executive Director. The written rebuttal shall be received no later than ten (10) days after receipt of the Notice of Proposed Agency Action. The Executive Director may choose to interview the employee after reviewing the employee's written rebuttal before making a final decision.

5. It is not intended that an employee be represented by an attorney or any other representative at any meeting prior to the effective date of the proposed action. (If an employee insists upon such representation, the Executive Director should discuss the subject with Counsel.)

D. Notice of Final Agency Action

The Executive Director shall prepare a Notice of final Agency Action, after consultation with Counsel.

E. Notice of Withdrawal of Proposed Agency Action
If the decision is made not to follow the proposed agency action, a Notice of Withdrawal of Proposed Agency Action shall be prepared by the Executive Director.

F. Confidentiality

The Public Records Act requires that the TBEP make available to the public, upon proper demand, records of the TBEP. This may include disciplinary records such as reprimands and Notices of Proposed Agency Action. Supervisors are urged to keep any and all records pertaining to employee discipline as confidential as possible. No statements, written or verbal, should be made to anyone regarding the reasons for the discipline of a TBEP employee, unless such statement is made to a person with a genuine need or entitlement to have access to the information.

In the absence of clearance from Counsel, verbal statements of reasons for discipline should not be made to the employee's co-workers, or any other employee of the TBEP, the media, an attorney or other person claiming to inquire on behalf of the employee, or members of the public at large, including family members.
1.5 EMPLOYEE PERFORMANCE AND APPRAISALS

I. STANDARD: To provide a performance appraisal system that will give direct feedback from supervisors to employees, and to help the employee monitor his/her own performance level.

II. SCOPE: This standard applies to all employees of the TBEP.

III. GUIDELINES:

A. All performance evaluations are prepared by the employee's immediate supervisor. Each employee's performance should be evaluated in accordance with the following schedule.

1. Annual evaluation. Each employee's performance shall be evaluated annually and is to be completed at least 15 calendar days prior to the end of the TBEP’s fiscal year. Other evaluations will be performed as needed, for example, promotion, reinstatement, demotion of other personnel actions. The Executive Director will be evaluated by the Chairman of the Policy Board.

2. Six-month performance evaluation. A new employee will receive a performance appraisal in the seventh month of employment to evaluate job performance during the preceding six months. There will not be a merit pay increase associated with a six-month performance appraisal.

B. Employee performance evaluations shall be recorded on the Employee Performance Review Form, Attachment 1. The form can be obtained from the Program Administrator.

C. Employee performance evaluations are used for, but not limited to, the following purposes:

1. To inform the employee of strong and weak points and any improvements necessary.

2. To identify employee's annual goals.

3. To determine the employee's eligibility for salary increases.

4. As a basis for taking disciplinary action against the employee.

5. To assist in determining the order of layoff and reinstatement.

D. Employees shall be expected to meet or exceed supervisor's expectations.

E. If an employee received an evaluation which indicates the need for improvement, the Executive Director, in cooperation with the immediate supervisor, shall counsel the
employee and identify the improvement(s) necessary to meet expectations. If, at the
time of receiving such an evaluation, the employee is retained by the TBEP, the
employee's performance shall be evaluated as necessary and appropriate but not more
than 60 days thereafter until:

1. The employee's performance has improved and is evaluated at least meets
   expectation, or;

2. Three months have elapsed without meeting expectations. In such cases,
   management shall make a determination for further action.

F. After the rating has been finalized, the results shall be discussed with the employee
   who shall be furnished a copy of the completed rating, and shall sign a copy which
   shall be placed in the employee's personnel file.
1.6 EMPLOYEE PERSONNEL RECORD

I. STANDARD: To provide a central source for applicable employment related personnel data.

II. SCOPE: This standard applies to all TBEP employees.

III. REFERENCE: Chapter 119, Florida Statutes, Public Records Law

IV. GUIDELINES:

A. The Program Administrator is the official Custodian of Records for all personnel records.

B. An individual Personnel Record is created following new employee orientation and systematically maintained by the Program Administrator throughout the duration of employment. Further retention is in accordance with the established records retention schedule.

C. Chapter 119, Florida Statutes, Public Records Law makes all personnel records open to the public upon request with the exception of those records identified in Sections 119.071(4) and (5), Florida Statutes. All requests should be directed to the Program Administrator. The requests will be granted in a reasonable amount of time. When a personnel record is pulled for review per a request, the Executive Director or Program Administrator will stay with the record being reviewed.

D. Only the Executive Director or Program Administrator may add materials to the personnel records. For the purpose of copying, the same two staff may temporarily remove materials. No materials may be permanently removed from a personnel record.
1.7 TERMINATION

I. STANDARD: To provide guidelines for timely notification and termination procedures for reduction in force, resignation, retirement or dismissal.

II. SCOPE: This standard applies to all TBEP employees.

III. GUIDELINES:

A. Reduction in Force

An employee may be separated for such reasons as lack of work, lack of funds, and changes in mission. Employees affected by reduction in force shall receive not less than one month's written notice of termination of employment. Termination will be without adverse effect on the employee's eligibility for re-employment. In cases involving part-time employees, two weeks written notice will be provided.

B. Resignation

1. Professional personnel shall be required to submit written notice of resignation to the Executive Director at least two weeks prior to the effective date of such resignation, unless otherwise authorized by the Executive Director. Personnel are encouraged, but not required, to notify the Executive Director of their intent to resign prior to the required two-week notice.

2. Non-professional personnel shall be required to submit written notice of resignation to the Executive Director at least two weeks prior to the effective date of such resignation.

3. Failure to notify shall result in the loss of leave benefits. Failure to comply with items listed in the termination process shall result in withholding of leave benefits until all items are satisfied.

4. All fringe benefits cease on date of separation except for benefits required by law.

C. Termination Procedures

1. Terminating employee shall:

   a. Schedule an exit meeting with the Program Administrator.

   b. Complete all items on Employee Check-Out Form (Attachment 2) and return to the Program Administrator at exit interview.

   c. Contact TBRPC Accounting to make arrangements for repayment of outstanding travel advance, negative balance of cafeteria account,
outstanding computer purchase loan, or prepaid tuition for courses not successfully completed prior to termination.

d. Return any telephone or telephone cards, credit cards, or car rental cards to Program Administrator.

e. Contact Deferred Compensation Program representative directly regarding account, if a participant.

2. Program Administrator shall:

a. Send an Employee Termination Memorandum (Attachment 3) to terminating employee with appropriate forms attached.

b. Complete and route an Employee Pay Change Authorization Form, (Attachment 4).

c. Complete health insurance paperwork.

d. If termination is in conjunction with the employee's retirement under the Florida Retirement System, the Program Administrator will work with the employee to complete necessary paperwork.

e. Complete COBRA letter and paperwork.

f. Hold an exit meeting with terminating staff to collect ID card, keys, TBEP credit card(s), and finalize any exit paperwork.
1.8 DESIGNATION OF INTERIM EXECUTIVE DIRECTOR

I. STANDARD: To provide for an interim Executive Director in the event of a planned or unplanned absence of the Executive Director.

II. SCOPE: This standard applies to the Executive Director and his or her designee.

III. GUIDELINE:

The Executive Director shall designate an Interim Executive Director to perform the duties of the Executive Director in the event of a temporary leave of absence, either planned or unplanned, or an unplanned permanent absence.

In the event of an unplanned permanent absence, this designation shall remain in effect until the Estuary Program’s Policy Board appoints a new permanent Executive Director.
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2.1 TBEP STAFFING

I. STANDARD: To establish, maintain and administer an equitable staffing and pay plan to ensure that all employees are compensated equitably for the level of work being performed.

II. SCOPE: This standard applies to all TBEP employees.

III. GUIDELINES:

A. Introduction

The Tampa Bay Estuary Program Interlocal Agreement prescribes the authority for a staff of paid employees to carry out the will of the membership. The Policy Board employs and sets the compensation of the Executive Director. The Executive Director is authorized to then employ and discharge professional, technical and clerical staff as may be necessary to carry out the purposes of the TBEP.

This staffing system is the primary tool by which the Executive Director provides the staff support to carry out the business of the TBEP and is outlined yearly in the Annual Workplan. Its functions are: to assist in determining what kinds of jobs are needed to perform the work; to provide a framework for staff planning; to help keep Tampa Bay Estuary Program competitive in today's job market; and to provide a means for maintaining equity in work and pay relationships.

B. Purpose of the Staffing System

While the system is a functional tool for manpower planning, it has four major purposes. They are:

1. To ensure internal equity among the several positions within the TBEP. This is to ensure that each job is compensated fairly with relation to the other jobs in the TBEP.

2. To ensure external equity between the several positions in the TBEP and like positions in the market place. In order to retain and attract the kind of employees the TBEP wants, the compensation must be competitive in the labor market.

3. To establish a basis for recognizing and rewarding the contribution to the TBEP's success that each position makes.

4. To establish a basis for recognizing and rewarding each individual employee's contribution through their own individual effort.
2.2 HOURS OF WORK AND OVERTIME

I. STANDARD: To establish TBEP hours of work.

II. SCOPE: This standard applies to all TBEP employees.

III. GUIDELINES:

A. Hours of Work

Normal business hours of the TBEP are 8:30 a.m. to 5:00 p.m. Monday through Friday with a one-hour lunch period. All full-time employees (75 hours per pay period) are required to be present on their assigned jobs during the normal business hours, or arrange a flextime schedule if allowable as outlined below. Part-time employees are required to be present on their assigned job during the established work schedule. When necessary, the Executive Director will assign employees to lunch periods in order to maintain sufficient staff to perform all necessary work during the lunch period.

B. Flextime

Employees interested in working a flextime schedule should discuss the possibility of such an arrangement with the Executive Director. The Executive Director may allow employees to work flexible schedules where appropriate, but will deny flextime requests made by workers in jobs where such schedules would cause significant production or administrative problems. Employees on flextime schedules must maintain a schedule of 37.5 work hours per week.

C. Overtime Policy and Compensation

1. Exempt and Non-Exempt Employees

Exempt employees are those TBEP personnel whose positions are classified as exempt from provisions of the Fair Labor Standards Act (FLSA). All other employees are Non-Exempt.

2. Non-Exempt personnel will be compensated for overtime work.

3. Overtime compensation for Non-Exempt personnel will be according to the following schedule:

   37.5 - 40 hours per week - paid at regular hourly rate

   Over 40 hours per week - paid at 1-1/2 times regular hourly rate

4. Non-Exempt personnel working overtime will obtain prior authorization from the Executive Director to work overtime.
D. Compensatory Time

TBEP does not recognize payment for, or accrual of, compensatory time for Exempt personnel. When the employee is required to work on a designated holiday, evening, or on a weekend day, the employee will be provided with equal time off at the earliest practical date.

Employees shall record work on designated holidays, evenings or weekend days, and equal time off in the staff calendar.
2.3 HOLIDAYS

I. STANDARD: To establish a schedule of designated holidays when TBEP offices will be closed.

II. SCOPE: This standard applies to all employees.

III. GUIDELINES:

A. The following dates will be observed as holidays, and the TBEP offices will be closed whenever practical:

- New Year's Day: January 1
- Martin Luther King, Jr. Birthday: Third Monday in January
- Presidents' Day: Third Monday in February
- Good Friday: Friday before Easter Sunday
- Memorial Day: Last Monday in May
- Independence Day: July 4
- Labor Day: First Monday in September
- Veteran's Day: November 11
- Thanksgiving Day: Fourth Thursday in November
- Day after Thanksgiving: Friday following Thanksgiving
- Christmas Day: December 25

B. Holidays occurring on Saturday or Sunday:

When an authorized holiday occurs on Sunday, the Monday following shall be observed as a holiday. Should the holiday occur on Saturday, the preceding Friday shall be observed.

C. Additional Holidays

The Executive Director may also designate two (2) additional days during the year as paid holidays.

D. Holidays occurring during authorized leave

Employees who are on approved leave with pay when authorized holidays occur shall not have such days charged against their accrued leave credits.

E. Employees required to work on holidays

If the Executive Director deems that the TBEP's interest can best be served by an employee working on a holiday, such employee will be provided with equal time off at the earliest practical date.
F. Regular Part-time employees

Regular part-time employees who work 20 or more hours per week will be allowed to take holidays with pay on a pro-rata basis.
2.4 LEAVE

I. STANDARD: To outline the various types of leave provided to employees by the TBEP.

II. SCOPE: This standard applies to all TBEP employees.

III. GUIDELINES:

The rate of accrual of annual leave and sick leave for each employee as set forth in B. and C. below shall be based on the length of service with the Tampa Bay Estuary Program.

A. Leave Authorization

Any leave of absence, with or without pay, shall be approved subject to TBEP workload prior to the leave being taken, except in the case of emergency where the employee must be absent prior to receiving approval. Prior approval is obtained by requesting approval from the Executive Director via email or telephone call.

1. When prior approval cannot be obtained by the employee due to emergencies, the Executive Director shall take one of the following actions:

   a. Grant the employee leave with pay provided the employee has sufficient accrued leave credits to cover the absence; or,

   b. Grant the employee leave without pay if the employee does not have sufficient accrued leave.

   c. Consider the employee to have abandoned the position and resigned from the TBEP if the absence is for 3 consecutive workdays without notice.

2. If an employee's request for leave of absence is disapproved and the employee takes unauthorized leave, the Executive Director shall place the employee on leave without pay. After unauthorized leave of 3 consecutive workdays, it will be considered that the employee has abandoned the position and has resigned from the TBEP.

B. Annual Leave

1. Method of Earning Annual Leave

   a. Annual leave accrues to all full-time and regular part-time employees according to the following schedule.

      • 1 day per calendar month for up to 5 years of continuous full-time service (maximum 12 days a year)
1-1/2 days per calendar month for 5-10 years of continuous full-time service (maximum 18 days a year)

2 days per calendar month for over 10 years of continuous full-time service (maximum 24 days a year)

Regular part-time employees who work less than 37.5 hours per week for a period of time beyond six months will earn annual leave on a pro-rata basis.

Employees who work less than a full pay period due to initial employment, separation, or leave of absence without pay shall earn annual leave credits on a pro-rata basis.

b. During leave of absence with pay, annual leave credits will be earned.

c. Annual leave credit will not be earned during leave of absence without pay.

d. In order to provide employees with vacation and proper rest and relaxation, they shall be encouraged to use earned annual leave on a current yearly basis. In the event the earned annual leave is not used within the fiscal year, employees shall be allowed to carry over leave up to a maximum of 1-1/2 times the maximum allowed annual leave. Credit in excess of that amount will be automatically forfeited if not taken before September 30 of each year. Whenever the workload makes it impractical, a temporary waiver of forfeiture will be granted upon receipt of written justification from the employee.

2. Use of Earned Annual Leave

a. Annual leave shall be used to provide periodic vacation; however, earned annual leave credits may also be used for other personal leave.

b. Use of annual leave shall not be authorized prior to the time it is earned and credited to the employee.

c. Employees must request leave from the Executive Director for approval prior to taking leave. Approval will be based on the employee's workload.

d. Annual leave credits shall be used only in minimum increments of one-half hour.

f. Annual leave which has been used as a guarantee for sick leave shall not be taken prior to replenishment of sick leave in arrears. Effective
September 30 of each year all unreplenished sick leave will automatically be charged to annual leave.

g. Annual leave shall not be granted in conjunction with separation from service except where such separation is for long-term or terminal illness with documentation from employee's physician and is authorized by the Executive Director.

3. Payment for Earned Annual Leave upon separation from TBEP

a. An employee with 6 months of satisfactory continuous service who separates from the TBEP for any reason shall be paid for unused annual leave as of the date of separation. Such payment shall be made at the employee's current rate of pay at the time of termination.

b. An employee with less than 6 months continuous service who separates from the TBEP shall not be paid for unused annual leave except when separation is due to reduction in workforce.

c. In case of death of an employee, payment for unused annual leave at the time of death shall be made to the employee's beneficiary, estate, or as provided by law. Such payments shall be made at the rate of pay at the time of death.

C. Sick Leave

1. Method of Earning Sick Leave

a. All full-time employees shall earn sick leave at the rate of one day per calendar month.

b. After six months of continuous employment, regular part-time employees who work less than 37.5 hours per week will earn sick leave on a pro-rata basis.

c. Full time employees who work less than a full pay period due to initial employment, separation, or leave of absence without pay shall earn sick leave credits on a pro-rata basis.

d. During leaves of absence with pay, sick leave credits will be earned.

e. Sick leave credits will not be earned during leave of absence without pay.

f. There shall be no limit on the number of hours of unused sick leave an employee may accrue.
2. Use of Earned Sick Leave

a. The use of sick leave shall not be authorized prior to the time it is earned. When an employee has used all accrued sick leave and has accrued annual leave, approval to use unearned sick leave not to exceed the accrued annual leave will be granted by the Executive Director. Effective September 30 of each year all unreplenished sick leave will automatically be charged to annual leave.

b. Sick leave shall be authorized only for the following purposes:

1. Employee's personal illness, injury, disability, or after exposure to contagious disease.
   a. After 3 workdays of absence in any 30-day calendar period, TBEP shall require medical certification before authorizing any additional use of leave hours.
   b. After 20 consecutive workdays of absence, the employee must provide medical certification from the attending physician stating that employee is able to return to work and perform the regularly assigned duties, or that continued absence is medically necessary.

2. Employee's appointments with doctor, dentist, or other recognized practitioner when it is not possible to arrange such appointments during off-duty hours. Sick leave is authorized only for the time needed to attend the appointment.

3. Family medical leave as outlined in E.1-E.6 for illness or injury of a member of the employee's immediate family up to a maximum of 12 weeks in any calendar year. (The maximum number of days may be waived by the Executive Director upon receipt of documentation by a physician that the family member has a long-term or terminal illness.)

4. Notification of absence due to illness, injury, or death of a member of the employee's immediate family shall be given to the Program Administrator as early as possible on the first day of absence.

5. Sick leave shall not be granted in conjunction with separation from service except where such separation is for long-term or terminal illness with documentation from employee's physician and is authorized by the Executive Director.
3. Payment of Sick Leave

a. An employee with at least 5 but less than 10 years of continuous service who separates from the TBEP in good standing shall be paid one-quarter (1/4) of his/her accumulated sick leave. Payment not to exceed an amount equivalent to 4 weeks (150 hours) compensation.

b. An employee with 10 or more years of continuous service who separates from the TBEP in good standing shall be paid one-half (1/2) of his/her accumulated sick leave. Payment not to exceed an amount equivalent to 4 weeks (150 hours) compensation.

c. Such payment shall be made at the employee's current rate of pay within 60 days of separation.

d. Employees with less than 5 years of continuous service who separate from the TBEP shall not be paid for unused sick leave.

e. In case of death of an employee, payment for unused eligible sick leave (as provided in 3.a and 3.b) at the time of death shall be made to the employee's beneficiary, estate, or as provided by law. Such payment shall be made at the rate of pay at the time of death.

D. Administrative Leave

1. Court

An employee who is summoned for jury duty shall be granted administrative leave with pay, but will be paid only for the difference between the employee's wages and any jury fees paid by the courts to the employee. The TBEP shall not reimburse the employee for meals, lodging, and travel expenses incurred while serving as a juror.

2. Military Leave

An employee who is a member of the United States Armed Forces or National Guard who is engaged in training shall be entitled to administrative leave with pay, but will be paid only for the difference between an employee's regular wages and military pay during training exercises. Such leave with pay shall not exceed 240 working hours in any one calendar year. An employee who is called for active military service in the United States Armed Forces or National Guard shall receive leave with pay for 30 days. (reference F.S. 115.09 and 115.14).

3. Death in the immediate family

Death in the immediate family (three days per occurrence). Immediate family
is defined as the spouse, parents, children, spouse of children, grandparents, grandchildren, brothers or sisters, of both the employee and the spouse.

4. **Natural disasters**

Natural disasters and other emergency conditions necessitating closing the buildings in which TBEP offices are located.

E. **Parental Leave**

A regular part-time or full-time employee (female or male) who has satisfactorily completed six-months of employment shall, upon written request, be granted paid parental leave for a period of time not to exceed 12 weeks in a one-year period of time for the following reasons:

1. The birth of a child, or placement of a child for adoption or foster care. Foster care means 24-hour care. Parental leave can begin before birth or placement, but must be completed within 12 months of birth or placement and must be taken consecutively.

F. **Family Medical Leave**

A regular part-time or full-time employee who has satisfactorily completed six-months of employment shall, upon written request, be granted family medical leave without payment of salary for a period of time not to exceed 12 weeks in a one-year period of time for the following reasons:

1. Family medical leave can be taken to care for a spouse, a parent, a son, or daughter who has been certified with a serious health condition. Family medical leave for care of a spouse, parent, son or daughter may be taken intermittently or on a reduced work schedule basis not to exceed equivalent to a 12 week period of time.

2. Family medical leave can be taken because of an employee's own serious health condition that makes the employee unable to work or to perform any of the essential functions of the job. Family medical leave for employee's illness may be taken intermittently or on a reduced work schedule basis not to exceed equivalent to a 12 week period of time.

3. Employee's position, or an equivalent position, will be available upon return from Family Medical Leave.

4. Employee's benefits, i.e. health insurance, will continue through the period of time of the Family Medical Leave. Employee is responsible for payment of employee portion of health insurance premium.

5. Accrued annual leave and accrued sick leave shall be used in conjunction with Family Medical Leave under the following conditions:
a. Accrued leave with pay must be used first and Family Medical Leave without pay used last;

b. The combined leave period shall not exceed 12 weeks; and,

c. The Executive Director shall notify the employee in writing as to the period of leave to be granted, clearly specifying the date the employee returns to duty, identifying employer funded fringe benefits that continue, and that the employee will return to the same or equivalent position.

G. Leave of Absence Without Pay

An employee will, upon request, be granted leave without pay provided the Executive Director deems such leave to be justified and not detrimental to the operations of the TBEP. An employee shall not earn annual or sick leave credits while on this type of leave without pay.
2.5 PROFESSIONAL DEVELOPMENT

I. STANDARD: To encourage employee development through participation in job related education programs, workshops, training programs and professional organizations.

II. SCOPE: This standard applies to TBEP employees.

III. GUIDELINES:

A. Employees are encouraged to attend national or state conferences, conventions, symposia, or other organized activities to advance the employee's professional development and fulfill his/her job responsibilities, dependent upon available funding and staff assignment, with concurrence of the Executive Director.

1. To request approval for attendance at a conference, convention, symposium, workshop or other educational activity, employee must receive approval from the Executive Director via email prior to attendance.

B. The Executive Director may assign staff to attend conferences, symposia and meetings as a part of the employee's regular duties.

C. Tuition Payment Program

1. After completion of the first full year of continuous service, full time employees of the TBEP will be reimbursed for one course per school quarter that is beneficial to the TBEP and the individual's job.

   a. To be considered beneficial to TBEP, course work must maintain or improve skills required in the employee's job.

2. TBEP will reimburse up to 100% of the tuition fees, excluding books and supplies, following completion of an undergraduate or graduate level course with a grade of a B or better or satisfactory on a pass-fail system.

3. Travel time and/or course time may not be counted as hours of actual work.

D. The TBEP may pay for institutional memberships in technical and professional associations. The TBEP may pay for individual memberships when the association does not accept institutional membership or when individual membership provides economic advantage.

E. TBEP may pay fees required to complete review courses taken in preparation for professional certification and continuing certification. TBEP may pay fees for professional certification and continuing certification.
F. The Executive Director may require any employee to provide a summary report or briefing on any activity the employee has attended that was paid for by TBEP.

G. The Executive Director has final approval for all employee training and development applications.
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## BENEFITS

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3.1 MANDATORY BENEFITS

I. STANDARD: To provide assurance to employees that TBEP maintains all mandatory benefit coverage.

II. SCOPE: This standard applies to all TBEP employees.

III. GUIDELINES:

A. TBEP withholds and pays taxes as required under the Federal Insurance Contributions Act (FICA). FICA taxes pay for old-age, survivor, and disability insurance benefits (OASDI), as well as health insurance for the elderly and disabled. TBEP and employees pay an equal rate as prescribed by law.

B. TBEP maintains unemployment insurance as required by the Federal Unemployment Tax Act and the State of Florida unemployment insurance laws. TBEP participates in the state self-insured program.

C. TBEP maintains Workers Compensation Coverage which protects employees against income losses caused by job-related injuries or occupational disease.

1. In the event of any job-related injury or occupational disease, the employee should immediately notify the Program Administrator.

2. The Program Administrator will generate any accident report or any paperwork necessary.

3. Workers compensation benefits include:

   • medical benefits
   • temporary or permanent partial disability benefits
   • total disability benefits
   • survivor benefits
   • rehabilitation benefits
3.2 FLORIDA RETIREMENT SYSTEM

I. STANDARD: The TBEP participates in the Florida Retirement System (FRS) and contributes the state required percentage for all regular established positions regardless of the number of hours worked per week.

II. SCOPE: All regular part-time and full-time TBEP employees are participants in the Florida Retirement System.

III. GUIDELINES:

A. The Florida Retirement System (FRS) is a defined benefit plan, administered by the Division of Retirement for the State of Florida. The FRS is contributory for members with participating employers making contributions as established by the FRS. Membership in the FRS is compulsory for all regularly established part-time and full-time positions. Under the FRS, if you enrolled in the FRS prior to July 1, 2011, vesting occurs after six years of credible service, or eight years of service if you enrolled in the FRS on or after July 1, 2011. Refer to the FRS Handbook for options available at time of retirement. Current FRS benefits, rules and guidelines will always supersede any information that may become obsolete in this chapter.

As a member of the FRS, TBEP personnel are also covered for disability and survivor benefits.

Disability coverage is available for active members of the FRS Pension Plan and FRS Investment Plan. (Reemployed retirees of either plan with renewed membership and participants of the Deferred Retirement Option Program are not eligible for disability benefits.) To qualify for disability retirement under the FRS Pension Plan or FRS Investment Plan, the member must be totally and permanently disabled and be unable to work — that is, must be prevented by reason of a medically determinable physical or mental impairment from performing useful and efficient service as an officer or employee. The disabling injury or illness must have occurred or become symptomatic before the member terminated covered employment. An employee who is physically or mentally unable to continue performing in his/her present occupation, but is able to perform another type of work, will not qualify for disability benefits. As of July 1, 2001, to qualify for regular disability retirement, a member of either plan must have completed at least 8 years of creditable service, regardless of the other vesting requirements for his/her membership class or plan. Members are covered for in-line-of-duty disability from their first day of employment.

Refer to the FRS Handbook for more detailed information.
3.3 INSURANCE PROGRAMS

I. STANDARD: To outline the life, health, dental, and vision care benefits provided to eligible employees and their dependents.

II. SCOPE: Insurance eligibility is identified with each type of program.

III. GUIDELINES:

A. LIFE INSURANCE

TBEP provides life insurance with accidental death and dismemberment coverage to regular full-time employees who are scheduled to work at least 22.5 hours a week. Insurance commences following a thirty day waiting period. The amount of life insurance benefit is based on the following schedule:

<table>
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<th>Classification</th>
<th>Amount of Insurance Before Age 65</th>
<th>Amount of Insurance After age 65</th>
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<tr>
<td>Non-exempt</td>
<td>$15,000</td>
<td>$10,500</td>
</tr>
<tr>
<td>Exempt</td>
<td>$25,000</td>
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<td>Executive Director</td>
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Coverage ceases for an employee under this benefit provision on the date the employee terminates employment with the TBEP. Upon termination of employment, the employee may apply for and pay premiums for, an individual policy on his own life up to the employee's insured amount. The employee will be issued such individual policy without evidence of insurability.

B. HEALTH, DENTAL, AND VISION INSURANCE

TBEP makes available health, dental and vision care insurance benefits to eligible employees and their dependents through policies purchased from commercial insurers.

The health insurance benefits available will include coverage of hospitalization and surgical, as well as major medical, expenses incurred by workers (up to the limits specified and in accordance with the rules established in the applicable policies). All regular full-time employees who work at least 22.5 hours per week and their dependents are eligible for health insurance coverage. Premiums for the health insurance will be paid by the TBEP and the employee. The employees' contributions will be determined on an annual basis.

All regular part-time and full-time employees and their dependents are eligible for dental and vision care insurance following completion of one month of service. The premiums for dental and vision care are paid entirely by the employee.

Health, dental and vision care insurance regular coverage ceases at the date of termination of
an employee. However, the employee and eligible dependents become eligible for temporary continuation coverage at group premium rates as part of the Consolidated Omnibus Budget Reconciliation Act (COBRA) of 1986.
3.4 CAFETERIA/FLEXIBLE SPENDING PLAN

I. STANDARD: To inform employees of the opportunity to choose the benefits they receive from a "menu" of options offered through a cafeteria/flexible spending plan.

II. SCOPE: All regular full-time and part-time TBEP employees are eligible to participate in a cafeteria/flexible spending plan.

III. GUIDELINES:

The Cafeteria Plan is a tax savings for employees and is regulated by Internal Revenue Codes. The Plan consists of two reimbursement accounts: Dependent Care Reimbursement Account and Health Care Reimbursement Account. Each plan year employees have the option of deferring earned income into one or both of the reimbursement accounts by completing an annual Cafeteria Plan Election Form and Participation and Salary Reduction Agreement (Attachments 5 and 6).

Employees will be reimbursed approximately each quarter. Submit the Cafeteria Plan Incurred Expense Affidavit to the Program Administrator and the check for reimbursement will be received within three weeks following submission. The procedure to be followed for each account is as follows:

1. **Dependent Care Reimbursement Account** - Submit the Cafeteria Plan Incurred Expense Affidavit completed with the total amount of reimbursement requested, along with receipt(s) that clearly indicate the provider's correct name, social security number, period for which service was provided and amount of charge for the service. The receipt must be signed by the dependent care provider.

2. **Health Care Reimbursement Account** - Submit the Cafeteria Plan Incurred Expense Affidavit completed with the total amount of reimbursement requested, along with copies of receipts for all expenses included with the reimbursement request.

A qualified benefit is a benefit that does not defer compensation and is excludable from an employee’s gross income under a specific provision of the Internal Revenue Service Code, without being subject to the principles of constructive receipt. Qualified benefits include:

- Accident and health benefits (but not Archer medical savings accounts or long-term care insurance);
- Adoption assistance;
- Dependent care assistance;
- Group-term life insurance coverage;
- Health savings accounts, including distributions to pay long-term care services.

The current enrollment period and contract year is April 1st each calendar year. Employees that chose to participate are required to complete a participation agreement before the beginning of the contract year. Salary reductions will be established by TBRPC Accounting. The Program Administrator will submit a flex spending request to the plan administrator once
each quarter. At this time, employees are required to submit an expense affidavit with receipts for all authorized and qualifying expense. The Program Administrator will verify all employee claims and authorize the TBRPC to reimburse employees.
3.5 DEFERRED COMPENSATION

I. STANDARD: To inform employees of the tax-deferred program available.

II. SCOPE: All regular full-time TBEP employees are eligible to participate in the tax-deferred program.

III. GUIDELINES:

Deferred-compensation programs are authorized under Section 457(b) of the Internal Revenue Service Code. This plan is a tax-deferred supplemental retirement program that allows public employees to contribute a portion of their salary, before federal taxes, to a retirement account.

A. Participation in the deferred income program is on a voluntary basis.

B. Employees who choose to participate may authorize the TBEP to defer a portion up to 25% of their gross income (to a maximum allowable by the IRS) to the plan.

C. Employees may direct the investment of those funds to the retirement fund administrator.

D. Withdrawals from the tax-deferred compensation account can be made only for specified reasons, e.g., retirement, death, disability, separation from service, attainment of age 59 1/2.
3.6 HEALTH AND DENTAL/VISION CARE CONTINUATION NOTICE (COBRA)

I. STANDARD: To inform all TBEP employees and their dependents of their continuation of coverage rights.

II. SCOPE: Continuation coverage (COBRA) applies to any TBEP employee with health, dental, or vision insurance coverage.

III. GUIDELINES:

On April 17, 1986, a Federal law was enacted (Public Law 99-272, Title X) requiring that most employers sponsoring group health plans offer employees and their families the opportunity for a temporary extension of health coverage (called "continuation coverage") at group rates in certain instances where coverage under the plan would otherwise end. This notice is intended to inform employees, in a summary fashion, of their rights and obligations under the continuation coverage provisions of the new law. (Both employee and his or her spouse should take the time to read this notice carefully.)

If an employee of Tampa Bay Estuary Program (TBEP) is covered by TBEP’s current health insurance company, s/he has a right to choose this continuation coverage if s/he loses group health coverage because of a reduction in his or her hours of employment or the termination of employment (for reasons other than gross misconduct).

If the spouse of an employee is covered by TBEP’s current health insurance company, s/he has a right to choose this continuation coverage if group health coverage is lost under TBEP’s current health insurance company for any of the following four reasons:

1. The death of a spouse;
2. A termination of a spouse's employment (for reasons other than gross misconduct) or reduction in spouse's hours of employment;
3. Divorce or legal separation from a spouse; or
4. Spouse becomes eligible for Medicare.

In the case of a dependent child of an employee covered by TBEP’s current health insurance company, s/he has the right to continuation coverage if group health coverage covered under TBEP’s current health insurance company is lost for any of the following five reasons:

1. The death of a parent;
2. The termination of a parent's employment (for reasons other than gross misconduct) or reduction in a parent's hours of employment with TBEP;
3. Parent's divorce or legal separation;
4. A parent becomes eligible for Medicare; or
5. The dependent ceases to be a "dependent child" under TBEP’s current health insurance company.

The employee or a family member has the responsibility to inform the Program Administrator of a divorce, legal separation, or a child losing dependent status under TBEP’s current health
insurance company. TBEP has the responsibility to notify the current health insurance company of the employee's death, termination of employment or reduction in hours, or Medicare eligibility.

When the Program Administrator is notified that one of these events has happened, s/he will in turn notify the employee of the right to choose continuation coverage. The employee has at least 60 days from the date coverage would have been lost because of one of the events described above, to inform the Program Administrator that continuation coverage is wanted.

If continuation coverage is not chosen, group health insurance coverage will end.

If continuation coverage is chosen, TBEP is required to give the employee coverage which is identical to the coverage provided under the plan to similarly situated employees and/or family members. Continuation of coverage is available for 18 months, 29 months, or three years, length of time dependent on qualifying event. However, continuation coverage may be cut short for any of the following five reasons:

1. TBEP no longer provides group health coverage to any of its employees;
2. The premium for continuation coverage is not paid;
3. Employee becomes covered under another group health plan;
4. Employee becomes eligible for Medicare;
5. Spouse of a covered employee is divorced and subsequently remarries and is covered under the new spouse's group health plan.

Proof of insurability is not required for continuation coverage. However, under the new law, premium for continuation coverage are to be paid by the employee (or spouse) with the continuation coverage. The new law also says that, at the end of the 18 months or three year continuation coverage period, an individual conversion health plan provided under TBEP’s current health and dental plans must be offered.

This law applies to TBEP’s current health and dental plans beginning on July 1, 1986 under Section 10002(d) of COBRA. Questions about the law should be directed to the Program Administrator. If any changes in marital status, or address, please notify the Program Administrator.
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4.1 ACCESS TO PUBLIC INFORMATION

I. STANDARD: To provide access to all public records.

II. GUIDELINES:

TBEP permits all public records to be inspected and examined in accordance with Chapter 119, Florida Statutes, by any person requesting to do so, at any reasonable time, under reasonable conditions, and under supervision by the custodian of the public record or his/her designee.

In accordance with Florida law, all TBEP records shall be open for inspection and copying by any person desiring to do so at any reasonable time, under reasonable conditions, and under supervision by the custodian of the public records, with the exception of exempted or confidential material identified by Florida law. The Program Administrator is the official custodian of TBEP public records.

―Public Records‖ means all documents, papers, letters or other material, regardless of the physical form, characteristics, or means of transmission, made or received, pursuant to law or ordinance or in connection with the transaction of official business which is intended to perpetuate, communicate, or formalize knowledge of some type. Public records also include any TBEP business-related materials generated from employee-owned equipment whether or not those materials are logged on the TBEP server.

―Exempt Public Records‖ are those which are specifically excluded by law from public inspection and copying, and include for example:

- Social security numbers
- Medical records or a prospective current or former employee
- Home addresses and phone numbers of certain current and former public officials, public employees and members of their family (law enforcement, fire fighters, prosecutors and public defenders, judges, HR personnel, tax collectors,)
- Public building plans, blueprints, drawings
- Security assessments and security plans
- Trade secrets and proprietary information
- Economic development inquires
- Preliminary audits while in draft
- Certain emergency contact information
- Drafts of documents or notes that are not intended to communicate or perpetuate formal action
- Sealed bids or proposals until agency issues intent to award or within 10 days of bid opening, whichever is earlier
- Financial statements submitted in response to a bid, RFP or RFQ
- Employee bank account numbers, credit card numbers, deferred compensation records, direct deposit information, drug test results, medical information
- Criminal justice intelligence and active investigation information
- Law enforcement investigatory files
- Whistle blower identity
• Complaints of discrimination based on race, sex, national origin, handicap, etc. until probable cause is found or investigation becomes inactive
• Complaint of misconduct filed with an agency against an agency employee while the complaint is under investigation
• Direct access to an agency’s electronic database
• Date processing software obtained under a licensing agreement or that qualifies as a trade secret
• Data processing software developed and copyrighted by an agency

Note that the law only applies to existing documents. The law does not require a custodian of public records to create a record in response to a request (but may do so at their discretion).

A. PUBLIC RECORD REQUEST PROCEDURE

1. A public record request can be submitted by phone, e-mail, regular mail, or in person. The person requesting a public record is not required to show any identification or provide a reason or justification for the request. A written request is not required by law and cannot be required by the agency. A public record request may be submitted to and received by any member of the TBEP staff.

2. When a public record request is received, the Program Administrator shall be promptly informed and shall keep a record of each request with the following information: contact information of the person making the request (if provided), date received, nature of request, date completed (if applicable), and amount of fee charged (if applicable). Upon being notified of a public record request, the Program Administrator shall promptly notify Counsel of the request so that it can be determined if any exemption applies.

3. Unless the request clearly specifies, the Program Administrator shall determine if the request is for inspection of records or for copying of records.

4. "Readily available documents" are those that are regularly distributed to the public and do not need to be reviewed in order to determine whether the documents contain exempt information. Readily Available Documents should generally be provided within 3 business days of receipt of the request. Such records include, but are not limited to: meeting minutes, meeting agenda and materials, contracts, agreements, approved budget, final reports. There should not be any charge for labor for retrieving the Readily Available Documents for inspection, but for any copies provided to the requestor, a charge will be imposed as set forth below.

5. Requests for "Non-Readily Available Documents" shall be handled as follows:
a. If the volume of public records requested to be inspected and/or copied is such that it requires extensive use of information technology resources or involves extensive clerical or supervisory assistance by personnel, agents or representatives of the TBEP, or both, the TBEP will charge, in addition to the actual cost of duplication, a "Special Service Charge", which shall be reasonable and shall be based on the cost incurred for such extensive use of information technology resources or the labor cost actually incurred by the TBEP for the personnel providing the service. Extensive means that it will take more than thirty (30) minutes to locate, review for confidential information, copy, and refile the requested public records and also includes the time, if any, for clerical personnel to remain with all individual inspections of public records to ensure that no records are altered, destroyed or removed. The Special Service Charge will be computed to the nearest quarter of an hour exceeding fifteen (15) minutes based on the current rate of pay, including wages, overtime, the employer portion of federal and state payroll taxes, unemployment compensation taxes, workers compensation insurance, retirement plan contributions and health insurance costs for the person who performed the service and will be charged regardless of whether any copies are made and regardless of the number of individual copies made. No charges, other than duplication costs, will be assessed if the request takes less than thirty (30) minutes to locate, review for confidential information, copy and also includes the time, if any, for clerical personnel to remain with an individual inspecting public records to ensure that no records are altered, destroyed or removed.

b. The Program Administrator shall notify the requestor of the estimated cost and anticipated time frame to complete the request, and confirm with the requestor that the TBEP must be paid in advance of the requestor’s receipt of the records.

c. For large requests involving more than one hour of staff time and/or more than $50.00 for copying charges, the TBEP may require an advance deposit of 50% prior to beginning retrieval and/or copying.

d. Non-Readily Available Documents should generally be provided within 6 business days of receipt of the request.

6. Records should be provided electronically whenever possible, unless the requestor asks for hard copies.

7. Requests for documents that may contain information that is exempt from disclosure under Florida law may be delayed until the record can be reviewed and redacted as necessary.
8. All requests for public records from the media or from public officials shall be handled consistently with the procedures outlined herein.

B. CHARGES FOR PUBLIC RECORDS

1. One sided copy of records no more than 8.5 by 14 inches – 15 cents per page.

2. Two sided copy of records no more than 8.5 by 14 inches – 20 cents per two-sided copy.

3. For all other copies – actual cost of reproduction.

4. Certified copies of records - $1.00 per page for the certification plus applicable copying charge.

Extensive use of information technology or staff time – cost of reproduction plus a service charge which shall be reasonable and shall be based on the cost incurred to make copies or actual labor costs incurred for record retrieval, copying and/or supervision during record inspection.
AMERICANS WITH DISABILITIES ACT (ADA)

I. STANDARD: To inform staff of the provisions of the Americans with Disabilities Act of 1990 (ADA) and to provide a format for requesting reasonable accommodation and filing a grievance if an alleged violation of the act occurs.

II. SCOPE: This standard applies to all TBEP employees, applicants, and general public requesting public services, public accommodation, or telecommunication.

III. GUIDELINES:

A. General

1. The ADA (Title 42, U.S. Code, Section 12101, et seq.) prohibits discrimination against individuals with disabilities in employment, public services, public accommodations, and telecommunications.

2. ADA's employment provisions require employers to extend equal opportunities in all aspects of employment including hiring, advancement, compensation, and training, to individuals with disabilities. The law requires employers to provide reasonable accommodations for persons with disabilities who are otherwise qualified for the job. This requirement does not apply if: (1) making the accommodation poses an "undue hardship" on the employer; or (2) the individual poses a direct threat to the health or safety of others in the workplace. Persons who can perform the "essential functions" of a job, with or without reasonable accommodation, are considered qualified and protected from employment discrimination under the law.

B. TBEP Organization for ADA Compliance

1. TBEP has designated the Program Administrator as the ADA Coordinator. The ADA Coordinator shall be responsible for ADA compliance. In the absence of the Program Administrator, the Executive Director shall serve as the ADA Coordinator.

2. To assist in ADA compliance, a representative shall be appointed from each department. The department representatives may make recommendations and suggestions in determining reasonable accommodations.

3. Equal opportunity notices, including reference to ADA, shall be posted in accessible locations. A copy of TBEP's notice of nondiscrimination on basis of disability is included as Attachment 12.

C. Request for Reasonable Accommodation

1. An employee, applicant, or member of the general public requesting public services, public accommodation, or telecommunication who due to a disability,
requires reasonable accommodation in their employment, to include on-the-job training, advancement and wages, benefits or reasonable accommodation for public meetings or telecommunication, should contact the ADA Coordinator. The ADA Coordinator will assist that person in determining the necessary accommodation.

2. TBEP will provide reasonable accommodation unless it would become an undue hardship. If the undue hardship does not allow for the requested accommodation, or if the person making the request for accommodation perceives the TBEP practice to be discriminatory under the ADA, they may file a grievance as outlined below in the ADA Grievance Procedure.

D. ADA Grievance Procedure

1. A grievance is an alleged wrong to a person, either real or imagined, which causes the person to feel discriminated against on the basis of disability with some aspect of employment practices, the programs, activities or services of TBEP. The following procedure has been established to provide for prompt and equitable resolution of complaints alleging any action prohibited by the U.S. Department of Justice regulations implementing the ADA.

   a. Report the situation to the ADA Coordinator within ten (10) working days of the incident on which the grievance is based. The ADA Coordinator will reply within (5) days and will simultaneously report the incident and all relevant facts directly to the Executive Director.

   b. If the person feels that the above action has not resolved his/her grievance, the person shall put the grievance in writing and present it to the Executive Director within ten (10) working days. The Executive Director shall respond to the grievance within ten (10) working days.

   c. It is anticipated that most problems will be resolved by one or both of the above procedures. However, if not, the person may resubmit the written grievance to the Executive Director who, upon hearing all parties shall issue the final administrative ruling on the issue. The Executive Director's ruling may be appealed to the Department of Justice.

   d. Also, any person who has a complaint that discrimination on the basis of disability exists in employment, programs, activities, or services of TBEP may notify the Department of Justice. A complaint may be filed by email at ADA.gov, or by mail at US Department of Justice, 950 Pennsylvania Avenue, NW
   Civil Rights Division, Disability Rights Section – 1425 NYAV
   Washington, D.C. 20530.

   e. Letters of complaint should explain: who was discriminated against; in what way; by whom or what institution; when the discrimination took
place; who was harmed by the discriminatory act; who can be contacted for further information; the name, address and telephone number of the complainant; and as much background information as possible. These are suggestions, not requirements. However, the Department of Justice can move more efficiently if it is well-informed. Citizens may ask the above offices for help in writing a complaint.

f. The ADA Coordinator shall maintain the files and records relating to complaints filed.

g. TBEP will not retaliate against any person because they made a charge, testified, assisted, or participated in any manner in an investigation, proceeding, or hearing.
4.3 CODE OF STANDARDS OF CONDUCT

I. STANDARD: To provide a standard of conduct for all TBEP employees, officers or agents.

II. GUIDELINES:

In accordance with the Code of Federal Regulations (41 CFR 31.36) and Chapter 112, Part III, Florida Statutes, no employee, officer or agent of the Tampa Bay Estuary Program (TBEP), or any board or committee representing TBEP shall participate in the selection, or in the award or administration of a contract supported by Federal or state funds if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when a TBEP employee, officer or agent; any member of his/her immediate family; his/her partner; or an organization which employs or is about to employ, (or any of the aforementioned persons) has an interest in any firm being considered or selected for award.

The TBEP shall not knowingly issue a request for service where there is evidence of a conflict of interest. In instances where a conflict may exist, the employee shall refer the matter to the Executive Director. In the event the possible conflict involves the Executive Director, the matter shall be referred to the Policy Board of the TBEP.

Declared Policy of the State Applicable to TBEP Employees
- No officer or employee shall have any interest (financial or otherwise, direct or indirect), engage in any business transaction or professional activity, or incur any obligation of any nature which is in substantial conflict with the proper discharge of his or her official duties
- Public officers and employees hold their positions for the benefit of the public and are bound to
  o Uphold the federal and state constitutions
  o Perform efficiently and faithfully their duties under the law
  o Observe in their official acts the highest standards of ethics regardless of personal considerations
  o Recognize that promoting the public interest and maintaining respect of the people in their government must be of foremost concern

Prohibited Conduct
- Solicitation or Acceptance of Gifts and Unauthorized Compensation – receipt or giving of “anything of value” if it will influence vote, official action or judgment
- Doing Business with One’s Agency – purchase, rent or lease goods or services for one’s own agency from any business of which the employee, spouse or child is an officer, partner or director
- Misuse of Public Position – obtaining a special benefit or exemption for yourself
- Conflicting Employment – being employed by or having a contractual relationship with a business entity that is regulated by or does business with your own agency
- Disclosure or Use of Certain Information – information not available to the general public used for personal gain or benefit
• Employment of Relatives – appoint, employ, advance or advocate for a relative in any agency in which one exercises supervision or control
• Post-Employment Restrictions – lobbying on behalf of another person or entity for compensation before the agency for which you were employed for 2 years after leaving that agency (senior management service or selected exempt service, other employees who were in the career service on July 1, 2001).

Proposal reviewers will be asked to complete and sign a Code of Standards of Conduct form (Attachment 7), certifying that they have no conflict of interest with any of the Request for Proposals respondents.
4.4 DRUG-FREE WORKPLACE

I. STANDARD: The Tampa Bay Estuary Program (TBEP), as an organization covered by the Drug-free Workplace Act of 1988 (PL 100-690, Title V, Subtitle D.) and concerned with the effects of controlled substance on employees, is declared to be a drug-free workplace. The following guidelines shall be strictly enforced to protect the TBEP's status as a responsible source for the award of federal contracts:

II. GUIDELINES:

A. Employees are expected and required to report to work on time and in appropriate mental and physical condition for work. It is the TBEP's intent and obligation to provide a drug-free, healthful, safe, and secure work environment.

B. The unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance on TBEP premises or while conducting TBEP business off TBEP premises is absolutely prohibited. Violations of this policy shall result in disciplinary action, up to and including termination for a first offense, and may have legal consequences. A controlled substance is a chemical substance that affects the user's feelings, perceptions and behavior. The chemical substances include narcotics, sedatives, alcohol, stimulants, marijuana, inhalants, hallucinogens and phencyclidine.

C. Employees have the right to know the dangers of substance abuse in the workplace, the TBEP's policy about them and what help is available to combat substance abuse problems. This document spells out the TBEP's policy. The following help may be available for combating substance abuse problems:

- Counseling Programs
- Information on community resources for assessment and treatment
- Medical benefits for substance abuse treatment

D. Employees must, as a condition of employment, notify the Executive Director of any conviction (including pleas of guilty or nolo contendere) within five days of the conviction occurring. Failure to so inform the TBEP shall result in severe disciplinary action, which may include termination for the first offense. By law, the TBEP shall notify the federal contracting officer at EPA Region 4 within 10 days of receiving notification from an employee or otherwise receiving notice of such conviction.

E. Effective October 1, 1998, pre-employment and probable cause urine drug screening of all employees shall be used to encourage abusers to stop on their own, if possible, or seek professional help, if necessary. Probable cause screening shall be implemented in the event of any accident during work hours; the smell of alcohol; or reporting to work or remaining at work in apparently unfit condition. All screening information shall be treated in a confidential manner.

F. In cases of confirmed controlled substance use, sale or possession on or off TBEP premises, appropriate disciplinary measures shall be taken, up to and including
immediate discharge.

G. Law enforcement officials will be notified for procedural consultation whenever illegal controlled substances are found.

H. All employees must sign and return to the Program Administrator a Drug Free Workplace Program Certificate and Agreement (Attachment 8) to acknowledge they have been informed of the above policy and agree to abide by it in all respects. By law, such acknowledgment of agreement is required as a condition of continued employment.

J. Any employee violating the terms of this policy statement is subject to immediate dismissal. Employees found to be abusing substances, but not convicted of any drug statute violation, shall be subject to progressive discipline and required to satisfactorily participate in a rehabilitation program approved for such purpose at the employee's expense.

III. ADMINISTRATIVE PROCEDURES:

Tampa Bay Estuary Program (TBEP) considers controlled substance screening, such as urinalysis and blood tests, to be a part of an overall program to prevent those controlled substances from entering the workplace. The TBEP maintains that the working environment is safer and more productive without the presence of controlled substances.

A. ORIENTATION

All new employees shall receive oral and written orientation on the TBEP's Drug Free Workplace Program, as well as chemical screening, before beginning work. Each employee shall be required to complete and sign the Drug Free Workplace Program Certificate and Agreement to signify their understanding and willing participation with the provisions of this policy.

B. PROBABLE CAUSE SUBSTANCE SCREENING

All employees of the TBEP are subject to probable cause substance screening whenever an employee is or has recently been involved in an accident during working hours, smells of alcohol or reports to work in apparently unfit condition.

C. STEP-BY-STEP PROCEDURE

1. Suspicion of use of a controlled substance:
   a. The immediate supervisor of a suspected employee or any employee having any accident during work hours shall contact the Program Administrator or the Executive Director.
b. The Program Administrator and/or the Executive Director shall question the employee privately about the matter.

c. Following the interview, the Program Administrator shall schedule a urinalysis at the designated laboratory facilities. The TBEP shall pay for the screening. Employees refusing to take the screening test shall be discharged.

d. If results of the urinalysis are positive, the Executive Director shall inform the employee privately, and if this is a first offense the employee shall be referred to a treatment program at the employee's expense. The cost of the treatment shall be eligible for reimbursement upon one year of being substance free. If this is a second offense, the employee shall be discharged.

2. Suspicion of sale, possession or purchase of a controlled substance:

a. Suspected employee's immediate supervisor shall contact the Program Administrator or the Executive Director.

b. With reasonable cause to believe the employee possesses a controlled substance, and with a witness, the Program Administrator and/or Executive Director shall attempt to confiscate those items from the employee.

c. If the investigation produces a suspicious substance, the Executive Director shall counsel the employee about the potential effect on performance and job safety. The employee shall be suspended without pay pending an analysis of the substance confiscated.

d. The suspicious substance shall be delivered immediately to the designated laboratory facility for testing. Safeguards shall be taken to assure the suspicious substance from the point of confiscation to the laboratory that will be analyzing the substance.

e. If the substance is found to be illegal, the Executive Director shall turn over the confiscated substance to the local authorities for proper disposal and obtain a receipt from the authorities, and the employee responsible for illegal substances shall be discharged.

D. EMPLOYEE ASSURANCES

1. Specifically Prohibited Substances of Abuse and Threshold Limits:
The specifically prohibited substances and corresponding threshold concentration maximum limits prohibited by this Policy are identified in the current Federal 5 Panel Drug Screening listing and made a part hereof by reference. In the event the list of prohibited substances is altered by additions, deletions, or modifications, employees shall be notified far enough in advance of authorizing any screening tests to detect same to allow time for affected employee(s) to come into compliance and any significant bodily concentrations to be eliminated.

2. Method of Determining Substance Abuse:

In the absence of witnesses or the employee's admission of usage, the determination as to whether an employee has violated the terms and conditions of the Drug Free Workplace Policy shall be made by assaying the employee's urine (or blood serum, if preliminary breath alcohol screening indicates alcohol is present) followed by a confirming test if presumptively positive results of the urine screening test are obtained.

Screening tests shall be administered by a Drug Screening Contractor designated by and at the expense of the TBEP. The Drug Screening Contractor shall be staffed by licensed physicians, nurses, qualified lab technicians and professionally trained attendants and counselors. The Drug Screening Contractor shall be capable of handling all aspects of the drug screening program including administration, specimen collection, testing and/or referrals to other certified labs, providing confirmation testing and reporting results through qualified Medical Review Officer(s) (MRO).

Chain-of-custody procedures, which are important legal safeguards to assure the integrity of urine specimens from the point of collection through lab testing and reporting, will be maintained by the Drug Screening Contractor. This may necessitate specimen collection to be witnessed by same-gender medical personnel.

Prior to conducting testing, the Drug Screening Contractor will require employees to provide Relevant Personal History Information and sign an Abused Substance(s) Screening Authorization certifying the accuracy of information provided and authorizing testing. Upon completion of the collection process, examinees will be required to verify their specimen has been properly secured and identified.

A negative screening test result shall be accepted as proof the examinee has not abused the substance(s) assayed. A positive screening test results shall be interpreted as presumptive proof the examinee has abused the substance(s) assayed. A positive finding shall not be concluded however, unless the examinee admits to have abused the substance or, in the absence of such an admission, until and unless a second and more specific confirmation test also produces a positive result.
3. Confirming Test Methodology:

In the event of a positive screening test result, the employee shall be contacted by the MRO, if possible, to determine if previously undisclosed prescription(s) may account for the positive screening results. In the absence of a legitimate, verifiable prescription or other acceptable explanation, and if the employee denies substance abuse, a portion of the original specimen, still under chain-of-custody, will be submitted for confirmation testing. The remainder of the specimen shall be frozen and securely maintained in the original container for up to 12 months following collection by the Drug Screening Contractor or testing laboratory for reconfirmation testing, if requested.

GC/MS (gas chromatography/mass spectrography) will be used as the confirmation method because its specificity permits distinguishing substances of abuse from structurally similar compounds. If the GC/MS result confirms substance abuse and the examinee continues to deny use, a re confirmation test on a further portion of the remaining specimen may be ordered at the employee's expense to be performed by any commercially licensed laboratory using testing methodology mutually acceptable to the employer and the employee.

4. Disciplinary or rehabilitative actions

No disciplinary or rehabilitative actions shall be initiated by the TBEP until the results of all screening, confirmation, and reconfirmation testing (if requested) are reported as positive. The cost of reconfirmation testing, ordered by the employee, shall be reimbursed by the TBEP only if negative.

E. INSTRUCTIONS FOR DRUG TESTING

Drugs tests for employment with Tampa Bay Estuary Program are administered at several locations throughout the area. Current locations are available from the Program Administrator.

**The Tampa Bay Estuary Program requires a 5 panel drug screen.**

Attachments 8 and 9 include TBEP’s Drug Free Workplace Program Certificate and Drug Free Consent agreements.
4.5 WORKPLACE SMOKING

I. STANDARD: It is the intent of the Tampa Bay Estuary Program (TBEP) to maintain a smoke-free work place.

II. PURPOSE: To protect the health of all employees, avoid conflicts between smoking and nonsmoking workers, and ensure accommodations for nonsmokers' preferences when necessary.

III. GUIDELINES:
   A. In accordance with state law, smoking is prohibited in all indoor areas at all times.
   B. Smoking is permitted only in designated outdoor locations.
   C. Violators of the no-smoking policy are subject to disciplinary action as determined by the Executive Director.
4.6 TELEWORKER POLICY

I. STANDARD: It is the intent of the Tampa Bay Estuary Program (TBEP) to maintain a Teleworker Policy.

II. PURPOSE: To allow for increased productivity, reduce fuel usage, reduce greenhouse gas emissions, and set an example as an environmental organization.

Teleworking is the concept of working from home generally on a part-time basis. Teleworking is not a formal, universal employee benefit, rather an alternative method of meeting the needs of the TBEP. TBEP has the right to refuse to make teleworking available to an employee and to terminate a teleworking arrangement at any time. Employees are not required to telework and may refuse to telework if the option is made available.

TBEP’s policies for teleworking are as follows:

1. Compensation and Work Hours

The employee’s compensation, benefits, work status and work responsibilities will not change due to participation in the teleworking program.

The amount of time the employee is expected to work per day or pay period will not change as a result of participation in the teleworking program.

Employees may be allowed to telework to a maximum of 6 full days per month. Additional time in excess of the monthly maximum will need prior approval from the employee’s supervisor.

2. Eligibility

Successful teleworkers have the support of their supervisors. Employees will be selected based on the suitability of their jobs, an evaluation of the likelihood of their being successful teleworkers, and an evaluation of their supervisor’s ability to manage remote workers.

3. Equipment/Tools

Teleworkers are expected to have their own equipment at home. The Executive Director will determine on a case-by-case basis, based on information shared by the employee, the appropriate equipment needs (i.e. hardware, software, etc.) for each telecommuting arrangement.

Equipment supplied by the employee, if deemed appropriate by TBEP, will be maintained by the employee. The Employer accepts no responsibility for damage or repairs to employee-owned equipment. The TBEP reserves the right to make determinations as to appropriate equipment, subject to change at any time.

Public records include any TBEP business-related materials generated from employee-owned equipment whether or not those materials are logged on the TBEP server.
4. Worksite

The employee shall maintain his/her home worksite in a safe condition, free from hazards and other dangers to the employee and equipment.

5. Office Supplies

Office supplies will be provided by TBEP as needed. Out-of-pocket expenses for other supplies will not be reimbursed unless by prior approval of the employee’s supervisor.

6. Worker’s Compensation

Teleworkers are covered by worker’s compensation during working time and while performing work functions at the designated home worksite.

7. Liability

TBEP assumes no liability for injuries occurring in the employee's home workspace outside the agreed-upon work hours as well as whenever the employee is not performing employer related duties, and the employee agrees to hold TBEP harmless for any such claims. This includes family members, visitors, or others that may become injured within or around the employee’s home.

In order to minimize TBEP’s exposure to worker’s compensation claims, telecommuters may not conduct employer related business meetings in their homes. If a meeting is scheduled on an employee’s telecommuting day, the employee must go to the office to attend the meeting or make other arrangements, such as teleconferencing.

8. Dependent Care or Sick Leave

Teleworking is not a substitute for dependent care or family sick leave. Teleworkers will not be available to and will not provide dependent care during teleworker hours.

9. Accrued Leave

Teleworking is not a substitute for annual leave or sick leave.

10. Income Tax

It will be the employee’s responsibility to determine any income tax implications of maintaining a home office area. TBEP will not provide tax guidance nor will TBEP assume any additional tax liabilities. Employees are encouraged to consult with a qualified tax professional to discuss income tax implications.

11. Communication

Employees shall be available at all times by phone and email during core hours or as otherwise
deemed necessary. Participants must attend staff meetings, and other meetings deemed necessary by management which are held at the TBEP office.

TBEP will pay for reasonable work-related long distance charges.

12. Evaluation

The employee shall agree to participate in all studies, inquiries, reports and analyses relating to this program.

The employee remains obligated to comply with all other TBEP rules, practices and instructions.
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## PROCEDURES

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5.1 INTERNAL RECORDS PROCEDURES

TBEP has filed and stored required internal records electronically since 2001. TBEP maintains an on-site server. All files on the TBEP server are copied to an on-site backup system once a month, and off-site (cloud-based) backup every three months. Records maintained electronically including but not limited to the following:

- Business emails
- Contracts
- Management and Policy Board agendas, minutes, recordings
- Scientific documents, research, data, publications
- Outreach publications and campaign material

TBEP maintains hard-copy records including but not limited to the following:

- Original documents establishing TBEP
- Administrative records and personnel records
- Banking records and documents

A number of historic TBEP records are stored off-site at U-Haul Storage Pinellas Park, 4015 Park Blvd., Pinellas Park, (727) 545-1723. Access to the center is from 8:00 a.m. to 5:00 p.m. Access keys and code must be obtained from the Program Administrator. TBEP records consist of the following types of materials, all of which are required by State law to be retained for a prescribed length of time. No records shall be disposed of without the consent of the Program Administrator.

- **Files** - correspondence, memorandums, reports, etc.
- **Computer Printouts** - Information relating to accounting, projects and general operating.
- **Minutes and Agendas** - Official
- **Canceled Checks** - All Accounting generated
- **Purchase Orders and Invoices** - Filed in various ways (numerically, vendor, date generated).
- **Contracts, Leases and Agreements** - Legal documents, correspondence, reports, etc.
- **Desk Calendars and Appointment Books** - Official daily appointments and meetings.
- **Employee Records** - Employee’s personnel files and attendance and leave records.
- **Feasibility Study Records** - Working papers, correspondence, consulting firm reports, etc.
- **Federal Project Files** - Originally approved project contracts, etc.
- **Grant Files** - Material subsequent to application for and/or expenditure of grant funds.
- **Procedural Records** - Internal written instructions.
- **Policies** - Official courses of action for a particular situation.
5.2 STAFF TRAINING

Supervisors may identify and request staff to attend a training or workshop that would be beneficial to staff in performing his/her duties.

Additionally, TBEP may schedule training/workshops for all staff participation. When such sessions are scheduled the training will be mandatory.

TBEP will pay for such training.
5.3 TELEPHONE PROCEDURES

1. General phone procedures

   A. All incoming calls shall be answered primarily by the Program Administrator and directed to the proper person. All staff are encouraged to assist the Program Administrator in answering calls during heavy call traffic or when she/he is not in the office.

   B. When an extension has rung several times and is not answered, it will transfer to the TBEP Voice Mailbox to allow caller to leave a message.

   C. If the person being called is not available, the caller should be given the option to leave a voice message.

2. Local outgoing calls

   A. TBEP has local telephone lines which are to be used for all local calls including Tampa. A local line is accessed by dialing “9”. The “9” access code should not be used for placing long distance calls outside the (727) area code.

3. Long distance calls

   A. TBEP participates in the State of Florida SUNCOM long distance call system and shall be used for all long-distance calls. SUNCOM is accessed by dialing “8”.

      - Dial 8
      - Await dial tone
      - Dial 1-area code-7 digit number

   B. Long distance conference calls can be set up SUNCOM. To set up a SUNCOM conference call, notify all call participants of the date and time of the call, the dial-in number, and the conference code. The TBEP Staff person organizing the call must initiate the call. To do this, call the dial-in number, enter the conference code, and when prompted enter the leader PIN Number. **Never give a non-TBEP person our PIN number as this will allow them to make long distance calls charged to the TBEP account.**

4. Cell phones

   A. For personal or TBEP-issued cell phones, the use of said phones for program business subjects them to the public records law. In response to a public record request for phone records, the records for any cell phone used at any time for program business will have to be made available, subject to redaction by the Program Administrator of
personal information. The burden is on the employee to show that the redacted material is solely personal and has no business content.

B. TBEP will provide a $10/month stipend to staff members who use their personal cell phones for work-related tasks such as phone calls, texts or emails.
5.4 TIMESHEETS/PAYROLL

As outlined in Hours of Work and Overtime in the Pay/Compensation Sections of this handbook, the workweek begins on Sunday at 12:01 a.m. and ends on Saturday 12:00 midnight. Timesheets shall be submitted by all staff to the Program Administrator on Thursday of every other week and signed by the Executive Director. The timesheet will cover a two-week period, ending on the Saturday following the Thursday due date. Time shall be charged to the appropriate activity code distributed by the Program Administrator by October 1 of each year.

TBEP has direct deposit of payroll. All staff who participate receive a payroll stub each pay period. Transfers are made to individual accounts by Thursday morning.

To participate in the direct deposit program you will need to complete a direct deposit selection form (Attachment 10) and attach to it a check marked VOID from the account to which the direct deposit is to be made.
5.5 TRAVEL ARRANGEMENTS

All travel over $100 must be pre-approved by the Executive Director. If attending a workshop/conference/symposium the following procedures need to be followed:

- Email a travel request, including anticipated costs, to the Executive Director for approval. The Executive Director will reply and copy the Program Administrator.
- If travel advance is needed, complete a Request for Check Issuance available from the Program Administrator and submit to the Executive Director.
- Once approved, make travel arrangements.

5.6 TRAVEL REIMBURSEMENT

The following rules will be observed when per diem and other traveling expenses are incurred by TBEP employees, or other authorized individuals.

1. Computation of Travel Time for Reimbursement

For purposes of reimbursement, and methods of collecting fractional days of travel, the following principles shall apply:

a. Class "A" Travel--Calendar day from midnight to midnight. Twenty-four hours or more of continuous travel.

b. Class "B" Travel--Less than 24 hours requiring overnight absence from official headquarters. Reimbursed one-fourth of the authorized rate of per diem for each quarter, or fraction thereof, of the travel day included within the travel period.

c. Class "A" and "B" Travel--Travel shall include any assignment on official business, outside of regular office hours and away from regular places of employment, when it is considered reasonable and necessary to stay overnight, and for which travel expenses are approved.

d. Class "C" Travel--When no overnight travel is involved, a traveler will not be reimbursed on a per diem basis, but will receive subsistence, and allowance for meals as follows:

1) Breakfast--when travel begins before 6:00 a.m. and extends beyond 8:00 a.m.
2) Lunch--when travel begins before 12:00 noon and extends beyond 2:00 p.m.
3) Dinner--when travel begins before 6:00 p.m. and extends beyond 8:00 p.m., or when travel occurs during nighttime hours due to special assignments.
e. No allowance will be made for meals when travel is confined to the Tampa Bay watershed.

f. Requests for reimbursement of all classes of travel are to be made on the Travel Reimbursement Form (Attachment 11). Class C travel will be paid on the regular payroll dates. To receive reimbursement at that time, requests must be submitted five (5) working days prior to payroll (the same day that timesheets are due). Other travel will be processed through the tenth of the month payables.

g. Class C meals are reported as wages earned for the payroll system and federal income tax will be withheld.

2. Rates of Per Diem and Subsistence Allowance

Employees traveling to a convention, conference, or a meeting out of the Tampa Bay vicinity which serves a direct and lawful public purpose with relation to TBEP will be allowed per diem and subsistence allowances in accordance with applicable state travel policies.

TBEP employees are encouraged to charge travel expenses to the TBEP credit card when possible.

3. Transportation

a. All travel must be made using the most direct route. In case a person travels by an indirect route for their own convenience, any extra costs will be covered by the traveler, and any reimbursement for expenses shall be based only on such charges as should have been incurred using the most direct route.

b. Transportation by common carrier when traveling on official business, and paid for personally by the traveler, shall be substantiated by a receipt therefore.

c. In the event transportation is other than the most economical class, as approved by the Executive Director the charges in excess of the most economical class shall be refunded by the traveler to TBEP.

4. Mileage

a. Whenever travel is by privately owned vehicle, the traveler shall be entitled to a mileage allowance at the rate allowed by TBEP travel policies. TBEP has adopted the State of Florida Travel Policy.

b. All mileage will be shown from TBEP office location to point of destination, and when possible shall be computed on the basis of a current map or using an electronic navigation tool.

c. Mileage will only be reimbursed for travel that is exclusively for official business. If official business is conducted during an employee’s commute, mileage will only be reimbursed for distance in excess of normal commute mileage.
d. Vicinity mileage necessary for the conduct of official business is allowed but must be shown as a separate item on the expense voucher.

e. No traveler shall be allowed either mileage or transportation expense when the employee is gratuitously transported by another person, or when the employee is transported by a person entitled to mileage or transportation expense.

5. **Other Expenses**

The following incidental expenses of the traveler may be reimbursed:

a. Taxi and other for-hire vehicle transportation, or public transportation fare.
b. Ferry-fare and bridge, road and tunnel tolls.
c. Communication expense.
d. Convention registration fee while attending a convention or conference which will serve a direct public purpose with relation to TBEP. However, any meals or lodging included in the registration fee will be deducted from the per diem allowance.
e. Parking.

6. **Travel Authorization and Reimbursement**

a. **Authorization Documentation.** A Travel Request (email) is to be approved by the Executive Director prior to travel.

b. **Travel Voucher/Reimbursement Form**--When submitting traveling expense statements for approval and payment, a travel voucher will be completed. No travel expense statement will be approved for payment by the Executive Director unless it is made on a travel voucher form signed by the payee and immediate manager (refer to Attachment 11.). Receipts for travel charges made to the TBEP credit card will be submitted to the Program Administrator.

The travel voucher form will state travel expenses actually incurred by the traveler while in the performance of official duties of TBEP.

7. **Advancements**

The Executive Director may authorize travel expense advances to lower anticipated costs of travel to travelers. Such advancements may include the costs of subsistence and travel.
5.7 ELECTRONIC INFORMATION AND THE INTERNET

Specific policies to be followed by TBEP employees in regard to electronic information exchange are:

- TBEP web page address is http:\\www.tbep.org

- The Internet is not to be used to view, download, transmit, display, play (sound files), or print any sexually-oriented, humanly demeaning, or other normally considered vulgar material.

- Sexual harassment policies apply equally and extend into Internet use at the TBEP.

- All e-mail on TBEP computers are stored on the common directory (G:) under “E-mail Archives”, and printed out if needed for records management purposes.

- E-mail is an extension of the TBEP (and therefore not private), and the TBEP has the right to retrieve and print messages and mail in your mailbox, if the need arises.

E-mail is meant to make the information exchange easier and less time-consuming; however, employees must remember that an E-mail message carries the same force and weight as any other memorandum and so good judgment must be used in the utilization of E-mail messages or other computerized transmissions.
5.8 PUBLIC RECORDS REQUESTS

The TBEP Program Administrator shall serve as the TBEP Public Records Custodian. Contact information of TBEP Public Records Custodian (name, mailing and email addresses, telephone number and fax number) shall be posted on the TBEP website and in a prominent location within the TBEP office.
6.1 HURRICANE PREPAREDNESS

I. STANDARD: To provide information pertinent to hurricane preparedness in the workplace.

II. SCOPE: This standard applies to all employees of the TBEP and any external person(s) in contact with TBEP employees.

III. GUIDELINES:

The Hurricane Preparedness Plan for the NOAA Building in which TBEP is located will be used by TBEP (Attachment 12).
Holly Greening, Executive Director (2012-2017)
Over 20 conferences attended during this PE period, including:

- 6th Restore America’s Estuaries Conference (October 2012)
- UF Turf Grass Symposium (January 2013)
- Gulf of Mexico Alliance Workshop (June 2013)
- Florida Local Environmental Resources Agencies Conference (October 2013)
- Modeling Workshop, Horn Point, MD (April 2014)
- National Research Council Gulf Research Meeting (June 2014)
- Southeast and Gulf Coast Coastal Zone Management Meeting (January 2015)
- Statewide UFWS Planning Meeting (January 2015)
- Long Island Sound Study Partners Seminar (June 2015)
- Presented at BASIS6 (September 2015)
- FL NEP Directors Meeting (October 2015)
- Sea Level Rise: What’s Our Next Move Conference (October 2015)
- National State Revolving Funds Coordinators Conference (November 2015)
- EPCHC Citizen Advisory Committee (November 2015)
- CERF, Portland, OR (November 2015)
- Eco-Metrics Workshop, Corpus Christi, TX (March 2016)
- Tampa Bay Blue Carbon Demonstration Project Workshop (May 2016)
- Florida Environmental Health Association Annual Conference (July 2016)
- Tampa Bay Association of Environmental Professionals Leadership Forum (August 2016)
- Audubon Assembly Session (October 2016)
- Water Environment Federation Meeting (June 2017)
- Numerous ANEP Meetings (2012-2017)

Ed Sherwood, Senior Scientist (2012-2017)
- Participated in FDEP Stream Assessment Training (March 2013)
- Presented at Coastal Monitoring Network Meeting (June 2013)
- Participated in Seagrass Statistics Workshop (July 2013)
- Co-facilitated the Interagency Seagrass Transect Monitoring Training (August 2012-2017)
- Participated in Tidal Creeks Training (September 2013)
- Presented at Southeast Tidal Creek Summit in Wilmington, NC (December 2013)
- Participated in Regional Interagency Sea Level Rise Project Inventory Workshop (January 2014)
- Presented at the National Association of Environmental Professionals Conference (April 2014)
- Participated in Coastal Habitat Integrated Modeling Program (April 2014)
- Participated in GCOOS Workshop, Houston, TX (June 2014)
- American Water Resources Association Conference (September 2014)
- Presented on TBNMC at BACWA Symposium, San Francisco, CA (October 2014)
- Presented OTB Integrated Modeling Project at the 5th ICRW Conference, Charleston, SC (March 2015)
- Presented at Gulf of Mexico Community of Practice Workshop (May 2015)
- Participated in Hydro-biological Monitoring Program Meeting (May 2015)
- Participated in Florida Ocean Acidification Workshop at Mote Marine Laboratory (September 2015)
- Presented at FWCC Coastal Habitats Independent Mapping and Monitoring Program Workshop (September 2015)
- Presented at BASIS6 (September 2015)
- Participated in FDEP SW District Regional Utilities Meeting (October 2015)
- Presented at CERF, Portland, OR (November 2015)
- Attended ANEP National Tech Transfer (Puerto Rico 2015)
- Participated in Snook Symposium (January 2016)
- Participated in Climate Change Impacts to Pinellas County Workshop (February 2016)
- Participated in Eco-Metrics Workshop, Corpus Christi, TX (March 2016)
- Participated in FDEP Natural Attenuation Monitoring Workshop (April 2016)
- Presented at TECO's Annual Environmental Summit (April 2016)
- Presented at National Water Quality Monitoring Conference (May 2016)
- Participated in Tampa Bay Blue Carbon Demonstration Project Workshop (May 2016)
- Presented at FLERA Annual Conference (August 2016)
- Participated in CHNEP-sponsored Communicating Your Science Workshop (October 2016)
- Organized and participated in panel discussion at AWRA Annual Conference (November 2016)
- Attended the 3rd Annual Mangrove Vulnerability, Blue Carbon CHIMMP Workshop at FWRI (January 2017)
- Participated in Oyster Integrated Mapping and Monitoring Program Workshop (February 2017)
- Participated in Blue Carbon Workshop, New Orleans, LA (March 2017)
- Participated in Chesapeake Bay Technical Advisory Committee Workshop (June 2017)

**Lindsay Cross, Science and Policy Coordinator (2012-2016)**
- Fellow in the Florida Natural Resources Leadership Initiative, an 8-month training program on leadership, consensus-building, and conflict management
- Co-facilitated the Interagency Seagrass Transect Monitoring Training (August 2012-2015)
- Presented at Tampa Wetlands Regulatory Conference (October 2013)
Co-facilitated Climate Change: A Conversation (October 2013)
Hosted Tampa Bay Compensatory Mitigation Regulatory Charrette (December 2013)
Participated in Regional Interagency Sea Level Rise Project Inventory Workshop (January 2014)
Participated in the Green Infrastructure and Water Management in Growing Metropolitan Areas Conference (January 2014)
Presented at the National Association of Environmental Professionals Conference (April 2014)
Participated in Coastal Habitat Integrated Modeling Program (April 2014)
Presented on compensatory wetland mitigation at EPA Region IV Regional Wetlands/401 Workshop (October 2014)
Participated in Pinellas County Economic Innovation and Leadership Symposium (October 2014)
Participated in Hillsborough County Climate Adaptation Workshop (April 2015)
Presented on SLR Planning and Tampa Bay Habitats at NOAA Brown Bag Seminar (April 2015)
Participated in Climate Change Education Workshop and Community Resilience Index Training (May 2015)
Participated in Gulf of Mexico Community of Practice Workshop (May 2015)
Participated in CHNEP-sponsored Behavior Change Workshop (August 2015)
Presented at Florida Water Resource Council (September 2015)
Presented at FWCC Coastal Habitats Independent Mapping and Monitoring Program Workshop (September 2015)
Presented at Initiative on Coastal Adaptation and Resilience Workshop (September 2015)
Presented at BASIS6 (September 2015)
Participated in League of Cities Leadership Academy, St. Paul, MN (November 2015)
Presented at CERF, Portland, OR (November 2015)
Presented at National Working Waterways Symposium (November 2015)
Participated in Climate Change Impacts to Pinellas County Workshop (February 2016)
Participated in NOAA Climate Adaptation Workshop (February 2016)

Nanette O'Hara, Public Outreach Coordinator (2012-2017)
Presented and attended the Florida Stormwater Association conference (2012)
Presented and attended the Florida Federation of Garden Clubs Conference (2012)
Completed the UF Short Course in Sustaining Urban Landscapes (2012)
Completed Florida Master Gardener certification (2013)
Attended forum on Invasive Species and the Law (2013)
Participated in CHNEP-sponsored Behavior Change Workshop (August 2015)
Presented at BASIS6 (September 2015)
Ron Hosler, Program Administrator (2012-2017)
- Attended ANEP National Tech Transfer Meeting in Mobile, AL, (November 2013)
- Attended the Florida Government Finance Officers Association (FGFOA) conference in Palm Beach Gardens (October 2015)

Misty Cladas, Community Project Manager (2012-2017)
- Attended Leave No Trace Awareness Workshop (2012)
- Attended ANEP National Tech Transfer (Mobile 2013; Puerto Rico 2015)
- Attended First Aid and CPR training (2014)
- Attended World Environment Day conference (2014)
- Bachelor of Arts, Business Management, Eckerd College, St. Petersburg, FL, 2015.
- Participated in CHNEP-sponsored Behavior Change Workshop (August 2015)
- Presented at BASIS6 (September 2015)
- Attended Clean Communities Forum (2016)
- Attended Microplastics in Tampa Bay Workshop (2016)
- Attended Regional Oceans Conference for Students (2016, 2017)

Colleen Gray, Outreach Specialist (2012-2014)
- Attended Leave No Trace Awareness Workshop (2014)

Gary Raulerson, Program Ecologist (2016-2017)
- Presented and attended GTM NERR State of the Reserve Workshop (2016)
- Attended a Pinellas County Stormwater Manual Stakeholder Workshop (2016)
- Attended the 4th International Meeting on Mangroves and Macrobenthos in St. Augustine, FL (July 2016)
- Co-facilitated the Interagency Seagrass Transect Monitoring Training (August 2016)
- Participated in several Peninsular Florida Landscape Conservation Cooperative Workshops (2016-2017)
- Attended an ANEP meeting in New Orleans, LA (December 2016)
- Participated in 8th National Summit on Coastal and Estuarine Restoration in New Orleans, LA (December 2016)
- Participated in CHNEP-sponsored Communicating Your Science Workshop (October 2016)
- Attended Clean Gulf Exposition (November 2016)
- Participated in Environmental Law Institute Wetland Mitigation Workshop (November 2016)
- Attended the 3rd Annual Mangrove Vulnerability, Blue Carbon CHIMMP Workshop at FWRI (2017)
- Presented at an FDEP hosted workshop on Coastal Community Planning and Stakeholder Engagement Training (2017)
- Facilitated Southwest Florida Seagrass Working Group meetings (2016-2017)
- Participated in a SEACAR Webinar and Workshop (March/April 2017)
- Participated in Oyster Integrated Mapping and Monitoring Program Workshop (February 2017)
- Participated in Tidal Creek Training (March 2017)

**Maya Burke, Science Policy Coordinator (2016-2017)**
- Participated in Tampa Bay Blue Carbon Demonstration Project Workshop (May 2016)
- Participated in NOAA Regional Preparedness Training Workshop (June 2016)
- Participated in CHNEP-sponsored Communicating Your Science Workshop (October 2016)
- Co-facilitated the Interagency Seagrass Transect Monitoring Training (August 2016)
- Participated in Peril of Flood Workshop (March 2017)
- Presented at St. Petersburg Sustainability Summit (April 2017)
- Participated in Climate Council of Sarasota-Manatee Workshop (April 2017)
- Participated in Socio-Economic Indicators Workshop, Corpus Christi, TX (May 2017)
Awards, Peer-Reviewed Publications, Invited Presentations
July 1, 2012- June 30, 2017

Awards

2012
• Future of the Region Award to TBEP for Give a Day for the Bay Volunteer Workdays

2014
• Unsung Heroes Award for Steadfast Protection of Florida's Water Resources (Florida Association of Water Quality Control) – to Holly Greening, Executive Director

2015
• Gulf Guardian Award for Tampa Bay Environmental Restoration Fund (with Restore America’s Estuaries)
• Future of the Region Award for Master Plan for Protection and Restoration of Freshwater Wetlands in the Tampa Bay region

2016
• ONE BAY McIntosh Award to TBEP and our partners for collaborative approach to Bay restoration and meeting seagrass target
• Herman Goldner Award for Regional Leadership (Tampa Bay Regional Planning Council) – to Holly Greening, Executive Director

2017
• Civic Leadership Award (League of Women Voters of Hillsborough County) – to Holly Greening, Executive Director
• Coastal Stewardship Award to Tampa Bay Nitrogen Management Consortium (Coastal and Estuarine Research Federation)
Peer-Reviewed Publications


**Invited Presentations**

**Holly Greening, Executive Director (2012-2017)**

Invited speaker at more than 40 scientific, education, and public events throughout the Tampa Bay area. Other invited presentations include:

- 2012. Integrating Ecosystem Services into Restoration Decisions for the Gulf of Mexico. Invitational workshop. Harte Research Institute, Corpus Christi, TX.
- 2012. Institute of Medicine of the National Academies. Understanding the Connection between coastal waters and Ocean Ecosystem Services and Human Health: Basis Services, Valuation and Resiliency. Invited speaker. Washington, DC.
- 2013. Meeting with EPA Administrator Gina McCarthy and four NEP Directors. Washington, D.C.
- 2014. AERS Spring meeting. Invited keynote presentation. Ocean City, MD.
- 2015. Long Island Sound Study PE. Ex-officio and invited speaker. Stamford, CT.
- 2015. Chair, Planning meeting for Community Engagement Activity about Responsible Coastal Planning and Development. The National Academies. Washington, DC.
- 2015. Estuary Program Workshop for FL Panhandle. Invited speaker. Santa Rosa Beach, FL.
- NWQMC National Monitoring Conference. Keynote address. EPA, USGS, NALMS. Tampa, FL.
- 2016. Baffin Bay Symposium. Invited speaker. Corpus Christi, TX.
· 2017. NEP-ORD Collaboration on quantifying the ecosystem goods and services of estuaries. Invited webinar speaker.

Ed Sherwood, Senior Scientist (2012-2017)

Invited speaker at more than 20 scientific, education, and public events throughout the Tampa Bay area.

· 2013. CB Stormwater Retreat. “Nutrient Management in the Tampa Bay Estuary.” Shepherdstown, WV.
· 2015. 5th ICRW Conference. “OTB Integrated Modeling Project.” Charleston, SC.
· 2016. AMWA. “Tampa Bay Environmental Issues, Restoration, and Sustaining Recovery.”
· 2016. FLERA. “Habitat Restoration Initiatives to Buffer Potential Impacts of Climate Change in the Tampa Bay Estuary.”

Lindsay Cross, Science and Policy Coordinator (2012-2015)

Invited speaker at more than 20 scientific, education, and public events throughout the Tampa Bay area.

· 2013. Tampa Wetlands Regulatory Conference. “Compensatory Wetland Mitigation in Tampa Bay.” Tampa, FL.
· 2015. FWCC Coastal Habitats Independent Mapping and Monitoring Program Workshop
2015. Initiative on Climate Adaptation and Resilience Workshop. “Helping Habitats Get a Hand up for Climate Change.” St. Petersburg, FL
2015. BASIS6. “Helping Habitats Get a Hand up for Climate Change.” St. Petersburg, FL
2015. Coastal and Estuarine Research Federation Conference. “Critical Coastal Habitat Assessment to Detect Climate Change Impacts to Habitats in Tampa Bay, FL.” Portland, OR.

Nanette O’Hara, Public Outreach Coordinator (2012-2017)
Invited speaker at more than 20 scientific, education, and public events throughout the Tampa Bay area.
2016. “Be Floridian.” Orange County Staff Workshop.

Colleen Gray, Outreach Specialist (2012-2014)
2013. ANEP Meeting. “Up the Creek with Lots of Paddles.” Mobile, AL.

Ron Hosler, Program Administrator (2012-2017)
2013. ANEP Meeting. “Up the Creek with Lots of Paddles.” Mobile, AL.

Misty Cladas, Community Project Manager (2012-2017)
2013. ANEP Meeting. “Up the Creek with Lots of Paddles.” Mobile, AL.
2014. ONE BAY Resilient Communities Working Group. “King Tide Photography Exhibit.” Pinellas Park, FL
· 2015. BASIS6 Conference. “Community Connections Create Bay Improvement.” St. Petersburg, FL

· 2016. 4th International Meeting on Mangroves and Macrobenthos in St. Augustine, FL
· 2016. 8th National Summit on Coastal and Estuarine Restoration in New Orleans, LA
· 2017. Coastal Community Planning and Stakeholder Engagement Training. Tampa, FL.

Maya Burke, Science Policy Coordinator (2016-2017)
· 2016. Florida Department of Environmental Protection Southwest District. “Applying the Freshwater Wetlands Master Plan in Existing Regulatory Programs.” Temple Terrace, FL.
· 2016. United States Army Corps of Engineers. “Applying the Freshwater Wetlands Master Plan in Existing Regulatory Programs.” Tampa, FL.
· 2017. Hillsborough River Interlocal Planning Board TAC. “Tampa Bay Environmental Restoration Fund Overview.” Tampa, FL.
PUBLIC SUMMARY

CHARTING THE COURSE:
THE COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN FOR TAMPA BAY

AUGUST 2017 REVISION
INTRODUCTION

Tampa Bay, designated an “estuary of national significance” by Congress, is the vibrant centerpiece of a bustling region of 2.7 million people. The bay’s watershed stretches from the spring-fed headwaters of the Hillsborough River to the sugar-white beaches of Anna Maria Island.

The Tampa Bay Estuary Program was established by Congress in 1991 to assist the region in developing and implementing a comprehensive plan to protect and improve the bay. The third revision of this community blueprint for action was released in 2017, and is summarized here.

ABOUT CHARTING THE COURSE

Charting the Course: The Comprehensive Conservation and Management Plan (CCMP) for Tampa Bay presents 39 actions to sustain progress in bay restoration through the year 2027. The CCMP addresses historical challenges – such as reducing nutrient pollution and restoring key habitats – as well as new or emerging concerns such as impacts of climate change.

TAMPA BAY IS A SPECIAL PLACE

More than 200 species of fish live in the bay

26,000 pairs of herons, egrets and other colonial waterbirds nest each summer on bay islands

One-quarter of the Gulf Coast population of Florida manatees winters in Tampa Bay

One in every five jobs in the watershed depends on a healthy bay

More than one-third of all cargo shipped in and out of Florida passes through Tampa Bay ports

ADDITIONALLY, THE CCMP REVISION INCLUDES THE FOLLOWING ELEMENTS:

State of the Bay reports
Strategic Plan
Research and Monitoring Priorities
Monitoring and Indicators Plan
Communications Plan
Climate Change Vulnerability Analysis
Tampa Bay Reasonable Assurance Report

VIEW THE COMPLETE CCMP AT TBEP.ORG OR TBEPTECH.ORG.
TAMPA BAY WATERSHED

SIZE:
- TAMPA BAY PROPER: 400 SQUARE MILES
- TAMPA BAY WATERSHED: 2,200 SQUARE MILES
- AVERAGE DEPTH: 11 FEET
- MAXIMUM DEPTH: 43 FEET (MAIN SHIPPING CHANNEL)
- SALINITY RANGE:
  - >20–35 PARTS PER THOUSAND IN BAY PROPER;
  - <1–25 PARTS PER THOUSAND IN TIDAL TRIBUTARIES
- POPULATION IN WATERSHED: 2.7 MILLION (2010 CENSUS)
- MAJOR TRIBUTARIES: HILLSBOROUGH, ALafia, LITTLE MANATEE AND MANATEE RIVERS

ABOUT THE TAMPA BAY ESTUARY PROGRAM

TBEP is a partnership of Hillsborough, Manatee, Pasco and Pinellas counties; the cities of Tampa, St. Petersburg and Clearwater; the U.S. Environmental Protection Agency (EPA); the Southwest Florida Water Management District (SWFWMD); and the Florida Department of Environmental Protection (FDEP).

TBEP STAFF

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MISSION STATEMENT

The mission of the Tampa Bay Estuary Program is to build partnerships to restore and protect Tampa Bay through implementation of a scientifically sound, community-based management plan.
A HISTORY OF TAMPA BAY


1950s
Population less than ¼ of today.

1960s
Bay degradation is recognized.

1967
Environmental Protection Commission of Hillsborough County (EPCHC) established.

1970s
Save Our Bays and other citizen groups call for legislative action to reduce pollution discharges.

1972
EPA Clean Water Act approved.

1972
Florida’s Wilson-Grizzle Act requires wastewater plants discharging to Tampa Bay to upgrade to Advanced Wastewater Treatment (AWT) standards, or enact 100% reclaimed.

1974
EPCHC initiates baywide water quality monitoring program.

1979
City of Tampa’s Howard F. Curren Wastewater Treatment Plant (WWTP) achieves AWT standard, reduces nitrogen loadings by 90%. City of St Petersburg implements 100% reclaimed water from their direct discharge, with similar reductions. Other WWTPs in the region implement nutrient reductions.

1982
Statewide Stormwater Rule is enacted, requiring nutrient management from municipal stormwater systems.

1982
The first Bay Area Science Information Symposium (BASIS) is conducted by the Tampa Bay Regional Planning Council.

1985
The Tampa Bay Regional Planning Council convenes the region to develop the Future of Tampa Bay report, including specific actions to reduce pollution and recover habitats in Tampa Bay. The Agency on Bay Management is established to support the report's recommendations.
1991
Tampa Bay is recognized by EPA as an “estuary of national significance,” and the Tampa Bay National Estuary Program is created to develop a Comprehensive Conservation and Management Plan.

1996
TBNEP’s CCMP is approved by local partners, the Governor, and the EPA Administrator. Numeric goals for habitat restoration and water quality improvement are adopted.

1998
The TBNMC develops an Action Plan (Partnership for Progress) to meet nutrient management targets.

2006
First year that all bay segments achieve TBEP water quality targets.

2014
Tampa Bay surpasses seagrass recovery goal of 38,000 acres.

1987
The State’s Water Management Districts establish Surface Water Implementation and Management (SWIM) programs to restore and protect priority water bodies within each District. Tampa Bay is identified as the Southwest Florida Water Management District’s priority water body.

1996
An Interlocal Agreement between the TBNEP partners forms a new Independent Special District of the State of Florida, the Tampa Bay Estuary Program. TBEP partners commit to implementing projects to assist in meeting numeric goals, and to support a funding schedule.

2009
TBNMC develops voluntary nutrient loading limits for all sources, to continue to meet water quality targets. Federal and state regulatory agencies adopt limits to meet regulatory requirements.

2016
Seagrass coverage increases to 41,655 acres.
ACCOMPLISHMENTS

IMPORTANT ACHIEVEMENTS OF THE 2006–2016 IMPLEMENTATION PERIOD
OF CHARTING THE COURSE:

Met and surpassed TBEP’s seagrass recovery goal of 38,000 acres baywide, with an estimated 41,655 acres in 2016.

Established the Tampa Bay Environmental Restoration Fund, a public-private grant partnership jointly managed by TBEP and Restore America’s Estuaries. TBERF supports large-scale restoration, research and education initiatives that advance the goals of the CCMP. From 2013-2016, the Fund awarded more than $3 million for projects that restored more than 200 acres of seagrass and 112 acres of coastal uplands, and created 8 acres of oyster reefs.

Removal or prevented 537 tons of nitrogen from entering the bay through projects completed by public and private industry partners of the Tampa Bay Nitrogen Management Consortium (NMC). Nitrogen loading targets developed by the NMC were adopted as formal water quality criteria by the state.

Met one or both water quality targets in all bay segments every year but one (2011).

Established restoration targets for freshwater wetlands (18,703 acres) and emergent tidal wetlands (22,739 acres).

Expanded the TBEP Management Conference by adding Pasco County, Tampa Bay Water and the Manatee Port Authority.

Facilitated a stakeholder process that resulted in adoption and implementation of local ordinances that restrict sales or use of lawn/landscape fertilizer in the summer.
IMPORTANT GOALS
FOR THE 2017–2027 IMPLEMENTATION HORIZON
OF CHARTING THE COURSE:

Maintain at least 38,000 acres of seagrass by continuing to manage nitrogen loadings to the bay.

Establish restoration and protection targets for hard bottom habitats, coastal uplands and tidal tributaries.

Improve water quality in Old Tampa Bay through better management of freshwater inflow and removal of physical barriers to tidal circulation.

Ensure that bay habitats can withstand and adapt to climate change, and further quantify the role and value of salt marshes, mangroves and seagrasses in storing carbon and buffering ocean acidification.

Expand our knowledge of the sources, distribution and ecological effects of new Contaminants of Concern such as personal care products, pharmaceuticals and microplastics.

Maintain adequate funding to ensure base operations of TBEP and to implement the CCMP.

Reduce municipal sewer overflows and the occurrence of Harmful Algal Blooms in the bay.
# GOALS AND PRIORITIES OF CHARTING THE COURSE

## INFORMED, ENGAGED AND RESPONSIBLE COMMUNITY

Inform and engage our partners and the public to appreciate, protect, and sustain Tampa Bay through responsible use, participation in restoration, and adoption of best practices.

**GOAL: FOSTER RESPONSIBLE PUBLIC USE OF THE BAY**
- Provide for and manage recreational uses of the bay

**GOAL: INCREASE PUBLIC EDUCATION AND INVOLVEMENT**
- Promote public involvement in bay restoration and protection
- Promote public education about key issues affecting Tampa Bay

**GOAL: INCORPORATE CCMP GOALS AND ACTIONS IN LOCAL GOVERNMENT PLANS**
- Incorporate CCMP goals and actions in local government comprehensive plans, land development regulations or ordinances

## CLEAN WATERS AND SEDIMENTS

Improve water quality by managing nutrient loads from urban, agricultural, and atmospheric sources and by reducing contaminants from spills and discharges.

**GOAL: IMPROVE WATER QUALITY**
- Implement the Tampa Bay nutrient management strategy
- Reduce frequency and duration of harmful algal blooms

**GOAL: REDUCE POLLUTION FROM STORMWATER RUNOFF**
- Reduce nitrogen runoff from urban landscapes
- Expand adoption and implementation of best management practices for commercial and urban agriculture
- Expand use of Green Infrastructure practices

**GOAL: REDUCE THE EFFECTS OF AIR POLLUTION ON THE BAY**
- Continue to reduce nitrogen loading from atmospheric deposition

**GOAL: REDUCE POLLUTION FROM WASTEWATER DISCHARGED TO THE BAY**
- Expand the beneficial use of reclaimed water
- Extend central sewer service to priority areas now served by septic systems
- Require standardized monitoring of wastewater discharges
- Reduce the occurrence of municipal sewer overflows

**GOAL: REDUCE CONTAMINANTS OF CONCERN IN THE BAY**
- Address hot spots of contamination in the bay
- Identify and understand emerging contaminants

* PRIORITY ACTION
## GOALS AND PRIORITIES (CONT’D)

### CLEAN WATERS AND SEDIMENTS (CONT’D)

**GOAL: REDUCE SOURCES OF BACTERIAL CONTAMINATION**
- Continue assessments of human and ecosystem health indicators suitable for Tampa Bay beaches and other recreational waters
- Reduce fecal contamination from humans and pets in Tampa Bay Area waters
- Reduce pollution from recreational boaters

**GOAL: IMPROVE SPILL PREVENTION AND RESPONSE**
- Continue implementation of advanced technology to improve coordination of ship movements in Tampa Bay
- Evaluate and update oil and hazardous material spill response plans for priority areas

**GOAL: REDUCE THE IMPACT OF DREDGING AND IMPROVE DREDGED MATERIAL MANAGEMENT**
- Develop a plan for beneficial uses of dredged material in Tampa Bay
- Continue to minimize impacts to wildlife and their habitats from dredging activities

### THRIVING HABITATS AND ABUNDANT WILDLIFE

Increase the number and diversity of healthy bay habitats through restoration and protection to support thriving fisheries and wildlife resilient to a changing climate.

**GOAL: INCREASE AND PRESERVE THE NUMBER AND DIVERSITY OF HEALTHY BAY HABITATS**
- *Implement the Tampa Bay Habitat Master Plan
- Establish and implement mitigation criteria
- Reduce propeller scarring of seagrass and pursue seagrass transplanting opportunities
- Identify hard bottom communities and avoid impacts
- Encourage habitat enhancement along altered waterfront properties
- Continue and enhance habitat mapping and monitoring programs
- Enhance ecosystem values of tidal tributaries
- Implement the Tampa Bay Freshwater Wetland Habitat Masterplan

* PRIORITY ACTION
GOALS AND PRIORITIES (CONT’D)

THRIVING HABITATS AND ABUNDANT WILDLIFE (CONT’D)

GOAL: ESTABLISH AND PRESERVE ADEQUATE FRESHWATER FLOWS TO THE BAY AND ITS TRIBUTARIES

Maintain seasonal freshwater flows in rivers

GOAL: REDUCE THE OCCURRENCE OF INVASIVE SPECIES IN THE BAY

Support prevention, eradication or management of invasive species in Tampa Bay and its watershed

GOAL: PROTECT AND ENHANCE FISHERIES AND WILDLIFE

Increase on-water enforcement of environmental regulations
Achieve a sustainable bay scallop population
Continue and expand the Critical Fisheries Monitoring Program
*Preserve the diversity and abundance of bay wildlife

GOAL: IMPROVE THE RESILIENCE OF BAY HABITATS TO CLIMATE CHANGE

Improve ability of bay habitats to adapt to a changing climate
Understand and address the effects of ocean acidification

* PRIORITY ACTION

INTERLOCAL AGREEMENT

The Interlocal Agreement adopted between local government and regulatory partners of the Tampa Bay Estuary Program formally affirms their commitment to implementing the goals of Charting The Course. The first of its kind among the nation’s 28 NEPs, the Agreement is a binding pledge by TBEP’s major partners to work together to achieve bay recovery targets. The Interlocal Agreement was updated in 2015, including a revised funding schedule and dues for local government partners that calls for a minimum increase in annual dues of 2.5% per year for 5 years for those member governments contributing to the Tampa Bay Environmental Restoration Fund, and slightly higher annual dues for those members that do not contribute to TBERF. This baseline funding commitment will allow TBEP to keep up with inflation and continue to provide support to our partners.

FY 2017/18 MAJOR FUNDING PARTNERS

(w/TBERF contribution)

Pasco County: $25,926
Manatee County: $38,195
City of St. Pete: $35,069
City of Tampa: $46,714
Pinellas County: $87,392
Hillsborough County: $88,225
In-Kind: $131,568
SWFWMD: $145,338
EPA: $600,000
Tampa Bay Water: $10,000
City of Clearwater: $16,573
FINANCING THE PLAN

TBEP will continue to pursue multiple separate avenues to secure funding or in-kind support to finance operation of the base program and to implement the CCMP. Four funding sources provide dedicated or reasonably secure funding, over both the short-term and long-term:

- Federal National Estuary Program funding administered through the US Environmental Protection Agency;

- The Interlocal Agreement that obligates local government and agency partners to help fund the program;

- Revenue from the Tampa Bay Estuary specialty license plate authorized under Florida State law, and;

- The Tampa Bay Environmental Restoration Fund, a fundraising partnership between TBEP, Restore America’s Estuaries, local governments and private industry.

Additional variable funding sources supplement CCMP implementation through local action plans of TBEP partners, grants, cooperative agreements, and other mechanisms.

MONITORING SUCCESS

A wide variety of characteristics are monitored within Tampa Bay, to both track and demonstrate effects of management actions (including progress, losses, and status quo) and to evaluate whether measureable environmental results have been achieved. These efforts include assessing changes in water and sediment quality, bay habitats, fish and wildlife and climate change effects within the Tampa Bay study area.
HOW TO NAVIGATE THIS DOCUMENT:

WELCOME TO THE ONLINE DOCUMENT VIEWING EXPERIENCE.

Here is a quick-reference guide for navigating through this Adobe Online document.

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**STATE OF THE BAY**

- Tampa Bay Estuary Program Progress Report
- Basis 6 Symposium Proceedings
- Tampa Bay Habitat Restoration Master Plan

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**EXTERNAL LINKS**

- Strategic Plan
- Implementing and Financing Charting the Course
- Research and Monitoring Priorities
- Monitoring and Indicators Plan
- Climate Change Vulnerability Analysis
- Communications Plan
- Tampa Bay Reasonable Assurance Report

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**NOTE:** Clicking any external links will take you away from this report.
ACKNOWLEDGMENTS
The August 2017 Revision of Charting the Course: The Comprehensive Conservation and Management Plan for Tampa Bay was prepared by Nanette O’Hara (TBEP Public Outreach Coordinator), with research, writing and data/graphics support from Shafer Consulting and design by Bazany Design. TBEP staff and members of the TBEP’s Technical Advisory and Community Advisory Committees and Nitrogen Management Consortium; the Tampa Bay Regional Planning Council Agency on Bay Management; and the Tampa Bay scientific and management community provided critical input and review. Comments from Felicia Burks (EPA Region 4, Atlanta) and Nancy Laurson (EPA Headquarters, Washington DC) and their colleagues provided valuable structural and content edits. This revision of Charting the Course: was approved by TBEP’s Management and Policy Board in February 2017.

INTRODUCTION
The 2017 Revision of Charting The Course: The Comprehensive Conservation and Management Plan (CCMP) for Tampa Bay is intended to serve as a community blueprint for action to sustain progress in protecting and restoring the bay over a 10-year horizon. Key achievements since the 2006 Revision include:

• Surpassing TBEP’s seagrass recovery goal of 38,000 acres bayside, with an estimated 41,655 acres in 2016;
• Meeting one or both water quality targets in all bay segments every year but one (2011), and;
• Establishing measurable restoration targets for freshwater wetlands (18,703 acres) and emergent tidal wetlands (22,739 acres).

Important goals and challenges for the 2017-2027 timeframe include:

• Maintaining at least 38,000 acres of seagrass by continuing to manage nitrogen loadings to the bay;
• Establishing restoration and protection targets for hard bottom habitats, coastal uplands and tidal tributaries, and;
• Planning for and adapting to a changing climate.

WHAT’S NEW IN THIS UPDATE
• This is the first CCMP designed exclusively on a digital platform.
• Two new categories have been added: Public Access and Local Implementation of CCMP Goals.
• Nine new actions have been added: WQ-3, WW-5, COC-4, BH-10, DR-2, PE-2, PA-1, CC-2, LI-1.
• Several existing actions were consolidated or moved to different categories that more accurately represent updated implementation strategies. See Index of Actions.
• Five actions have been completed and retired. See Index of Actions.
• New or revised goals adopted since the 2006 CCMP address Water Quality; Bay Habitats; Dredging; Fish and Wildlife; Invasive Species; Skill Prevention; Public Access; and Local Implementation of CCMP Goals. See Goals and Priority Table.
• This CCMP codifies the desire of TBEP’s local and regional partners to formally adopt the goals and actions of this Plan in their planning and guidance documents (see Action List).

PUBLIC AND STAKEHOLDER INPUT
Community input into the development of the CCMP Update was solicited as follows:

• An online survey was conducted in 2015 to solicit public and stakeholder opinions about bay improvement and to rank priority issues. More than 400 people took the poll; 41% identified urban/residential runoff as the biggest threat to the bay’s health today, while 31% said habitat loss will be the biggest threat to the bay 10 years from now.
• External reviewers with expertise in issues specific to each action were enlisted to provide comments and guidance.
• Actions were developed over a 2-year period with quarterly reviews by TBEP’s Technical Advisory Committee, Community Advisory Committee, and the Tampa Bay Regional Planning Council’s Agency on Bay Management. Recommendations from these groups were presented to TBEP’s Management Board, who made further recommendations for consideration by the Policy Board. Final adoption of individual actions, as well as the entire CCMP came from the Policy Board — composed of elected and appointed officials, and high-level environmental administrators from TBEP partner governments and agencies.
• A matrix of comments submitted during the development of the CCMP is available on request.
TAMPA BAY WATERSHED

SIZE:
- TAMPA BAY PROPER: 400 SQUARE MILES
- TAMPA BAY WATERSHED: 2,200 SQUARE MILES

AVERAGE DEPTH: 11 FEET
MAXIMUM DEPTH: 43 FEET (MAIN SHIPPING CHANNEL)

SALINITY RANGE:
- >20–35 PARTS PER THOUSAND IN BAY PROPER;
- <1–25 PARTS PER THOUSAND IN TIDAL TRIBUTARIES

POPULATION IN WATERSHED: 2.7 MILLION (2010 CENSUS)

MAJOR TRIBUTARIES: HILLSBOROUGH, ALAFIA, LITTLE MANATEE AND MANATEE RIVERS

Land Use in the Watershed

- Wetlands: 17%
- Agriculture: 29%
- Water (Lakes/Ponds): 2%
- Vegetated/Forest/Pasture/Natural: 12%
- Mining: 8%
- Urban Development: 39%
A HISTORY OF TAMPA BAY

1950s Population less than ¼ of today.

1960s Bay degradation is recognized.

1970s Save Our Bays and other citizen groups call for legislative action to reduce pollution discharges.

1967 Environmental Protection Commission of Hillsborough County (EPCHC) established.

1972 EPCHC initiates baywide water quality monitoring program.

1974 Statewide Stormwater Rule is enacted, requiring nutrient management from municipal stormwater systems.

1972 Florida’s Wilson-Grizzle Act requires wastewater plants discharging to Tampa Bay to upgrade to Advanced Wastewater Treatment (AWT) standards, or enact 100% reclaimed.

1979 City of Tampa’s Howard F. Curren Wastewater Treatment Plant (WWTP) achieves AWT standard, reduces nitrogen loadings by 90%. City of St Petersburg implements 100% reclaimed water from their direct discharge, with similar reductions. Other WWTPs in the region implement nutrient reductions.

1982 The first Bay Area Science Information Symposium (BASIS) is conducted by the Tampa Bay Regional Planning Council.

1982 The State’s Water Management Districts establish Surface Water Implementation and Management Consortium (SWIM) programs to restore and protect priority water bodies within each District. Tampa Bay is identified as the Southwest Florida Water Management District’s priority water body.

1985 The Tampa Bay Regional Planning Council convenes the region to develop the Future of Tampa Bay report, including specific actions to reduce pollution and recover habitats in Tampa Bay. The Agency on Bay Management is established to support the report’s recommendations.

1987 The State’s Water Management Districts establish Surface Water Implementation and Management Consortium (TBNMC) is formed to assist in meeting nitrogen management targets needed to meet seagrass goals.

1988 The public/private Tampa Bay Nitrogen Management Consortium (TBNMC) develops an Action Plan (Partnership for Progress) to meet nutrient management targets.

1989 An Interlocal Agreement between the TBNMC partners forms a new Independent Special District of the State of Florida, the Tampa Bay Estuary Program. TBNMC partners commit to implementing projects to assist in meeting numeric goals, and to support a funding schedule.

1991 Tampa Bay is recognized by EPA as an “estuary of national significance,” and the Tampa Bay National Estuary Program to develop a Comprehensive Conservation and Management Plan.

1995 TBNEP’s CCMP is approved by local partners, the Governor, and the EPA Administrator. Numeric goals for habitat restoration and water quality improvement are adopted.

1998 The public/private Tampa Bay Nitrogen Management Consortium (TBNMC) develops voluntary nutrient loading limits for all sources, to continue to meet water quality targets. Federal and state regulatory agencies adopt limits to meet regulatory requirements.

2006 First year that all bay segments achieve TBEP water quality targets.

2014 Tampa Bay surpasses seagrass recovery goal of 38,000 acres.

2016 Seagrass coverage increases to 41,655 acres.

KEY MILESTONES IN THE RESTORATION OF TAMPA BAY, 1950-2016.

1950s Population less than ¼ of today.

1967 Environmental Protection Commission of Hillsborough County (EPCHC) established.

1972 EPA Clean Water Act approved.

1973 Florida’s Wilson-Grizzle Act requires wastewater plants discharging to Tampa Bay to upgrade to Advanced Wastewater Treatment (AWT) standards, or enact 100% reclaimed.

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1982 The State’s Water Management Districts establish Surface Water Implementation and Management Consortium (SWIM) programs to restore and protect priority water bodies within each District. Tampa Bay is identified as the Southwest Florida Water Management District’s priority water body.

1985 The Tampa Bay Regional Planning Council convenes the region to develop the Future of Tampa Bay report, including specific actions to reduce pollution and recover habitats in Tampa Bay. The Agency on Bay Management is established to support the report’s recommendations.

1991 Tampa Bay is recognized by EPA as an “estuary of national significance,” and the Tampa Bay National Estuary Program to develop a Comprehensive Conservation and Management Plan.

1995 TBNEP’s CCMP is approved by local partners, the Governor, and the EPA Administrator. Numeric goals for habitat restoration and water quality improvement are adopted.

1996 The public/private Tampa Bay Nitrogen Management Consortium (TBNMC) is formed to assist in meeting nitrogen management targets needed to meet seagrass goals.

1998 The public/private Tampa Bay Nitrogen Management Consortium (TBNMC) develops an Action Plan (Partnership for Progress) to meet nutrient management targets.

2006 First year that all bay segments achieve TBEP water quality targets.

2014 Tampa Bay surpasses seagrass recovery goal of 38,000 acres.

2016 Seagrass coverage increases to 41,655 acres.
ABOUT US
Tampa Bay was designated an “estuary of national significance” by Congress in 1990, laying the foundation for the creation of the Tampa Bay Estuary Program (TBEP) in 1991.

TBEP is an intergovernmental partnership of Hillsborough, Manatee, Pasco and Pinellas counties; the cities of Tampa, St. Petersburg and Clearwater; the U.S. Environmental Protection Agency (EPA); the Southwest Florida Water Management District (SWFWMD); and the Florida Department of Environmental Protection (FDEP). These partners have pledged, through a binding Interlocal Agreement, to achieve the science-based goals of Charting the Course: The Comprehensive Conservation and Management Plan for Tampa Bay.

TBEP is governed by a Policy Board of elected officials from our local government members, SWFWMD, EPA and FDEP. A larger Management Board comprised of administrators from local, regional and state government agencies and organizations makes recommendations to the Policy Board.

TBEP’s mission of bay restoration, research and education is supported by several committees, including a Technical Advisory Committee of scientists and managers; a Nitrogen Management Consortium of industries, regulators and expanded city-county members; and a Community Advisory Committee of engaged citizens.

TBEP MISSION STATEMENT
The mission of the Tampa Bay Estuary Program is to build partnerships to restore and protect Tampa Bay through implementation of a scientifically sound, community-based management plan.

Hillsborough County
Manatee County
Pasco County
Pinellas County
City of Clearwater
City of St. Petersburg
City of Tampa
Southwest Florida Water Management District
U.S. Environmental Protection Agency
Florida Department of Environmental Protection
Florida Fish and Wildlife Conservation Commission
Environmental Protection Commission of Hillsborough County
Port Tampa Bay
Port Manatee
Tampa Bay Regional Planning Council
Tampa Bay Water
U.S. Army Corps of Engineers

ABOUT CHARTING THE COURSE
Charting The Course: The Comprehensive Conservation and Management Plan for Tampa Bay is intended to be a living document that reflects our evolving knowledge and understanding of bay processes and community needs. Major revisions of Charting The Course occur every 10 years; minor updates occur every 3-5 years.

There are 39 actions in the 2017 CCMP Update. Each action presents specific strategies to meet agreed-upon objectives. Responsible parties, implementation timetables, and results and deliverables are part of every action.

Costs estimates for implementing the various activities detailed in each action are as follows:

<table>
<thead>
<tr>
<th>Cost Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>$</td>
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<td>$$$$$</td>
<td>More than $500,000</td>
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</tbody>
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### GOALS AND PRIORITIES OF CHARTING THE COURSE

<table>
<thead>
<tr>
<th>CCMP GOAL</th>
<th>RELATED ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water and Sediment Quality</td>
<td></td>
</tr>
<tr>
<td><strong>Reduce or preclude nutrient loadings in the bay from all sources, to meet water quality targets and maintain at least 38,000 acres of seagrass baywide</strong></td>
<td>ACTIONS TO IMPROVE WATER QUALITY:</td>
</tr>
<tr>
<td><strong>Reduce the frequency and duration of harmful algal blooms</strong></td>
<td>WQ-1 Implement the Tampa Bay nutrient management strategy</td>
</tr>
<tr>
<td><strong>Reduce the amount of toxic chemicals in contaminated bay sediments and protect relatively clean areas of the bay from contamination</strong></td>
<td>WQ-3 Reduce frequency and duration of harmful algal blooms</td>
</tr>
<tr>
<td><strong>Reduce pollution from microplastics and emerging contaminants of concern</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Reduce bacterial contamination from sources in the watershed to maintain recreational uses of the bay such as fishing and swimming</strong></td>
<td></td>
</tr>
</tbody>
</table>

**ACTIONS TO IMPROVE WATER QUALITY:**
- WQ-1 Implement the Tampa Bay nutrient management strategy
- WQ-3 Reduce frequency and duration of harmful algal blooms

**ACTIONS TO REDUCE POLLUTION FROM STORMWATER RUNOFF:**
- SW-1 Reduce nitrogen runoff from urban landscapes
- SW-8 Expand adoption and implementation of Best Management Practices for commercial and urban agriculture
- SW-10 Expand use of Green Infrastructure practices

**ACTIONS TO REDUCE THE EFFECTS OF AIR POLLUTION ON THE BAY:**
- AD-1 Continue to reduce nitrogen loading from atmospheric deposition

**ACTIONS TO REDUCE POLLUTION FROM WASTEWATER DISCHARGED TO THE BAY:**
- WW-1 Expand the beneficial use of reclaimed water
- WW-2 Extend central sewer service to priority areas now served by septic systems
- WW-3 Require standardized monitoring and reporting of wastewater discharges
- WW-5 Reduce the occurrence of sanitary sewer overflows to the bay

**ACTIONS TO REDUCE CONTAMINANTS OF CONCERN IN THE BAY:**
- COC-1 Address hot spots of sediment contamination in the bay
- COC-4 Identify and understand emerging contaminants

**ACTIONS TO REDUCE PATHOGENS:**
- PH-2 Continue source and risk assessments of human and ecosystem health indicators suitable for Tampa Bay beaches and other recreational waters
- PH-4 Reduce fecal contamination from humans and pets in Tampa Bay Area waters
- PH-5 Reduce pollution from recreational boaters
# Bay Habitats

Update numeric targets and management actions for seagrass, marsh, mangrove, salt barrens, and freshwater wetlands; and establish initial numeric targets for tidal creeks, hard bottom habitats and coastal uplands.

- Maintain at least 38,000 acres of seagrass baywide and reduce propeller scarring of seagrasses.
- Assess and monitor mitigation of freshwater wetlands, estuarine wetlands, hard bottom and other habitat types.
- Enhance ecosystem values of tidal tributaries.
- Restore the historic balance of freshwater wetlands in the Tampa Bay watershed by restoring 871 acres of forested wetlands and 2,199 acres of non-forested wetland over 2008 levels.

### ACTIONS TO INCREASE AND PRESERVE THE NUMBER AND DIVERSITY OF HEALTHY BAY HABITATS:

- **BH-1** Implement the Tampa Bay Habitat Master Plan
- **BH-2** Establish and implement mitigation criteria
- **BH-3** Reduce propeller scarring of seagrass and pursue seagrass transplanting opportunities
- **BH-4** Identify hard bottom communities and avoid impacts
- **BH-6** Encourage habitat enhancement along altered waterfront properties
- **BH-8** Continue and enhance habitat mapping and monitoring programs
- **BH-9** Enhance ecosystem values of tidal tributaries
- **BH-10** Implement the Tampa Bay Freshwater Wetland Habitat Masterplan

# Dredging and Dredged Material Management

Identify and implement appropriate beneficial uses of dredged material in Tampa Bay.

### ACTIONS TO REDUCE THE IMPACT OF DREDGING AND IMPROVE DREDGED MATERIAL MANAGEMENT:

- **DR-1** Develop a plan for beneficial uses of dredged material in Tampa Bay
- **DR-2** Continue to minimize impacts to bay wildlife and their habitats from dredging activities

# Fish and Wildlife

Increase on-water enforcement of environmental regulations.

- Achieve a sustainable bay scallop population.
- Preserve the abundance and diversity of Tampa Bay’s fish and wildlife.

### ACTIONS TO PROTECT AND ENHANCE FISHERIES AND WILDLIFE:

- **FW-1** Increase on-water enforcement of environmental regulations
- **FW-3** Achieve a sustainable bay scallop population
- **FW-5** Continue and expand the Critical Fisheries Monitoring Program
- **FW-6** Preserve the diversity and abundance of bay wildlife
### Spill Prevention and Response

Reduce the risk of oil or chemical spills in the bay and protect high-priority environmentally sensitive areas

Secure a permanent funding source for the Physical Oceanographic Real-Time System (PORTS) of navigational information

**ACTIONS TO IMPROVE SPILL PREVENTION AND RESPONSE:**

- **SP-1** Continue implementation of advanced technology to improve coordination of ship movements in Tampa Bay
- **SP-2** Evaluate and update spill response plans for priority areas

### Invasive Species

Reduce impacts of existing and potential harmful invasive species in Tampa Bay and its watershed

**ACTIONS TO REDUCE THE OCCURRENCE OF INVASIVE SPECIES IN THE BAY:**

- **IS-2** Support prevention, eradication or management of invasive species in Tampa Bay and its watershed

### Public Access

Foster adequate and appropriate access to the bay and address competing uses

**ACTIONS TO IMPROVE RESPONSIBLE PUBLIC USE OF THE BAY:**

- **PA-1** Provide for and manage recreational uses of the bay

### Public Education and Involvement

Create a constituency of informed, involved citizens who engage in actions to protect the bay and actively participate in restoring and protecting it

**ACTIONS TO INCREASE PUBLIC EDUCATION AND INVOLVEMENT:**

- **PE-1** Promote public involvement in bay restoration and protection
- **PE-2** Promote public education about key issues affecting Tampa Bay

### Local Implementation

Integrate CCMP goals, actions and priorities in local government comprehensive plans and development guidance

**ACTIONS TO INCORPORATE CCMP GOALS AND TARGETS INTO LOCAL LAND USE PLANS, DEVELOPMENT CODES, CLIMATE CHANGE AND LAND ACQUISITION PROGRAMS:**

- **LI-1** Incorporate CCMP goals and actions in local government comprehensive plans, land development regulations or ordinances

### Climate Change

Assess the vulnerability of critical coastal habitats to sea level rise and support adaptation strategies that promote the long-term resiliency and diversity of these habitats

**ACTIONS TO IMPROVE THE RESILIENCY OF BAY HABITATS TO CLIMATE CHANGE:**

- **CC-1** Improve ability of bay habitats to adapt to a changing climate
- **CC-2** Understand and address the effects of ocean acidification
WATER & SEDIMENT QUALITY

Actions to improve water quality:

**WQ-1** Implement the Tampa Bay nutrient management strategy*

**WQ-2** Reduce pollution from recreational boaters
Action moved to Public Health Action Plan in 2017 Revision

**WQ-3** Reduce frequency and duration of harmful algal blooms
New action in 2017 Revision

Actions to reduce pollution from stormwater runoff:

**SW-1** Reduce nitrogen runoff from urban landscapes*

**SW-2** Assist businesses in implementing best management practices to reduce pollution, and to develop model landscaping guidelines for commercial use
Action merged into revised SW-1

**SW-3** Encourage local governments to adopt integrated pest management policies and implement environmentally beneficial landscaping practices
Action retired in 2017 Revision

**SW-4** Reduce impervious paved surfaces
Action retired in 2006 update

**SW-5** Require older properties being redeveloped to meet current stormwater treatment standards for that portion of the site being redeveloped, or
Action retired in 2006 update

**SW-6** Promote compact urban development and redevelopment
Action retired in 2006 update

**SW-7** Enforce and require the timely completion of the consent order for the cleanup of fertilizer facilities in the East Bay sector
Action retired in 2017 Revision

**SW-8** Expand adoption and implementation of best management practices for commercial and urban agriculture
Action revised in 2017 Revision

**SW-9** Improve compliance with agricultural ground and surface water management plans
Action retired in 2006 update

**SW-10** Expand use of Green Infrastructure practices
Action Revised

**SW-11** Expand the Adopt-A-Pond program to additional communities
Action merged into revised SW-1

**SW-12** Reduce nitrogen loading from urban landscapes
Action moved to SW-1 in 2017 Revision and expanded to incorporate SW-2 and SW-11

**AD-2** Promote public and business energy conservation
Action merged into AD-1

**AD-3** Improve opportunities for proper hazardous waste disposal
Action retired in 2017 Revision

**AD-4** Reduce toxic contaminants from ports and marinas
Action retired in 2006 update

**AD-5** Identify and understand emerging contaminants
New action in 2017 Revision

Actions to reduce the effects of air pollution on the bay:

**WW-1** Expand the beneficial use of reclaimed water
Action revised in 2017 Revision

**WW-2** Extend central sewer service to priority areas now served by septic systems

**WW-3** Require standardized monitoring and reporting of wastewater discharges

**WW-4** Revise HRS rules to incorporate environmental performance or design standards for septic systems
Action retired in 2006 update

**WW-5** Reduce the occurrence of sanitary sewer overflows to the bay*
New action in 2017 Revision

**PH-1** Reduce the occurrence of municipal sewer overflows to the bay
Action moved to Wastewater Action Plan in 2017 Revision

**PH-2** Continue assessments of human and environmental health indicators suitable for Tampa Bay beaches and other recreational waters.

**PH-3** Install additional sewage pump-out facilities for recreational boaters and live-aboard vessels

**PH-4** Reduce fecal contamination from humans and pets in Tampa Bay Area waters
Action revised in 2017 Revision and moved from Public Access Action Plan

**COC-1** Address hot spots of contamination in the bay
Action revised in 2017 Revision, renamed as “Contaminants of Concern”

**COC-4** Identify and understand emerging contaminants
New action in 2017 Revision

*denotes Priority Action
### BAY HABITATS

**Actions to increase and preserve the number and diversity of healthy bay habitats:**

**BH-1** Implement the Tampa Bay Habitat Master Plan*

**BH-2** Establish and implement mitigation criteria

**BH-3** Reduce propeller scarring of seagrass and pursue seagrass transplanting opportunities

**BH-4** Identify hard bottom communities and avoid impacts

**BH-5** Improve management of parking and vehicle access along causeways and coastal areas

**BH-6** Encourage habitat enhancement along altered waterfront properties

**BH-7** Improve compliance with and enforcement of wetland permits

**BH-8** Continue and enhance habitat mapping and monitoring programs

**BH-9** Enhance ecosystem values of tidal tributaries

**BH-10** Implement the Tampa Bay Freshwater Wetland Habitat Masterplan

**FISH & WILDLIFE**

**Actions to protect and enhance fisheries and wildlife:**

**FW-1** Increase on-water enforcement of environmental regulations

**FW-2** Establish and enforce manatee protection zones

**FW-3** Achieve a sustainable bay scallop population

**FW-4** Assess the need to investigate the cumulative impacts of power plant entrainment on fisheries

**FW-5** Continue and expand the Critical Fisheries Monitoring Program

**FW-6** Preserve the diversity and abundance of bay wildlife*

**DREDGING & DREDGED MATERIAL MANAGEMENT**

**Actions to reduce the impact of dredging and improve dredged material management:**

**DR-1** Develop a plan for beneficial uses of dredged material in Tampa Bay

**DR-2** Continue to minimize impacts to bay wildlife and their habitats from dredging activities

**SPILL PREVENTION & RESPONSE**

**Actions to improve spill prevention and response:**

**SP-1** Continue implementation of advanced technology to improve coordination of ship movements in Tampa Bay

**SP-2** Evaluate and update oil and hazardous material spill response plans for priority areas

**SP-3** Improve fueling and bilge-pumping practices among pleasure boaters

**INVASIVE SPECIES**

**Actions to reduce the occurrence of invasive species in the bay:**

**IS-1** Assess the extent of the existing invasions in Tampa Bay

**IS-2** Support prevention, eradication or management of invasive species in Tampa Bay and its watershed

**PUBLIC EDUCATION & INVOLVEMENT**

**Actions to increase public education and involvement:**

**PE-1** Promote public involvement in bay restoration and protection

**PE-2** Promote public education about key issues affecting Tampa Bay

**PUBLIC ACCESS**

**Actions to improve responsible public use of the bay:**

**PA-1** Provide for and manage recreational uses of the bay*

**PA-2** Evaluate and update oil and hazardous material spill response plans for priority areas

**PA-3** Improve fueling and bilge-pumping practices among pleasure boaters

### CLIMATE CHANGE

**Actions to improve the resiliency of bay habitats to climate change:**

**CC-1** Improve ability of bay habitats to adapt to a changing climate

**CC-2** Understand and address effects of ocean acidification

### LOCAL IMPLEMENTATION

**Actions to incorporate CCMP goals and targets into local land use plans and other planning and development guidance tools:**

**LI-1** Incorporate CCMP goals and actions in local government comprehensive plans, land development regulations or ordinances*

*denotes Priority Action
OBJECTIVES:
Continue to implement the nutrient management strategy for Tampa Bay to maintain water quality necessary to support seagrass at or above target levels. Document trends in water quality, and track nutrient reduction and prevention actions within the watershed. Develop and implement nutrient criteria recommendations and management strategies for the bay’s tidal streams.

STATUS:
Ongoing. The Tampa Bay Estuary Program (TBEP) continues to maintain the Nitrogen Reduction Action Plan Database and prepare Reasonable Assurance documentation for water quality requirements. TBEP further supported: 1) establishment of estimates for atmospheric deposition to Tampa Bay watershed sub basins and waters, 2) establishment of estimates of nitrogen loading from residential fertilizer and irrigation and corresponding nutrient load reductions associated with fertilizer restrictions and 3) development of numeric nutrient criteria recommendations for Tampa Bay.

RELATED ACTIONS:
AD-1  Continue to reduce nitrogen loading from atmospheric deposition
BH-1  Implement the Tampa Bay Habitat Master Plan
BH-9  Enhance ecosystem values of tidal tributaries
SW-1  Reduce nitrogen runoff from urban landscapes
SW-10 Expand use of green infrastructure practices
SW-8  Expand adoption and implementation of best management practices for commercial and urban agriculture
WW-1  Expand the beneficial use of reclaimed water
WW-2  Extend central sewer service to priority areas now served by septic systems
WW-3  Require standardized monitoring of wastewater discharges
WW-5  Reduce the occurrence of municipal sewer overflows to the bay

BACKGROUND:
Controlling nitrogen input into the bay as a means to regain vital seagrass beds has been one of TBEP’s most prominent initiatives. Seagrasses were selected as a metric by which efforts to improve the bay are measured because of their overall importance as a bay habitat and nursery, and because they are an important barometer of water quality.

In 1995, TBEP adopted a goal of restoring seagrass to 1950 levels after decades of decline. Reaching this goal required collaboration from local governments, industries, and citizens to reduce nutrients throughout the watershed. By June 2016, more than 500 nitrogen load reduction projects had been implemented, resulting in water clarity equivalent to the 1950s period. In 2017, the bay had 41,655 acres of seagrasses, surpassing the original restoration goal (38,000 acres) by more than 3,600 acres.
WATER AND SEDIMENT QUALITY

The nationally recognized Tampa Bay Nitrogen Management Consortium (TBNMC) — an alliance of more than 55 local governments, regulatory agencies and key industries bordering the bay — played a leading role in reducing nitrogen loadings in the bay. TBNMC members developed voluntary water quality and nutrient loading targets to support TBEP’s seagrass recovery goals. This partnership removed or prevented loading of 537 tons of nitrogen to the bay through a combined $649 million investment.

In 1998, the U.S. Environmental Protection Agency (EPA) approved a regulatory Total Maximum Daily Load (TMDL) for Tampa Bay; in 2007, EPA required all permitted nutrient sources within the Tampa Bay watershed to adhere to annual numeric loading limits, or allocations, for their nitrogen discharge to Tampa Bay. The TBNMC proactively developed voluntary nitrogen loading limits for themselves and submitted those limits as recommended allocations to EPA and the Florida Department of Environmental Protection (FDEP), rather than relying on the regulatory agencies to develop the limits for them. Both EPA and FDEP encouraged and participated in this effort, which was led by TBEP.

As outlined in the 2009 and 2012 Tampa Bay Reasonable Assurance documents, TBNMC members developed fair and equitable allocations for all 189 permitted sources within the watershed that total the federally-recognized TMDL for Tampa Bay. Consequently, both FDEP and EPA accepted the recommended allocations as meeting water quality requirements for Tampa Bay. In 2011, the TBNMC further developed recommended numeric nutrient criteria consistent with the bay’s nutrient loading targets, which were subsequently adopted by the State in 2012.

The Tampa Bay nutrient management strategy has become a national and international model for successful watershed management collaborations. TBNMC success has utilized a multifaceted approach to reduce nutrient impacts to the bay, including stormwater treatment (see Action SW-10), wastewater reuse and aquifer recharge (see Action WW-1), septic conversions and reduction in sewer overflows (see Actions WW-2, WW-3 and WW-5), reduction in fertilizer use (see Action SW-8), process improvements for industrial manufacturing and power plants (see Action AD-1), habitat rehabilitation and restoration (see Action BH-1) and homeowner education (see Action SW-1).

Examples (with corresponding reduction in Total Nitrogen, TN, where available) include:

- **stormwater treatment projects** such as the City of Clearwater’s Cliff Stephens Park Stormwater Retrofit Project (5.8 tons/yr TN reduction)
- **atmospheric deposition reduction projects** such as Tampa Electric Company’s repowering of Gannon Power Plant Bayside (1.9 tons/yr TN reduction)
- **industrial manufacturing process upgrades** such as those at CF Industries (now Mosaic) Bartow Phosphate Complex (18 tons/yr TN reduction)
- **agricultural water and fertilizer reductions** such as citrus and row crop conversion to micro-irrigation in Hillsborough County (2 tons/yr TN reduction)
- **wastewater discharge to reuse** such as Hillsborough County’s South County Reuse System (17.7 tons/yr TN reduction)
- **regional restoration and stormwater treatment creation** such as Southwest Florida Water Management District’s Cockroach Bay Restoration Project (0.7 tons/yr TN reduction)
- **overlay districts requiring additional stormwater treatment** such as Manatee County’s Development and Agricultural Overlay District in the Lake Manatee watershed (9.6 tons/yr TN reduction)
- **residential fertilizer ordinances restricting the use of nitrogen fertilizer during the rainy season** adopted by Pinellas County, Manatee County, and cities of St. Petersburg, Clearwater and Tampa (an estimated 6% reduction in TN stormwater runoff)
- **stream and creek rehabilitation** such as Pinellas County’s Allen’s Creek Rehabilitation Project (0.7 tons/yr TN reduction)
- **lake sediment rehabilitation** such as the City of St. Petersburg’s Lake Maggiore Dredging Project (1.7 tons/yr TN reduction)
• point discharge to deep well injection such as Tropicana’s Deep Well Injection Project (11 tons/yr TN reduction)

• education campaigns addressing homeowner actions to reduce stormwater runoff such as UF/IFAS Extension’s Florida Friendly Landscaping™ and TBEP’s Be Floridian campaign.

Periodic assessments of the bay’s condition using nutrient-related metrics are now required by FDEP for TBEP partners and the TBNMC. These reporting requirements include annual water quality reports and 5-year Reasonable Assurance (RA) demonstrations that assure that the Tampa Bay Nutrient Management Strategy continues to meet state and federal water quality requirements. Reporting elements in the RA document include 5-year nitrogen loadings from all sources, compliance assessments with approved allocations, water quality trends in each bay segment, and identification of current and future actions to reduce nutrient loadings to Tampa Bay. The next Tampa Bay RA report, which covers the 2012-2016 period, is due to FDEP by December 2017. Additional planned and budgeted projects are expected to reduce TN loading by 62 tons per year.

Efforts to implement a similar nutrient management strategy in Tampa Bay tidal streams are underway (see Action BH-9). Ongoing research includes development of environmental indicators and thresholds of tidal stream health and nursery function to protect wetland systems against nutrient impairment and a management framework for their restoration. This framework establishes proactive metrics that can be utilized by partners to implement watershed restoration actions that can reduce nutrient inputs to tidal streams.

As a follow-up, project partners are proposing to explore the relationship between nutrient dynamics and tidal stream condition, advancing regional knowledge of these important low-salinity habitats, as well as informing and prioritizing management actions that may be needed to protect or enhance the ecology of these systems.

Screen shot for TBEP Action Plan Database for tracking nitrogen management projects by Nitrogen Management Consortium Partners.

STRATEGY:

Activity 1
Continue to assess and report water quality targets annually. Expand monitoring and reporting to tidal creeks as available resources allow and appropriate water quality indicators are identified (see Action BH-9).

Responsible parties: TBEP (lead), with water quality data from EPCHC, Pinellas County and Manatee County

Timeframe: Ongoing; annual reports are delivered to FDEP and EPA by April 1 each year

Cost and potential funding sources: $ Using TBEP Workplan and CWA Section 320 funds for the annual bay report; $$ for water quality monitoring conducted by EPCHC, Pinellas County and Manatee County

Location: Baywide

Benefit/Performance measure: Annual documentation of attainment of numeric water quality targets in each major bay segment and in tidal creeks where data are available. Public reports to promote understanding of water quality trends to multiple audiences.

Results: Annual assessment of water quality progress and potential problems will allow timely understanding of potential problem areas and promote adaptive management of nutrient management in each bay segment.

Deliverables: Annual reports assessing numeric water quality targets in each major bay segment and tidal creek where data are available. Graphic report of water quality trends for public outreach.

Activity 2
Develop Reasonable Assurance Updates to demonstrate that the Tampa Bay Nutrient Management Strategy is effective at maintaining water quality to support seagrasses. Maintain the Nitrogen Action Plan Database developed by TBEP to effectively track and quantify nitrogen load reduction projects.

Responsible parties: Tampa Bay Nitrogen
Management Consortium participants (lead), TBEP (facilitation of the Consortium and maintenance of database)

**Timeframe:** Ongoing; next Reasonable Assurance document submitted in 2017 and every 5 years thereafter

**Cost and potential funding sources:** $ Staff time and funds to support Consortium’s technical contractor from TBNMC participants; $ for TBEP database management (CWA Section 320 funds); $$–$$$$ to implement nutrient management projects by local partners.

**Location:** Baywide

**Benefit/Performance measure:** Documentation of nutrient loadings and nutrient reductions from projects conducted throughout the Tampa Bay watershed.

**Results:** Nutrient management projects and programs implemented throughout the watershed will help attain water quality targets and seagrass goals.

**Deliverables:** 2017 Reasonable Assurance documentation. Updated TBNMC Action Plan database of nitrogen reduction projects.

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**Activity 3**

Further develop and refine effective nutrient management strategies to support ecological function of Tampa Bay tidal tributaries.

**Responsible parties:** TBEP (in partnership with Sarasota Bay and Charlotte Harbor National Estuary Programs), local government and agency partners

**Timeframe:** Initiate in 2018, complete within 3 years of initiation

**Cost and potential funding sources:** $$ grant funds from EPA or other agencies; $ for TBEP staff time (CWA Section 320 funds)

**Location:** Tidal creeks throughout Tampa Bay

**Benefit/Performance measure:** Analysis and documentation of nutrient dynamics in Southwest Florida tidal creeks. Prioritized strategies for effective nutrient management to support ecological function of these systems.

**Results:** Increased protection and management of tidal creeks and the fisheries that depend upon them.

**Deliverables:** Final report documenting nutrient dynamics and prioritized management strategies for ecological function of tidal creeks.

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1. 2015 Tampa Bay Nutrient Management Compliance Assessment Results
WATER QUALITY

Reduce frequency and duration of harmful algal blooms

OBJECTIVES:
Continue to implement the Tampa Bay Nutrient Management Strategy to reduce the potential for harmful algal blooms (HABs) to occur or be exacerbated by excessive nutrient inputs. Support additional research on regionally occurring algal bloom species that have the potential to affect Tampa Bay. Continue education on the causes and effects of HABs in Tampa Bay.

STATUS:
New Action. Prior Tampa Bay Estuary Program (TBEP) contributions include: 1) funding an assessment of the distribution of cysts of the harmful algal bloom species Pyrodinium bahamense in Old Tampa Bay sediments1, 2) supporting a Florida Fish and Wildlife Conservation Commission (FWC) project through the Tampa Bay Environmental Restoration Fund to monitor the extent and duration of HABs and map algal biomass in surface waters of Old Tampa Bay and 3) developing an integrated ecosystem model in Old Tampa Bay to understand management actions that could reduce Pyrodinium blooms.

RELATED ACTIONS:
IS-2 Support prevention, eradication or management of invasive species in the Tampa Bay watershed
WQ-1 Implement the nutrient management strategy for Tampa Bay

BACKGROUND:
A HAB is the proliferation of a toxic algal species that negatively affects natural resources or humans. Blooms occur when algae reproduce or accumulate at abundances much greater than normal for specific geographic areas. Because HABs can discolor water, they are sometimes referred to as ‘red tides’ or ‘brown tides’ depending on the algal species. However, this terminology can be confusing because HABs do not always discolor the water and discolored water may also be caused by non-harmful algal species or other phenomena.

Occurrence of algal blooms is influenced by environmental factors — such as water temperature, light and nutrient availability, rainfall and water circulation — as well as biotic interactions such as competition with other algae and grazing by zooplankton and shellfish. HABs can negatively affect ecosystems by shading seagrasses, disrupting food webs and killing wildlife. High biomass blooms can contribute to the formation of low oxygen “dead-zones,” and some HAB species produce potent toxins harmful to people and marine life.

The extent and duration of some HABs can be mitigated by reducing nutrient pollution that fuels their growth. Although Tampa Bay meets water quality management goals in most years in most bay segments (see Action WQ-1), HABs occur regularly in Old Tampa Bay, a bay segment that inconsistently meets water quality targets. In particular, blooms of the potentially toxic dinoflagellate Pyrodinium bahamense are occurring more frequently and for longer duration, with blooms occurring every year between 2008-2016. However, these blooms have yet to produce harmful ecological impacts — such as fish and shellfish toxicity resulting in large fish kills, widespread, low dissolved oxygen events or impacts to seagrass resources. Therefore, they have been characterized as nuisance algal blooms. The factors that drive Pyrodinium blooms in Old Tampa Bay are not fully understood, but the formation of resting cysts and
Establishment of *Pyrodinium* resting cyst beds is important for bloom recurrence each year.

The Indian River Lagoon (IRL) on Florida’s east coast provides a cautionary example of the potential environmental and economic consequences of severe algae blooms. Widespread “superblooms” in the lagoon since 2011, fueled in part by large volumes of nutrient-laden runoff, have caused a 60% loss of seagrasses, and unusually high mortality in fish, pelicans, and manatees. Residents and tourism-dependent businesses have suffered the loss of key recreational resources for extended periods.

FWC maintains a toll-free *Fish Kill Reporting Hotline* and online reporting form and, in response to public concern, the Florida Department of Environmental Protection (FDEP) launched a similar toll-free *Bloom Reporting Hotline* and online reporting form for residents to report algal blooms.

Species associated with HABs in Tampa Bay include:

- **Cyanobacteria** (also known as blue-green algae), a photosynthetic bacteria nearly ubiquitous in marine and freshwaters. Some but not all cyanobacteria can produce a bright blue-green tint or slimy scum. Similarly, some but not all cyanobacteria are known to produce one or more biotoxins. Extensive blue-green algal blooms occurred in Tampa Bay in the 1970s and 1980s, associated with nutrient pollution from poorly treated wastewater. Blue-green algal blooms now occur mostly in nutrient-rich freshwater systems such as Lake Thonotosassa. Preemptive measures to help prevent blue-green algal blooms in Tampa Bay focus on maintaining nutrient loading at targets levels (see Action WQ-1).

- **Karenia brevis** (also known as Florida’s ‘red tide’ alga) is a single-celled dinoflagellate naturally occurring in marine and estuarine waters of Florida. Blooms develop 10-40 miles offshore, and are sometimes brought inshore by currents and winds. Although there is no direct link between coastal nutrient pollution and the initiation, frequency, or severity of an offshore red tide bloom, nutrient runoff can help sustain blooms that are transported inshore. Red tide produces neurotoxins (brevetoxins) that can kill fish, seabirds, turtles, and marine mammals; cause respiratory distress in people; and accumulate to dangerous levels in shellfish. Presently, there is no practical and acceptable way to control the formation of red tide blooms or remove the resulting toxins from the water.

- **Pyrodinium bahamense** is also a naturally occurring dinoflagellate. It produces saxitoxins, which can accumulate in shellfish and cause poisoning if the shellfish are consumed. No closures of shellfish harvesting areas have been necessary in Tampa Bay to date, largely because no shellfish harvesting is allowed in Old Tampa Bay where blooms most frequently occur. *Pyrodinium* forms resting cysts that settle from the water column to sediments, forming a cyst bed to seed future blooms. There were no recorded occurrences of *Pyrodinium* in the bay between 1983 and 2000. However, blooms have occurred...
every summer since 2008. In the future, the intensity, timing and duration of *Pyrodinium* blooms may be influenced by increasing summer water temperatures, shifting rainfall patterns and corresponding changes in salinity and nutrient inputs. Additional research is needed to understand the factors associated with blooms of *Pyrodinium* and potential effective management actions.

**STRATEGY:**

**Activity 1**  
Continue to implement the nutrient management strategy for Tampa Bay to reduce the potential for harmful algal blooms to occur or be exacerbated by nutrient inputs (see Action WQ-1).

**Responsible parties:** Tampa Bay Nitrogen Management Consortium, TBEP  
**Timeframe:** Ongoing  
**Cost and potential funding sources:** $$$ Local government and industry funds to implement nutrient reduction actions  
**Location:** Baywide  
**Benefit/Performance measure:** Documentation of nutrient loadings and nutrient reductions from projects conducted throughout the watershed.  
**Results:** Nutrient reductions will reduce the potential, extent and duration of harmful algal blooms.  
**Deliverables:** Periodic documentation of nutrient targets, loadings and attainment of water quality standards.

**Activity 2**  
Support additional research on harmful algal bloom species found within the region that are or may emerge as a significant issue in the future (e.g., *Pyrodinium bahamense*, *Pseudo-nitzschia* spp., brown tide species such as *Aureoumbra lagunensis*). Research should include identification of critical factors in bloom development (such as physical circulation, nutrient limitation, rainfall and freshwater pulses, and life cycle dynamics) and understanding of trophic links with zooplankton and fish as well as interactions with drift algae. Leverage existing hydrodynamic models to better understand the role of circulation in HABs and improve forecasting of spread and extent of algal blooms.

**Responsible parties:** FWC-FWRI, Mote Marine Laboratory, USF Marine Sciences, FDOH, FDEP, Florida Sea Grant (for research related to HAB impacts on shellfish aquaculture), other academic institutions, TBEP  
**Timeframe:** Ongoing  
**Cost and potential funding sources:** $$ Programmatic funds; grants  
**Location:** Baywide, especially Old Tampa Bay  
**Benefit/Performance measure:** Models of phytoplankton life history and trophic dynamics to help predict, prevent and abate harmful algal blooms.  
**Results:** Better understanding of what causes HABs will result in better management strategies to avoid them.  
**Deliverables:** Research reports documenting relevant trophic and life history dynamics of nuisance algal bloom species relevant to conditions in Tampa Bay.

**Activity 3**  
Continue education about causes and effects of harmful algal blooms in bay waters, focusing on coordinated and timely communications to the public about potential health risks and environmental effects of HABs. Support general boater education and port vessel operations that reduce the potential to import HAB species through ballast or bilge water. Encourage modifications to dredging and dredge disposal activities that reduce potential spread of cysts through dredging and dredge disposal activities (see Action IS-2).

**Responsible parties:** FWC-FWRI, Mote Marine Laboratory, local health departments (for education and outreach regarding health effects and at-risk populations), TBEP, Port Tampa Bay, Port Manatee, Port of St. Petersburg (for ballast water issues)  
**Timeframe:** Ongoing  
**Cost and potential funding sources:** $ Programmatic funds; grants  
**Location:** Baywide  
**Benefit/Performance measure:** Educational outreach programs for the public with metrics for engagement and behavior change.  
**Results:** Better public understanding of what causes HABs will result in greater support of and compliance with nutrient reduction and other strategies to prevent or mitigate them.  
**Deliverables:** Educational outreach materials and program metrics.

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1 The distribution of *Pyrodinium bahamense* cysts in Old Tampa Bay sediments. TBEP Technical Report 07-12.
OBJECTIVES:
Continue to support and improve local fertilizer ordinances. Expand Best Management Practices (BMPs) certification programs for general landscape maintenance personnel. Explore incentives for homeowners to replace high-maintenance landscapes with lower maintenance alternatives. Expand outreach to homeowner and condo associations about statewide laws supporting water-conserving landscapes in deed-restricted communities and recommended changes to landscape covenants to comply with those laws. Continue research to quantify reduction in nitrogen loadings from reduced fertilizer use.

STATUS:
This action, formerly Action SW-12, has been merged with related Actions SW-1, SW-2, SW-3 and SW-11 to focus on the broader theme of reducing overall runoff from urban and residential landscapes.

RELATED ACTIONS:
WW-1 Expand the beneficial use of reclaimed water
SW-10 Expand use of Green Infrastructure practices

BACKGROUND:
Residential fertilizer is a significant source of nitrogen to the bay, accounting for about 20% of the nitrogen carried in stormwater. The costs of treating stormwater from urban areas (estimated at $3,500 per pound of nitrogen removed, per the statewide Section 319h stormwater project database) led many bay area communities to adopt local fertilizer ordinances as a practical and cost-effective way to substantially reduce nitrogen inputs at little cost to taxpayers. The Tampa Bay Estuary Program (TBEP) was instrumental in the development and adoption of these city and county ordinances.

Most of the ordinances prohibit use of nitrogen fertilizers from June 1-September 30, when the region receives 60% of its average annual rainfall and the potential for fertilizer runoff is greatest. They also require use of slow-release nitrogen fertilizers outside the summer rainy season to minimize nutrient leaching.

Ordinances in Pinellas County (and all 24 municipalities within the County) and the City of Tampa ban both use and sales of nitrogen lawn and landscape fertilizers in the summer. Manatee County’s ordinance restricts use of these products in the summer. Ordinances in Hillsborough and Pasco counties mirror a statewide model that prohibits fertilizer application when flood or storm watches are issued or likely, or when heavy rains are expected. Effectiveness of ordinances without sales restrictions could be enhanced by amendments to require stores where fertilizer is sold to post signs about the laws and to identify compliant products.

TBEP led regional fertilizer education efforts at the request of its Policy Board. The resulting Be Floridian campaign utilized Social Marketing principles to promote compliance with summer fertilizer bans. The campaign capitalized on the importance of water-based recreation to bay residents, urging them to “skip the fertilizer in the summer” to protect the waters that make living here fun. It also encouraged homeowners to “Garden Like A Floridian” by replacing turfgrass with lower-maintenance plants.

Over a 5-year period, Be Floridian used billboards, print ads, digital ads, vehicle wraps, a resource-rich website, shareable infographics, an online pledge and targeted outreach at both community events and garden centers (including big box stores) that sell lawn care products. A dynamic social media presence was enhanced by the campaign’s plastic pink yard flamingo mascot. A traveling exhibit of yard flamingos painted by area artists toured museums, art centers, tourist attractions and an airport promoting the “Protect Our Fun” theme. More than 230,000 people viewed the unique artist-painted flock during its year-long tour of the region.

At left: Landscapes with reduced turfgrass conserve water and reduce runoff. Photo by Nanette O’Hara.

Billboards like this one along I-275 in St. Petersburg reminded residents to avoid use of fertilizer in the summer.
Evaluations of Be Floridian showed that the campaign helped to boost knowledge of and compliance with the fertilizer ordinances. Fewer than 5% of respondents in a 2015 evaluation identified summer months as the best time to fertilizer lawns, and 63% said they were less likely to use fertilizer in summer because of what they had learned (up from 47% in a 2012 survey). External social science surveys conducted as part of an overall evaluation of fertilizer practices and ordinance awareness also showed widespread awareness that fertilizer should not be applied before a heavy rain. That research also found that Pinellas County residents were more aware of fertilizer ordinances, and applied significantly less fertilizer to their lawns.

A variety of other educational programs continue to reinforce and expand outreach to homeowners, property managers and lawn care professionals. The longstanding Florida Yards & Neighborhoods Program (FY&N) administered by UF/IFAS Extension is delivered locally through county extension offices. The FY&N program promotes Florida-Friendly Landscaping™ to reduce water, fertilizer and pesticide use. Extension specialists also provide Best Management Practices training now required by state law for all fertilizer and pesticide use. Extension specialists if funding were available.

Additional training for general landscape maintenance personnel on key aspects of lawn care that influence water quality (such as management of grass clippings) is required in Pinellas and Manatee counties. That training is provided by county staff, but potentially could be expanded to additional counties and conducted by Extension specialists if funding were available.

More effort also should be directed to educating landscapers, irrigation contractors, homeowners, homeowner associations and property managers about reducing or eliminating fertilizer use where reclaimed water is used to irrigate lawns, since reclaimed water contains varying amounts of nutrients depending on source (see Action WW-1).

Hillsborough and Pinellas counties also offer Adapt A Pond programs that teach residents how to improve management of stormwater ponds at the neighborhood level – including creation of vegetated shoreline buffer zones and reduced fertilizer and chemical use on neighborhood lawns that drain to the ponds. A comprehensive social marketing-based program led by UF/IFAS is increasing awareness and action to improve stormwater pond management among residents of the sprawling Lakewood Ranch community in Manatee and Sarasota counties.

Deed-restricted Homeowner Associations (HOAs) continue to be a major barrier to a shift in cultural norms toward less-lawn or no-lawn landscapes that require less water and fertilizer use. These barriers exist despite the passage of state laws allowing Florida-Friendly Landscaping™ in deed-restricted communities to conserve water. Court cases still have not clearly established a precedent that favors this law over HOA covenants, although some HOAs have updated their covenants and plant lists to allow more flexibility and integrate UF/IFAS recommendations for Florida-friendly plants.

Incentives to conserve water and reduce high-maintenance turfgrass also are needed. One promising model is the new “Turf Swap” program in Alachua County. Starting in April 2017, the program will offer cash rebates to property owners that replace irrigated turf with Florida Friendly Landscaping™.

As of 2017, Pinellas County has a UF/IFAS Extension specialist dedicated to working with HOAs, condo associations and property managers. Pasco County’s FY&N coordinator also has had success in working with HOAs, and all the FY&N county programs consistently provide high-quality training and free assistance to homeowners across their geographic and demographic spectrums. Future efforts to reduce nitrogen from urban landscapes in the Tampa Bay watershed must focus on reaching and recruiting these key audiences.

Additional research is needed to quantify the impact of fertilizer ordinances on water quality over time, and to improve ordinance compliance. A study coordinated by TBEP found that a minimum of 5-6 years of monitoring is needed to test for statistically significant differences in environmental data collected from Tampa Bay residential communities with different fertilizer ordinances.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Responsible parties</th>
<th>Timeframe</th>
<th>Cost and potential funding sources</th>
<th>Location</th>
<th>Benefit/Performance measure</th>
<th>Results</th>
<th>Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Support continued public education about proper fertilizer use and irrigation practices, Florida-Friendly Landscaping™ and other watershed protection principles. Support regional water conservation plans and outreach and incentive programs to encourage efficient irrigation practices. Increase efforts to inform HOAs and condominium associations about laws regarding Florida Friendly Landscaping™ and its benefits. Develop incentives for homeowners to replace turfgrass with low-maintenance Florida-friendly alternatives.</td>
<td>TBEP, UF/IFAS Extension, city/county stormwater programs, Southwest Florida Water Management District, Tampa Bay Water</td>
<td>Ongoing</td>
<td>$$ CWA Section 320 funds for TBEP staff time; other programs supported by local governments, SWFWMD, Tampa Bay Water</td>
<td>Baywide</td>
<td>Number of homeowners complying with fertilizer ordinances; number of landscape professionals certified in Best Management Practices (BMPs); compliance rate for retail stores in communities with store inspections. Number of communities participating in Adopt A Pond programs.</td>
<td>Reduced nitrogen loading from residential landscapes.</td>
<td>Annual reports from enforcement and education programs.</td>
</tr>
<tr>
<td>3</td>
<td>Explore support for expanding BMPs certification programs for general landscape maintenance personnel to additional counties.</td>
<td>FDEP, UF/IFAS; local counties</td>
<td>Initiate in 2017</td>
<td>$$–$$ $$ State or federal funds, such as 319 grants to reduce stormwater pollution and support BMPs</td>
<td>Baywide</td>
<td>Quantification of the relative importance of residential fertilizer inputs to urban stormwater loads.</td>
<td>Improvements to local ordinances and statewide BMP programs for homeowners, HOAs and lawn care professionals.</td>
<td>Technical reports or peer-reviewed scientific journal articles.</td>
</tr>
<tr>
<td>4</td>
<td>Continue research to quantify reduction in nitrogen loadings from reduced fertilizer use. Investigate sources, contributions and fate of nitrogen from urban landscapes.</td>
<td>UF, UCF, USF or other academic institutions, local cities and counties, FDEP, TBEP</td>
<td>Ongoing</td>
<td>$$–$$ $$ State or federal funds, such as 319 grants to reduce stormwater pollution and support BMPs</td>
<td>Baywide</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OBJECTIVES: Expand utilization of agricultural Best Management Practices (BMPs) to reduce nitrogen runoff to the bay. Target increased BMP participation from farms in priority areas where Total Maximum Daily Load regulations (TMDLs) or Basin Management Action Plans (BMAs) exist. Support regional cost-sharing programs for implementing BMPs. Expand education about best practices to community gardens and homeowners with vegetable gardens, backyard chickens, horses or livestock.

STATUS: Ongoing. The Florida Department of Agriculture and Consumer Services (FDACS) has completed and adopted BMP manuals for every major commodity produced in the Tampa Bay watershed. Efforts to increase enrollment in FDACS BMP program are ongoing with outreach targeted to BMAs. Enrollment in the Hillsborough and Manatee BMAs areas at or near 100%. FDACS and the Southwest Florida Water Management District (SWFWMD) have active cost-share programs to incentivize implementation of BMPs for commercial agriculture operations, while UF/IFAS provides educational materials and outreach on BMPs.

RELATED ACTIONS: SW-1 Reduce nitrogen runoff from urban landscapes

BACKGROUND: Non-point source pollutants from agriculture include nutrients from fertilizer and animal waste and pesticides. With improvements in irrigation and fertilization practices, public acquisition of former croplands and ongoing conversion of more intensive agricultural operations for commercial and residential development, nitrogen loading from agricultural sources has decreased in some areas in the Tampa Bay watershed. Some types of agriculture, such as cow/calf operations on pastures, may generate less nutrient runoff than residential development with highly maintained lawns. Urban agriculture (including community and backyard vegetable gardens and chicken coops) is increasing in popularity due to rising demand for homegrown and locally sourced foods.

Agriculture is an important economic driver in the region — Hillsborough, Polk and Manatee counties are among the top 6 Florida counties in value of agricultural products sold. Based on 2010–2014 estimates from the Tampa Bay Estuary Program’s Nitrogen Management Consortium, agriculture accounts for about 20% (approximately 655 tons of the 3294 tons per year average) of total nitrogen loading to the bay.

Best Management Practices Commodity Manuals

BMPs can help farmers reduce impacts to soil and water resources while maintaining economically viable crop production levels. BMPs generally include a broad array of structural (e.g., constructed swales or basins) and non-structural (e.g., preservation or prevention) approaches to conserving water and reducing fertilizer and pesticide use. Many BMPs are also designed to protect nearby water resources.

FDACS ADOPTED BMP MANUALS

Currently, if there is no applicable BMP manual for their livestock, farmers with diversified farm operations alternatively may adopt an approved conservation plan tailored to their operation.
For farmers to implement new technologies, partnerships, such as the Facilitating Agricultural Resource Program, incentivize adoption of BMPs through Cost-Sharing Incentives for Participation. Whether they are located within an adopted BMAP boundary, producers who enroll in the FDACS BMP Program benefit from a presumption of compliance regardless of whether they are located within BMAP areas. Producers who enroll in the FDACS BMP Program benefit from a presumption of compliance regardless of whether they are located within an adopted BMAP boundary.

Cost-Sharing Incentives for Participation

FDACS and SWFWMD incentivize adoption of BMPs through partnerships, such as the Facilitating Agricultural Resource Management Systems (FARMS) program that make it more feasible for farmers to implement new technologies.

- The mini-FARMS program is a partnership of FDACS and SWFWMD that provides small farmers (less than 100 irrigated acres) reimbursement for 75% of the cost (up to $5,000) to implement water conserving BMP projects. Farmers must be enrolled in the FDACS BMP Program to be eligible for mini-FARMS grants. SWFWMD offers the FARMS cost-share program for any farm located in the SWFWMD. Appropriate BMPs are encouraged through technical and financial assistance and a streamlined regulatory process. Farmers who implement FDACS-adopted BMPs benefit from a presumption of compliance with state water quality standards for pollutants that the BMPs address. Farming operations in BMAP areas are required to implement FDACS-adopted BMPs, otherwise they must conduct prescribed water quality monitoring that is approved by FDEP or Southwest Florida Water Management District (SWFWMD) to demonstrate compliance with water quality standards. FDACS prioritizes outreach to commercial operators within BMAP areas. Producers who enroll in the FDACS BMP Program benefit from a presumption of compliance regardless of whether they are located within an adopted BMAP boundary.

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- The Florida Farm Bureau County Alliance for Responsible Environmental Stewardship (CARES) program publicly recognizes farmers and ranchers that are enrolled with the FDACS BMP Program and remain in good standing with the FDACS Implementation Assurance Program. Producers receive a certificate and a “This Farm CARES” sign to place at their farm gate.

Assuring BMP Compliance

In 2014, FDACS’ Office of Agricultural Water Policy (OAWP) adopted a standardized statewide Implementation and Assurance Program consistent across all regions, commodities and BMP manuals. The program consists of two key components: mail-out surveys and site visits. Mail-out surveys are commodity specific and rotate between commodities year-to-year. The surveys contain a series of questions about management actions that correspond to the targeted BMPs for that commodity. Site visits utilize a standard form with inspections of BMP compliance for nutrient management, irrigation management and water resource protection. In 2014, site visits to 267 operations in 42 counties (including Manatee and Hillsborough) showed 55% needing improvement on one or more BMPs. In 2016, FDACS revised the program per the new State Water Law.

A 2016 map analysis comparing 2011 SWFWMD land use to FDACS BMP Program enrollment within the Tampa Bay watershed shows approximately 49% of lands identified as agricultural use are enrolled. Within the three BMAP areas (Alafia River, Hillsborough River and Manatee River drainage areas), approximately 81% of mapped agricultural lands are enrolled, while approximately 47% of mapped agricultural lands outside BMAP areas are in the program. According to the land use maps, most identified commercial agricultural operations in the Manatee River Basin BMAP and the Hillsborough River Basin BMAP have enrolled in BMPs, while approximately 53% of identified agricultural lands in the Alafia River Basin BMAP are enrolled. Continued expansion of enrollees is anticipated as they are identified in the future.

### ESTIMATED ACRES OF AGRICULTURAL LAND IN THE TAMPA BAY ESTUARY AS MAPPED BY SWFWMD AND LANDS ENROLLED IN FDACS BMP PROGRAMS FOR SPECIFIC COMMODITIES.

<table>
<thead>
<tr>
<th>Commodity/Type</th>
<th>2011 SWFWMD Land Use</th>
<th>2011 Acres</th>
<th>Related FDACS BMP Programs</th>
<th>2016 Acreage Enrolled</th>
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<tbody>
<tr>
<td>Pasture and Mixed Rangeland</td>
<td>161,856.8</td>
<td>Cow/Calf</td>
<td>75,107.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sod</td>
<td>2,574.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vegetable/Agronomic Crop (Hay)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row/Field/Mixed Crops</td>
<td>42,861.7</td>
<td>Vegetable/Agronomic Crops</td>
<td>48,753.6</td>
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<tr>
<td></td>
<td></td>
<td>Specialty Fruit &amp; Nut</td>
<td>1,508.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,384.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specialty Vineyards</td>
<td>1,277.5</td>
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</tr>
<tr>
<td>Nurseries and Vineyards</td>
<td>11,084.7</td>
<td>Statewide Nurseries</td>
<td>2,887.2</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Specialty Nursery</td>
<td>119.1</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Specialty Farm</td>
<td>2,384.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conservation Plan Rule</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,503.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Open Lands – Rural</td>
<td>50,436.5</td>
<td>No enrollment needed</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Aquaculture - Tropical Fish Farms</td>
<td>1,215.0</td>
<td>Aquaculture Certification Program</td>
<td>145,802.7</td>
<td></td>
</tr>
</tbody>
</table>

**TOTALS** | **297,086.0** | **145,802.7** |

**SOURCE:** FDACS
Education for Urban and Backyard Growers

UF/IFAS Extension Agents provide outreach to both commercial and non-commercial operators to encourage BMP adoption. Outreach to rural hobby operators (e.g., horse boarding facilities, alpaca ranches, rabbit breeding operations), especially with property adjacent to waterways, should be a focus. In addition, education should be extended to urban farmers with a greater potential to contribute pollution to stormwater runoff, including community gardens, backyard gardens and chicken coops.

With the growing popularity and interest among urban homeowners in backyard chicken coops, Pinellas County (and five of its municipalities), the City of Tampa, Polk County, and Manatee County have adopted backyard chicken ordinances. Some ordinances have setback requirements for the coop, which can help minimize stormwater pollution from waste. UF/IFAS is developing a Backyard Poultry 101 Workshop for Small Farms Agents in several counties, which will likely include recommendations for managing waste.

STRATEGY:

Activity 1
Expand utilization of agricultural Best Management Practices (BMPs) to reduce nitrogen and other pollution to the bay. Encourage development of new BMPs for emerging agricultural commodities that have the potential to contribute nutrient or pesticide runoff to the bay.

**Responsible parties:** FDACS, FDEP, SWFWMD, UF/IFAS

**Timeframe:** Ongoing

**Cost and potential funding sources:** $ FDACS

**Location:** Baywide, with emphasis on existing BMAP areas

**Benefit/Performance measure:** Increased enrollment in BMP Program among non-commercial hobby farmers in rural and urban areas.

**Results:** Reduction in nitrogen loading and pesticide runoff to the bay from agriculture.

**Deliverables:** Regularly updated FDACS-OAWP enrollment data and compliance reporting from outreach and Implementation and Assurance Program site visits.

Activity 2
Using information from FDACS, FDEP, SWFWMD and UF/IFAS, identify and map BMP practitioners in the watershed to better understand and estimate nitrogen loading from agricultural operations. Identify gaps in BMP participation where TMDLs or BMAPs exist, and target those areas for increased enrollment.

**Responsible parties:** FDACS for updating maps and enrolling new operations, FDEP, SWFWMD, UF/IFAS for identifying potential new enrollees; TBEP for estimates of nitrogen loadings

**Timeframe:** 2017

**Benefit/Performance measure:** Increased utilization of BMP improvements on commercial farms.

**Results:** Reduced nutrient pollution from agricultural operations entering Tampa Bay.

**Deliverables:** Progress report on number of cost-share projects implemented and types of BMPs implemented in the Tampa Bay watershed.

Activity 3
Support regional cost-sharing programs for implementing BMPs, including SWFWMD’s FARMS and mini-FARMS, and FDACS cost-sharing programs.

**Responsible parties:** SWFWMD, FDACS

**Timeframe:** Ongoing

**Cost and potential funding sources:** $ SWFWMD

**Location:** Baywide, with emphasis on existing BMAP areas

**Benefit/Performance measure:** Increased utilization of BMP improvements on commercial farms.

**Results:** Potential load reduction credits that could address TMDL and BMAP goals for reducing nitrogen from agricultural operations.

**Deliverables:** Regularly updated maps and data of participation in BMPs in the watershed with focus on BMAP areas.

Activity 4
Expand education and outreach about BMPs to hobby and small livestock operations, community gardens and homeowners with vegetable gardens and backyard chickens or other livestock.

**Responsible parties:** UF/IFAS Extension programs (Extension staff, as well as Master Gardener and 4H programs)
**Timeframe:** Ongoing

**Cost and potential funding sources:** UF/IFAS

**Location:** Baywide

**Benefit/Performance measure:** Increased adoption of BMPs for nutrient management among community gardens, homeowners and other non-commercial operations.

**Results:** Reductions in nitrogen loading to the bay from hobby and small farm agriculture.

**Deliverables:** Education and outreach materials on nutrient management targeted to urban community gardens and homeowners with backyard gardens and chicken coops. Outreach and education on waste management targeted to rural hobbyists with horses and other livestock.
STORMWATER RUNOFF

Expand use of Green Infrastructure practices

OBJECTIVES:
Promote expanded use of Green Infrastructure practices to prevent and reduce nitrogen pollution. Promote development and delivery of tools and incentives to expand low impact/green infrastructure implementation, including: professional training; compatibility reviews of local government development codes and comprehensive plans; and demonstration sites. Encourage Tampa Bay Estuary Program (TBEP) partners to submit local projects that implement innovative building or site design techniques to the Action Plan Database of the Tampa Bay Nitrogen Management Consortium. Encourage adoption and implementation of regional policies facilitating low impact/green infrastructure development.

STATUS:
Revised from previous SW-10 Design and Implement a Low Impact Development Strategy.

RELATED ACTIONS:
WW-1 Expand the beneficial use of reclaimed water
BH-6 Encourage habitat enhancement along altered waterfront properties

BACKGROUND:
Historically, stormwater management in Florida focused on rapidly removing rainwater from the built environment to avoid flooding. High volumes of polluted runoff were routed to the nearest receiving water body through extensive networks of gutters, ditches, canals and pipes. This management approach often resulted in polluted waterways, impacts to fish, wildlife and habitats and loss of economic and recreational opportunities that depend on healthy waters.

Florida Law requires that all new and redevelopment projects manage the first inch of rainfall onsite rather than discharging to storm drains. The Florida Department of Environmental Protection (FDEP) and the Southwest Florida Water Management District (SWFWMD) have determined that Environmental Resource Permit (ERP) applicants for new construction discharges in the Tampa Bay watershed must meet more stringent standards by demonstrating net improvement (i.e., no degradation) to waterways, because Tampa Bay is not meeting all water quality standards in all areas of the bay. Communities across Florida are now replacing outdated stormwater management systems with more innovative ones that can simultaneously reduce flooding while protecting the natural environment. These practices may also advance beneficial uses of reclaimed water (see Action WW-1) and comprehensive management of water resources within the watershed.

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Green Infrastructure is an approach to water management that protects, restores, or mimics the natural water cycle. Green Infrastructure reduces and treats stormwater at its source while delivering environmental, social, and economic benefits.

EXAMPLES OF GREEN INFRASTRUCTURE TECHNIQUES:
- **Pervious surfaces for parking areas, walkways and drives** can reduce runoff from small rain events, allowing gradual infiltration into underlying soils. Pervious surfaces include pavers, bricks, gravel, shell and porous concretes.
- **Retention areas like rain gardens, vegetated swales and recessed tree islands** are small depressions designed to capture runoff and allow it to evaporate or percolate into the ground. Associated vegetation can take up water and nutrients.
- **Vegetative buffers and littoral zones around shorelines, ponds and waterways** can filter pollutants and litter from runoff before it enters a waterbody. Specifically, biological communities (including bacteria) provide valuable nutrient removal services. Harvestable floating vegetated islands can increase the effective area over which plants can remove nutrient pollution from conventional detention ponds (see Action BH-6).
• **Rainwater harvesting systems**, such as rain barrels and cisterns, can capture rainfall and store it for later use.

• **Canopy trees and green roofs** can intercept rainfall before it hits the ground. An U.S. Environmental Protection Agency (EPA) study found that for every 10 percent increase in tree cover (up to 60%), water treatment costs decreased by approximately 20 percent.\(^1\)

Green Infrastructure techniques can produce cost savings for developers and property owners—including reduced paving, fewer or smaller stormwater conveyance structures and less land lost to conventional stormwater pond construction. An analysis of 17 case studies across the United States reported a 15 to 80 percent cost savings over conventional stormwater methods, with only a few exceptions.\(^1\) Many benefits were not monetized in this review, including improvements to water quality, human and environmental health, recreational opportunities, aesthetic value, property value, natural habitat and quality of life. Consideration of these broader watershed-scale benefits is important to evaluating the overall cost-benefits of Green Infrastructure applied on a parcel or local scale and is an important area for more research.

### Barriers to implementing Green Infrastructure

A variety of barriers exist to implementing Green Infrastructure, including lack of awareness of techniques; lack of accurate information about costs and benefits; limited opportunities for technical training and practice; homeowner association rules and deed restrictions; and outdated language in development codes and comprehensive plans that impede innovative practices. For example, a 2014 review of Hillsborough County construction and development codes identified a variety of provisions that discouraged, limited or otherwise prevented the use of low-impact development techniques.\(^2\)

A survey of Florida developers, professionals and government officials\(^3\) identified potential strategies for overcoming some of these barriers, including:

- Education, outreach and marketing to the building community and public;
- Land development code and comprehensive plan language amendments;
- Incentives for advanced stormwater treatment, such as integrating stormwater Best Management Practices (BMPs) with open space and landscape code requirements;
- Research and demonstration projects;
- Professional training for both public and private sector representatives responsible for design and review of stormwater systems.

### Evolving Regulatory Environment

The stormwater regulatory environment in Florida is slowly evolving to encourage and facilitate adoption of Green Infrastructure principles and techniques. FDEP drafted a new Statewide Stormwater Treatment Rule in 2010, which if adopted would be the first update since the original 1982 rule. The draft rule proposes to increase the level of nutrient removal required from stormwater treatment systems serving new development, such that post-development nutrient loads do not exceed loads from comparable natural, undeveloped areas. The draft rule aims to create a unified statewide standard supporting the underlying objectives of low-impact development. As of early 2017, the rule has not been adopted.

The Florida Legislature adopted a statewide ERP Rule (Chapter 62-330, F.A.C.) in 2013. A new two-volume Applicant’s Manual accompanies the Rule. Applicant’s Handbook Volume I is applicable statewide and provides general background and summaries of relevant statutes, rules, types of permits, system operation and maintenance and other general topics. Applicant’s Handbook Volume II contains Water Management District-specific design and performance criteria for stormwater quantity, quality, flood control and other special basin-specific criteria. The new ERP Rule and accompanying Applicant’s Manuals require that new stormwater management systems that discharge directly or indirectly into impaired waters must provide net improvement for the pollutants that contribute to the water body’s impairment.

To do this, a higher level of treatment is necessary to assure that the permit creates a net environmental benefit. However, in many cases, redevelopment is often exempt from the stricter stormwater treatment standards, for all or part of the redeveloped property. In 2016, Pinellas County completed a new stormwater manual to be used in conjunction with the Pinellas County Comprehensive Plan and Land Development Code. Recognizing that Pinellas County is almost entirely built-out, the manual and revised development codes incorporate a variety of Green Infrastructure techniques especially appropriate to redevelopment, adaptive reuse and retrofits.

### STRATEGY:

#### Activity 1

**Promote education and awareness of Green Infrastructure practices.**

**Responsible parties:** TBEP, SWFWMD, FDEP, EPA, UF/IFAS

**Timeframe:** Ongoing

**Cost and potential funding sources:** $-$-$ CWA Section 320; external grants

**Location:** Baywide

**Benefit/Performance measure:** Increased awareness, knowledge and understanding of Green Infrastructure and its relationship to improved water quality and habitat protection. Increased use of Green Infrastructure techniques.

**Results:** Reduced runoff volume and pollution in Tampa Bay waterways.

**Deliverables:** Outreach and education, printed materials, workshops, presentations.

#### Activity 2

**Develop and deliver information and tools needed to expand Green Infrastructure implementation within the watershed, including:**

- Outreach and education, printed materials, workshops, presentations.
- Education, outreach and marketing to the building community and public.
- Land development code and comprehensive plan language amendments.
- Incentives for advanced stormwater treatment, such as integrating stormwater Best Management Practices (BMPs) with open space and landscape code requirements.

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Vegetative shorelines help filter and treat runoff entering stormwater ponds.
Increased number of Green Infrastructure projects in the Tampa Bay watershed. Metrics to measure specific components include number of trainings; number of attendees; number of demo sites and website usage.

**Results:** Reduced stormwater runoff and pollution. Improved water and habitat quality.

**Deliverables:** Training workshops and manuals. Recommendations for compatibility changes to appropriate local government codes and plans.

**Activity 3**

Encourage unified adoption and implementation of regional policies to expand use of Green Infrastructure techniques.

**Responsible parties:** FDEP, SWFWMD, local governments, TBRPC, Florida Stormwater Association, TBEP

**Timeframe:** Beginning upon adoption of CCMP

**Cost and potential funding sources:** $ FDEP

**Location:** Baywide

**Benefit/Performance measure:** Adoption of regional policies

**Results:** Increased use of Green Infrastructure techniques. Reduced stormwater runoff and pollution. Improved water and habitat quality.

**Deliverables:** New or revised policies supporting and allowing Green Infrastructure.

**Activity 4**

Encourage TBEP partners to submit local projects that implement Green Infrastructure techniques to the Action Plan Database of the Tampa Bay Nitrogen Management Consortium, for nitrogen reduction credits or offsets.

**Responsible parties:** TBEP, Tampa Bay Nitrogen Management Consortium

**Timeframe:** Beginning 2017

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WATER AND SEDIMENT QUALITY

ATMOSPHERIC DEPOSITION

Continue to reduce nitrogen loading from atmospheric deposition

OBJECTIVES:
Continue to support power plant upgrades and transitions to alternate energy sources. Continue to support initiatives to reduce atmospheric nitrogen pollution from vehicles. Expand the number of air monitoring stations for atmospheric nitrogen. Support research to better understand and quantify the contribution of atmospheric deposition to stormwater runoff. Support public education about the link between air and water quality.

STATUS:
Revised Action. Formerly Action AD-1
Continue atmospheric deposition studies to better understand the relationship between air and water quality. Appended with background from former Action AD-2
Promote public and business energy conservation.

RELATED ACTIONS:
SW-1 Reduce nitrogen runoff from urban landscapes
SW-8 Expand adoption and implementation of Best Management Practices for commercial and urban agriculture
SW-10 Expand use of Green Infrastructure practices
WQ-1 Implement the Tampa Bay Nutrient Management Strategy
WW-2 Extend central sewer service to priority areas now served by septic systems

WW-3 Require standardized monitoring and reporting of wastewater discharges
WW-5 Reduce the occurrence of municipal sewer overflows to the bay

BACKGROUND:
Reducing nitrogen input (loading) to Tampa Bay is a core management objective for the Tampa Bay Estuary Program (TBEP) and its partners (see Action WQ-1). Reductions in nitrogen pollution are linked to improved water quality, recovery of seagrass meadows and associated marine life and other environmental and human health benefits.

Nitrogen (N) pollution can reach Tampa Bay from a variety of sources, including stormwater runoff from non-point sources (e.g., urban fertilizer runoff or septic systems — see Actions SW-1, SW-8, SW-10, WW-2), point sources (e.g., a wastewater treatment plant — see Actions WW-3 and WW-5), groundwater and springs and atmospheric deposition. Atmospheric nitrogen can reach bay waters directly through deposition from rainfall and dust and indirectly through stormwater runoff carrying atmospheric nitrogen deposited on impervious surfaces in the watershed.

Nitrogen can be emitted to the atmosphere from natural sources, such as manure emissions, forest fires and lightning. In Tampa Bay's highly urbanized watershed, natural sources are a relatively small contributor to atmospheric nitrogen loading. Most atmospheric nitrogen is emitted from fossil-fuel burning power plants and vehicles.

TBEP has been a national leader in investigating and quantifying the significant role of airborne nitrogen in overall nitrogen inputs to the bay. The long-term, multi-site bay Region Atmospheric Chemistry Experiment (BRACE), completed in 2013, was conducted by scientists from the U.S. Environmental Protection Agency (EPA), University of South Florida, TBEP and other federal, state and local environmental agencies.

BRACE demonstrated that atmospheric deposition (both directly on the bay's surface, and indirectly, through stormwater runoff) accounted for 57%
of the total annual nitrogen loading to the bay from all sources. This contribution is mainly in the form of nitrogen oxides (NOx), which contribute to ozone, an air pollutant of public health concern in Florida. BRACE showed that atmospheric sources contributed four times as much nitrogen to Tampa Bay as discharges from municipal sewage treatment plants and industry combined.

Although the bulk of emissions generated in the Tampa Bay Area originated from power plants and industry, BRACE demonstrated that emissions from vehicles had a larger local impact. This is likely due to the fact that these emissions are generated low to the ground and tend to stay within the bay watershed, while pollution emitted from tall industrial stacks is dispersed over a much larger area that extends north to Atlanta and south to Cuba.

Data collected for BRACE showed that, compared to power plants, vehicles contributed four times more NOx deposition to the Tampa Bay watershed and two times more NOx deposition directly to the bay. The study also reported that two-thirds of atmospheric nitrogen deposition was contained in dust particles (dry deposition) and one-third came with rainfall (wet deposition); and that air pollution from outside the Tampa Bay Area can impact the bay as well.

Local and national regulations are significantly reducing nitrogen emissions and improving air quality in the Tampa Bay Area.

Power plants
The Cross-State Air Pollution Rule (CSAPR) finalized in 2011 by the EPA requires states to improve air quality by reducing power plant emissions that contribute to fine particle pollution and ground-level ozone in downwind states. This rule replaced EPA's 2005 Clean Air Interstate Rule.

TECO-sponsored research has shown that cars and trucks contribute four times as much nitrogen deposition to the bay watershed as power plants.

Mobile sources have a disproportionately higher contribution than power plants to atmospheric N deposition to Tampa Bay.

Since 2001, Florida Power and Light (FPL) has transitioned from burning more oil than any other utility in the nation to having less than 0.1 percent of its electricity generation produced from oil. Locally, FPL added a new natural gas-fueled generator at its Manatee County power plant and converted two existing units to co-fire natural gas and oil.

Both TECO and FPL began operating universal solar energy facilities in 2017. FPL's 74.35-megawatt Manatee Solar Energy Center is among several large-scale facilities completed or planned by the company throughout Florida. The Manatee site houses 338,000 solar panels, enough to cover five football fields.

TECO launched a 23-megawatt photovoltaic (PV) array with more than 200,000 solar panels near the Big Bend Power Station. The system has the capacity to power more than 3,300 homes.

Despite its abundant sunshine throughout the year, Florida — the Sunshine State — lags nationally in solar production. In 2016, Florida voters approved a State Constitutional Amendment to provide property tax breaks for people who install solar panels on their homes.

Vehicles
America's fleet of cars and trucks is becoming more energy efficient. New Corporate Average Fuel Economy (CAFE) standards were adopted in 2012, but are currently being reevaluated. Progress continues in developing hybrid, electric and hydrogen-powered cars. Sales of battery-powered and plug-in hybrid cars in the U.S. increased by 37% in 2016, to 159,139 vehicles.

The Tampa Bay Area Regional Transit Authority (TBARTA) is working to create a better multi-modal regional transportation plan for the Tampa Bay Area. Cities and counties have improved alternative and public transit options, including local streetcar and trolley lines, compressed natural gas-powered buses, bicycle lanes and pedestrian-friendly neighborhoods and urban centers. Commuter light rail, high-speed ferries and even...
Elevated transit systems are in the discussion or planning phase. However, much work remains to build a successful interconnected, balanced multi-modal transportation network.

Energy conservation

Many opportunities exist to promote energy conservation that saves consumers money and reduces NOx emissions. Examples include:

- The EPA's voluntary Energy Star program helps businesses and individuals save money and protect the environment by identifying and promoting energy efficient products, homes and businesses. Since its inception in 1992, the Energy Star program has helped consumers save $362 billion dollars on utility bills and prevent 2.5 billion tons of greenhouse gases.

- A variety of rebate programs, free energy audits and other incentive programs are sponsored by local utilities such as TECO, FPL and Duke Energy to increase efficiency of appliances, heat pumps, air conditioning ducts and insulation.

- The Tampa Bay Regional Planning Council has a Telework program to promote and assess the benefits of tele-commuting to local businesses. TBEP is among the companies and organizations participating in the program.

- UF/IFAS Extension provides a wealth of general information about energy efficiency and "living green" including specific information about energy-efficient lighting, heating, cooling and landscaping.

Despite significant reductions in nitrogen emissions from power plants and vehicles and improved energy efficiency of buildings and appliances, rapid population growth in the Tampa Bay Area may offset some of these gains. In 2002, direct atmospheric loading to Tampa Bay was estimated to be 548 metric tons per year. The most recent estimate for the period 2010–2014 is 542 metric tons per year. As population size and energy demand grow, continuing reductions in per capita energy use and air pollution will be needed, especially from vehicles, to maintain and improve the region’s water quality and quality of life.

**Strategy:**

**Activity 1**: Continue to encourage power plant upgrades and transitions to alternate energy sources to reduce nitrogen emissions. Incorporate associated reductions into the Nitrogen Management Consortium's Action Plan Database.

**Responsible parties**: TECO, Duke Energy, FPL (leads); TBEP for incorporation of nitrogen reductions in baywide database

**Timeframe**: Ongoing.

**Cost and potential funding sources**: $ Contributions from NMC members support database maintenance

**Location**: Baywide

**Benefit/Performance measure**: Reductions in nitrogen emissions per unit of energy creation. Improved tracking of nitrogen emissions in the NMC Action Plan Database.

**Results**: Reduced nitrogen loading in Tampa Bay. Improved water quality.

**Deliverables**: Database entries.

**Activity 2**: Support federal and regional initiatives to reduce vehicle emissions, including increased fuel efficiency, mass transit, carpooling, bicycle commuting, telecommuting, and expansion of alternative/electric vehicle fueling stations. Incorporate associated reductions into the Nitrogen Management Consortium’s Action Plan Database.

**Responsible parties**: City/county transportation planning agencies, local commuter agencies, TBARTA, TBRPC (leads); TBEP for incorporation of nitrogen reductions in baywide database

**Timeframe**: Ongoing

**Cost and potential funding sources**: $ Staff Time from local and regional partners

**Location**: Baywide

**Benefit/Performance measure**: Reduced nitrogen emissions from cars and trucks. Increased fuel efficiency. More people carpooling, driving alternative energy vehicles, riding bicycles, using mass transit and telecommuting.

**Results**: Reduced nitrogen loading in Tampa Bay. Improved water quality.

**Deliverables**: Database entries.
Activity 3  Support existing air quality monitoring programs conducted by local governments. Expand the number of long-term air quality monitoring stations for atmospheric nitrogen deposition to include at least one in the Tampa Bay watershed.

**Responsible parties:** EPA, FDEP, EPCHC, local governments  
**Timeframe:** Beginning 2017  
**Cost and potential funding sources:** $5–$$5 EPCHC budget, potential state or federal grants  
**Location:** Baywide  
**Benefit/Performance measure:** Improved air quality monitoring. Improved understanding of the relationship and dynamics between air pollution and water pollution in Tampa Bay.

**Results:** Improved air and water quality management capacity.  
**Deliverables:** Air quality monitoring station in the Tampa Bay watershed.

Activity 4  Support research to better quantify the sources, pathways and contribution of atmospheric deposition to stormwater runoff, especially in urban areas with extensive impervious surfaces.

**Responsible parties:** TBEP, local governments, USF  
**Timeframe:** Beginning 2017  
**Cost and potential funding sources:** $5–$$5 CWA Section 320 funds, state or federal grants  
**Location:** Baywide  
**Benefit/Performance measure:** Improved understanding of sources, pathways and contribution of atmospheric N deposition to stormwater runoff.

**Results:** Improved air and water quality management capacity.  
**Deliverables:** Research study and report.

Activity 5  Improve outreach to the public about the link between air and water quality and foster behavior changes that reduce air pollution.

**Responsible parties:** TBEP, commuter and public health organizations, such as bay Area Commuter Services, TBARTA, local MPOs and the American Lung Association.

**Timeframe:** Ongoing  
**Cost and potential funding sources:** $ CWA Section 320 funds, Bay Mini-Grants  
**Location:** Baywide  
**Benefit/Performance measure:** Improved public understanding about link between air and water quality. Behavior changes resulting in reduced per capita emissions of atmospheric nitrogen pollution.

**Results:** Improved air and water quality.  
**Deliverables:** Outreach and education.
OBJECTIVES:
Encourage and expand beneficial water reuse to reduce nutrient loadings from wastewater discharges and enhance ecosystem benefits. Track the regional strategy and practices for Aquifer Storage and Recovery (ASR) and direct recharge projects to strengthen understanding of their cumulative effect on ground and surface water quantity and quality. Strengthen understanding of the contribution of nutrients and other constituents from beneficial uses of reclaimed water to Tampa Bay.

STATUS:
Ongoing. Nitrogen load estimates to Tampa Bay from all sources, including reclaimed water, were developed in 1994 and updated in 2001 and 2005. The Tampa Bay Nitrogen Management Consortium developed a Nutrient Management Strategy, with regular updates and assessments in 2007, 2009 and 2012 on the nitrogen loading reductions from reclaimed water projects. Estimates of nitrogen loading from irrigation were developed in 2008, leading to recommendations for reduced fertilizer application with reclaimed water irrigation incorporated into the Model Fertilizer Ordinance developed by TBEP. The potential presence, fate and transport of emerging contaminants of concern and microplastics in reclaimed water, wastewater, and other sanitary sewer systems warrants further investigation (see Action COC-4).

RELATED ACTIONS:
COC-4 Identify and understand emerging contaminants
WW-1 Identify and understand wastewater
BG-1 Implement the Tampa Bay nutrient management strategy

BACKGROUND:
Use of reclaimed water in the Tampa Bay watershed continues to grow rapidly, with dozens of new projects expected to be online by 2020, reducing the region’s dependence on groundwater while preventing nutrient-rich wastewater effluent from discharging into the bay. New technologies for treating and disposing of wastewater and stormwater are being tested and implemented, continuing to advance the Tampa Bay Area’s national reputation for innovation.

Reclaimed water can provide a valuable source of freshwater to the bay area — for example, to enhance wetlands, prevent saltwater intrusion into coastal areas or to augment low-salinity habitats identified as important for juvenile fisheries. For that reason, TBEP has encouraged water managers and local governments to retain reclaimed water within the bay watershed. TBEP plays an important role in tracking nutrient load reduction from all projects, including reclaimed water initiatives, via the Tampa Bay Nitrogen Management Consortium’s Action Plan Database. Between 2007–2011, a total nitrogen load reduction of 98.1 tons/yr was reported; about 9% from reuse/reclaimed water projects. The next calculation of nitrogen load reduction throughout the watershed will encompass 2012–2016. Additional planned and budgeted projects are expected to reduce TN loading by 62 tons/yr, with 1.3% from reuse and reclaimed projects.

Wastewater reuse across the 4-county area grew from 40 million gallons per day (mgd) in 1996 to 111.74 mgd in 2015, an increase of 279%. By 2015, 40% of the flow from 50 permitted wastewater treatment plants (WWTPs) was beneficially reused, as compared to 30% state-wide and 7% nationally. Still, in 2015 more than 99 mgd of treated wastewater were released to surface waters of Tampa — more than three-quarters from utilities within Hillsborough County. In its 2015 Regional Water Supply Plan, the Southwest Florida Water Management District (SWFWMD) projected that by 2035 almost 79% of wastewater could be utilized across Pinellas, Pasco, Hillsborough and Manatee Counties, with close to 100% reuse in Manatee and Pasco Counties.
Currently, there are 52 reclaimed water projects under development across the 4-county area, including transmission pipelines, pump stations, storage tanks and ponds, aquifer recharge, storage and recovery systems and feasibility studies. With completion dates by 2020, these projects could supply an additional 25 mgd of reclaimed water to the region.

**Regional Reclaimed Water Reuse in 2010, Planned Reuse by 2020 and Projected Reuse by 2035**

<table>
<thead>
<tr>
<th>COUNTY</th>
<th>ACTUAL 2010</th>
<th>PLANNED 2020</th>
<th>PROJECTED 2035</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WWTP Flow</td>
<td>Reuse %</td>
<td>WWTP Flow</td>
</tr>
<tr>
<td>Pasco</td>
<td>26.32</td>
<td>14.45 55%</td>
<td>29.07</td>
</tr>
<tr>
<td>Pinellas</td>
<td>99.11</td>
<td>46.35 47%</td>
<td>50.93</td>
</tr>
<tr>
<td>Hillsborough</td>
<td>100.21</td>
<td>30.56 30%</td>
<td>31.41</td>
</tr>
<tr>
<td>Manatee</td>
<td>26.82</td>
<td>16.03 60%</td>
<td>21.63</td>
</tr>
<tr>
<td>Total</td>
<td>252.46</td>
<td>107.39 43%</td>
<td>133.04</td>
</tr>
</tbody>
</table>

**Source:** SWFWMD

Aquifer Storage and Recovery (ASR) systems have enormous potential for diverting highly treated wastewater flows from disposal into the bay and balancing wet and dry season supply-demand inefficiencies. Reclaimed ASR systems inject treated wastewater deep into various underground aquifers, where it is stored in porous rock. From there, it can be pumped back to the surface and distributed for residential, commercial and industrial use. Exploratory wells are drilled to ensure the reclaimed water can be safely stored in the local geologic formations, additional wells drilled around the reclaimed water injection well are monitored for any possible groundwater contamination.

There are several reclaimed water ASR facilities in the Tampa Bay Area, with two more under development by the cities of Oldsmar and Palmetto.

Some recharge wells, when drilled near the coast with the right geologic conditions, can slow and potentially stop saltwater intrusion into the aquifer. For example, the South Hillsborough Aquifer Recharge Project (SHARP) is a pilot project designed to inject 2 mgd of highly treated reclaimed water into several wells in the Apollo Beach area to create a barrier to saltwater intrusion. With additional treatment, reclaimed water can be injected directly to recharge the aquifer. The Clearwater Replenishment Project will use state-of-the-art treatment technology to purify 2.4 mgd of wastewater to exceed drinking water standards, then inject it into a brackish water zone below the fresh water zone of the Upper Florida Aquifer.

The City of Tampa, which produces approximately 58 mgd of Advanced Wastewater Treated (AWT) effluent on an average annual basis, is considering a strategy to store and recover reclaimed water in the Floridan aquifer for subsequent delivery to the Hillsborough River system as part of the Tampa Augmentation Project (TAP).

Another method for “recycling” wastewater is by indirect aquifer recharge. Treated wastewater is released above ground to spray fields or to treatment and infiltration basins, typically man-made ponds or wetlands, where it can percolate back into groundwater. Pasco County relies primarily on spray-fields and rapid infiltration basins (RIBs); the county is conducting ongoing feasibility studies and planning for an innovative wetland recharge area in central Pasco County. In this public-private partnership among SWFWMD, Pasco County and land owners, wastewater effluent will be biologically treated and infiltrated through a series of constructed wetlands to reduce nutrient concentrations from 9 to 1 mg/L total nitrogen.

As part of the TAP project, the City of Tampa is conducting a feasibility study incorporating the use of RIBs for delivering AWT wastewater from the City of Tampa’s Howard F. Curren wastewater treatment plant to wetland areas along the Tampa Bypass Canal. From there, the water would seep into the ground and eventually into the Tampa Bypass Canal, potentially increasing water available for pumping into the Hillsborough River Reservoir.

Another potential use of reclaimed water is piping it from densely populated coastal areas to inland areas for reuse and/or recharge. For example, in 2016 the City of Bradenton completed a project to transfer 100% (5.57 mgd) of its reclaimed water to Lakewood Ranch for landscape irrigation — reducing direct surface water discharge in Manatee County by 90%. Similarly, there are opportunities to interconnect coastal WWTP utilities with spray fields and RIBs in eastern Pasco and Hillsborough Counties.

The City of St. Petersburg is designing an innovative wastewater reuse project at its Southwest Wastewater Reclamation Facility. The facility is being restructured to consolidate and treat biosolids, creating an alternative to traditional disposal and land application of this wastewater treatment byproduct. Biosolids will be transformed into higher fertilizer-grade biosolids suitable for sale in gardening centers. Bio-gas from the treatment process will be captured, cleansed and compressed for use on-site and as vehicle fuel.

Most reclaimed water construction projects include educational components that promote the value and benefits of efficient and effective water management. SWFWMD and local government utilities provide outreach to homeowners, school facility managers, government buildings, parks and open spaces, hospitals and golf courses on the proper application and maintenance of reclaimed water systems for landscaped areas. SWFWMD has a well-developed web page on water reclamation and reuse information, including GIS and other data, as well as educational publications. The Pinellas County South Cross Bayou Water Reclamation Facility and the St. Petersburg facilities offer tours and educational programming. The Florida-Friendly Landscaping™ Program, delivered by UF/IFAS County Extension offices throughout the region, emphasizes water conservation and efficient use of alternative water sources for watering. Additional education is...
needed to inform residents, golf course and property managers that fertilizer application can be reduced or eliminated where reclaimed water is used for irrigation. This message was a key theme of TBEP’s Be Floridian fertilizer education campaign. Pinellas County currently provides an online map of reclaimed water service areas, with corresponding fertilizer recommendations.

**STRATEGY**

**Activity 1**
Track the regional strategy and practices for beneficial uses of reclaimed water to strengthen understanding of their cumulative effect on ground and surface water quantity and quality. Evaluate constituents of reclaimed water that would limit its beneficial use in the region.

*Responsible parties:* SWFWMD and FDEP (co-leads)

*Timeframe:* Every 5 years

*Cost and potential funding sources:* $ state funds

*Location:* Baywide

*Benefit/Performance measure:* Tracking ASR and recharge projects with a 5-year reporting period.

*Results:* A coordinated regional strategy for reducing nutrient input to the bay, while also safeguarding aquifer resources.

*Deliverables:* Summary reports of regional ASR and recharge projects with a 5-year reporting period.

**Activity 2**
Improve understanding of the contribution of nutrients to the bay from beneficial uses of reclaimed water. Encourage the highest level nutrient removal that is economically and technically feasible for reclaimed water to ensure compliance with nutrient criteria.

*Responsible parties:* Tampa Bay Nitrogen Management Consortium, FDEP, SWFWMD

*Timeframe:* Initiate by 2022

*Cost and potential funding sources:* $ SWFWMD, TBERF, other grants

*Location:* Baywide

*Benefit/Performance measure:* Assessment of nutrient loading to the watershed.

*Results:* Updated nutrient loading estimates for watershed-applied reuse water.

*Deliverables:* Study results tracking the potential contribution of reclaimed water from wastewater plants to nutrient loads in surface and groundwater loading.

**Activity 3**
Encourage development of reclaimed water storage, transmission and recovery systems — including interconnections where feasible — as an efficient solution for balancing wet and dry season supply and demand inefficiencies throughout the region.

*Responsible parties:* SWFWMD, local utilities (co-leads)

**Activity 4**
Update or modify Comprehensive Land Use Plans or Land Development policies addressing reclaimed water, where appropriate, to ensure protection of nutrient-sensitive watersheds and wellfield recharge areas, and prioritize use of reclaimed water to benefit the Tampa Bay watershed. Track and ensure compliance with state legislation regarding development and distribution of reclaimed water systems.

*Responsible parties:* Local cities and counties, TBEP (for incorporation into local plans and codes); FDEP, SWFWMD (for tracking and ensuring compliance with state legislation)

*Timeframe:* Ongoing

*Cost and potential funding sources:* No additional funds

*Location:* Baywide

*Benefit/Performance measure:* Addition of new policies or revision of current policies within local Comprehensive Land Use Plans and Land Development Codes.

*Results:* Reduced nitrogen loadings to the bay and contributing waters.

*Deliverables:* Modifications to Comp Plans or Land Development Codes.

More than 200 golf courses in West Central Florida are irrigated with reclaimed water. Photo courtesy Manatee County.

Reclaimed water pipes are painted purple for easy identification.

Update or modify Comprehensive Land Use Plans or Land Development policies addressing reclaimed water, where appropriate, to ensure protection of nutrient-sensitive watersheds and wellfield recharge areas, and prioritize use of reclaimed water to benefit the Tampa Bay watershed. Track and ensure compliance with state legislation regarding development and distribution of reclaimed water systems.

*Responsible parties:* Local cities and counties, TBEP (for incorporation into local plans and codes); FDEP, SWFWMD (for tracking and ensuring compliance with state legislation)

*Timeframe:* Ongoing

*Cost and potential funding sources:* No additional funds

*Location:* Baywide

*Benefit/Performance measure:* Addition of new policies or revision of current policies within local Comprehensive Land Use Plans and Land Development Codes.

*Results:* Reduced nitrogen loadings to the bay and contributing waters.

*Deliverables:* Modifications to Comp Plans or Land Development Codes.
Activity 5  
Continue developing and implementing education for homeowners, managers of golf courses, residential and commercial properties and institutional facilities such as schools, parks and hospitals, on the proper application and maintenance of reclaimed water systems for landscaped areas. This educational/awareness effort should include the need to reduce fertilizer use where reclaimed water is applied, and provide support to the Florida-Friendly Landscaping™ Program of the UF/IFAS County Extension offices throughout the region.

Responsible parties: SWFWMD, UF/IFAS, TBEP, FDEP, local cities and counties, TBW

Timeframe: Ongoing

Cost and potential funding sources: $  
SWFWMD, FDEP

Location: Baywide

Benefit/Performance measure: Development and implementation of educational programs via web, workshops and site visits for facilities managers and HOA managers to promote the value and benefits of wastewater reuse.

Results: Increased acceptance and adoption of reuse water as a safe and beneficial alternative.

Deliverables: Educational materials and metrics on number of people engaged.
WATER AND SEDIMENT QUALITY

WASTEWATER

Extend central sewer service to priority areas now served by septic systems

OBJECTIVES:
Identify and prioritize hotspots of nutrient and bacteria contamination from septic tanks and small package plants, and convert to central sewer as opportunities arise. Develop nitrogen loading estimates for septic systems in the Tampa Bay Area. Support adoption of new septic system nitrogen reduction technology and requirements for regular maintenance and inspection.

STATUS:
Ongoing. Local municipal partners have mapped septic systems and made progress extending central sewer and converting septic systems strategically and opportunistically with land development. The Basin Area Management Action Plan (BMAP) process has helped identify hotspots and develop strategies to reduce bacterial loading (see Action PH-4).

RELATED ACTIONS:
- COC-4 Identify and understand emerging contaminants
- PH-4 Reduce fecal contamination from humans and pets in bay area waters
- WQ-1 Implement the Tampa Bay nutrient management strategy

BACKGROUND:
Overall, bay-wide nitrogen loadings from septic systems are minor when compared to other sources, such as stormwater and air pollution (see Action WQ-1). A 1995 study estimated the total nitrogen loading to the bay from septic systems at 220 tons/yr, about 5% of the total. Nevertheless, septic tanks may have significant impact locally, especially for smaller streams and water body segments. While nitrogen loading from septic systems is a concern, so are other chemicals including phosphates and “emerging contaminants” such as pharmaceuticals, personal care products and microplastics (see Action COC-4), and bacterial pollution (see Action PH-4). Failed septic systems in residential or rural areas can contribute large numbers of coliform and other bacteria to surface and ground water, especially in areas with large concentrations of older septic systems more prone to malfunctioning. Poorly maintained package plants (small privately owned wastewater treatment plants (WWTPs)) are also of concern. Over the last decade, several of these have been closed and wastewater flow consolidated with larger, more efficient municipal WWTPs.

Based on permit data from the Florida Department of Health (FDOH), there may be as many as 250,000 septic systems in the four coastal counties of the bay area, almost half built before 1970. For many years, new developments within Urban Service Areas have been required to hook up to central sewer, and expansion of Urban Service Areas over time has facilitated conversion of additional properties to central sewer. Even so, thousands of new permits for septic systems have been issued in the last decade. FDOH’s state-wide Florida Water Management Inventory completed in 2016 documents and maps the wastewater treatment method and the drinking water source for the more than 6 million improved parcels in the state. The study documented that in the three counties surrounding the bay, about 117,000 parcels have or likely have septic systems. This estimate does not include the portion of Pasco County within the bay watershed. More than half of all parcels in Pasco are on septic. Pinellas County has the fewest parcels served by septic systems (15,000 or 3.6%).

Local government partners have basic inventories and maps of septic systems, and all have made good to substantial progress in converting septic systems to central sewer. Pinellas County and the Cities of Clearwater, Largo, St. Petersburg, Tampa and Lakeland all have ongoing projects to convert more septic systems to central sewer as opportunities arise. Projects are tracked in the Action Plan Database of the Tampa Bay Nitrogen Management Consortium (see Action WQ-1). Challenges remain with regard to...
While Florida law requires a 75-foot septic system setback from wells and surface waters, Manatee County implemented county-wide requirements that mandate a 400-foot setback from waterways for new septic systems, encompassing freshwater, marine and tidal waters. If this setback is not feasible, then performance-based standards providing Advanced Wastewater Treatment (including additional nutrient removal capacity) must be achieved by the septic system. Hillsborough County also requires stricter setbacks as part of its wellfield protection buffers.

In 2015, FDOH completed the Florida Onsite Sewage Nitrogen Reduction Strategies Study, providing new methods and options for reducing nitrogen from septic systems in sensitive watersheds where sewers are not feasible. The seven-year project developed and field-tested new septic system designs, including system cost estimates and costs compared with existing systems. Systems were installed and tested at residential homes across the state, including a site in Hillsborough County.

The project also developed a nitrogen fate and transport model to estimate nitrogen contribution from septic systems in shallow aquifers. The Tampa Bay Estuary Program (TBEP) does not specifically quantify nitrogen loadings from septic tanks in overall watershed estimates; they are potentially captured as a part of non-point source and groundwater estimates. This is a future priority of the Nitrogen Management Consortium.

At present, the ability of local governments to mandate septic systems that meet environmental performance standards is uncertain; the Department of Health is currently developing rules to provide more flexibility to local governments, particularly for septic systems where pollutant limits have been established (TMDLs). The rules also could benefit residents with private drinking water wells in these areas.

Regular inspections for septic systems near wells and surface waters remain an important issue to be addressed, potentially as initiatives arise from the Florida Springs and Aquifer Protection Act passed by the Florida Legislature in 2016.

Locally, city and county permits issued through the National Pollutant Discharge Elimination System (NPDES) offer a mechanism for addressing chronic failures of septic systems and package plants. Local Land Development Codes may also address problem areas with repeated failures of septic systems.

STRATEGY:

Activity 1 Continue to update inventories and maps of septic systems within the watershed, and identify “hot spots” of potential pollution from septic systems or smaller package plants.

Responsible parties: FDOH, cities and counties (leads)

Timeframe: Ongoing

Cost and potential funding sources: $319 Program grants, Agency and local government resources.

Location: Baywide

Benefit/Performance measure: Assessment of number, size, age and condition of septic systems and small package plants.

Results: Better information for developing and prioritizing strategies for reducing and removing nutrient load from the watershed.

Deliverables: Data-rich GIS maps of septic systems and small package plants.

Activity 2 Continue to convert small package WWTPs and individual septic systems to central sewer, as
opportunities arise through funding or land use/development transitions. Encourage state grants to support voluntary private conversions and increased WWTP capacity to handle new flows from conversions. Incorporate strategies to remove septic systems and package plants in BMAP priority areas designated as impaired for nutrients or bacterial contamination.

**Responsible parties:** Cities and counties (leads)

**Timeframe:** Ongoing

**Cost and potential funding sources:** $$$

2017–2018 Funding request by Governor for 50/50 matching grants for septic system removal in Caloosahatchee/St. Lucie River watersheds could be expanded to other areas of Florida, including Tampa Bay

**Location:** Baywide

**Benefit/Performance measure:** Number of septic systems and small package plants threatening surface and groundwater quality converted to central sewer.

**Results:** Reduced nutrient loading and contamination in Tampa Bay.

**Deliverables:** Conversions of septic systems in areas served by central sewer.

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**Activity 3**

Develop baywide and segment-specific estimates of nitrogen loading from septic systems as part of overall annual nitrogen loadings to Tampa Bay, updated every five years.

**Responsible parties:** TBEP, NMC (leads)

**Timeframe:** Initiate by 2020; complete by 2022 RA Update

**Cost and potential funding sources:** $ Funded by NMC members through RA budget

**Location:** Baywide

**Benefit/Performance measure:** Assessment of nitrogen loading from septic systems.

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**Activity 4**

**Results:** Understanding of the relative contribution of septic systems to overall nitrogen loading to the bay.

**Deliverables:** 2022 Reasonable Assurance Update.

Support evaluation and adoption of new nitrogen-reducing septic system technology locally. Support legislation at local, state or federal levels to require regular maintenance and inspection of septic systems. Support FDOH efforts to allow stricter septic system setbacks and standards in areas with impaired waters.

**Responsible parties:** NMC (for evaluation), Agency on Bay Management, local cities and counties (to support adoption of legislation)

**Timeframe:** Ongoing

**Cost and potential funding sources:** $ NMC participants through RA Update budget, external grants

**Location:** Baywide

**Benefit/Performance measure:** Reporting on new performance-based systems. Adoption of new design and maintenance standards. Adoption of new siting criteria for septic systems in sensitive areas, or those with impaired waters through BMAPs and other local watershed improvement plans.

**Results:** Improved septic system design and performance. Enhanced protection of sensitive areas and improved quality of impaired waters.

**Deliverables:** Report on new technology and designs available for adoption and installation. Local and/or state adoption of rules or policies allowing stricter design and siting criteria.

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**Activity 5**

Increase education and outreach in problem areas (including ‘hot spots’ identified in Activity 1) to encourage proper operation and maintenance of septic systems, and encourage conversion to central service where it is available. See Pinellas County literature developed for Allen’s Creek, which could be adapted by other local governments and FDEP’s Waterfront Property Owner’s Guide, most recently revised in 2008.

**Responsible parties:** FDOH, FDEP, local governments

**Timeframe:** Ongoing

**Cost and potential funding sources:** $ Agency and local government resources, external grants

**Location:** Baywide

**Benefit/Performance measure:** Development and implementation of educational programs via web, workshops and utility mailings to promote proper operation and maintenance of septic systems and encourage conversion to central sewer service.

**Results:** Increased conversion to central sewer and improved septic system maintenance.

**Deliverables:** Educational materials and metrics on number of septic system owners reached.
Activity 6  Form a regional working group to provide guidance on common issues of concern associated with septic systems, including recommended setbacks or performance standards and planning considerations, such as advantages/disadvantages of low-density development in sensitive areas versus expansion of Urban Service Areas.

**Responsible parties:** TBEP, local cities and counties, county health departments, FDEP

**Timeframe:** Initiate in 2020; complete by 2021

**Cost and potential funding sources:** No additional funds necessary; staff time only

**Location:** Baywide

**Benefit/Performance measure:** Adoption of baywide standards for siting and design of septic systems.

**Results:** Improved protection of surface water and groundwater quality and reduction in nutrient loadings from septic systems.

**Deliverables:** Guidance document with regionally specific BMP recommendations for location, construction, design and maintenance of septic systems — for possible incorporation into local government comprehensive land use plans or land development codes.

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OBJECTIVES:
Require standardized monitoring and reporting of wastewater discharges to improve the accuracy and timeliness of pollutant loading estimates. Provide access to an up-to-date, publicly accessible database of industrial and domestic wastewater discharges. Develop and maintain an ongoing Tampa Bay-specific summary of information for loadings of core pollutants reported to the monitoring database.

STATUS:
Ongoing. Action revised to incorporate new information on improvements to reporting of wastewater discharges.

RELATED ACTIONS:
WQ-1 Implement the Tampa Bay nutrient management strategy
WW-1 Expand the beneficial use of reclaimed water

BACKGROUND:
Improved water quality has produced a resurgence of healthy seagrass meadows and associated fish and invertebrate communities in Tampa Bay. Protecting these gains requires diligent monitoring of pollutant inputs (loading) to the bay. The Tampa Bay Estuary Program (TBEP) regularly estimates loadings of core pollutants, including total nitrogen (TN), total phosphorus (TP), total suspended solids (TSS) and more recently, biochemical oxygen demand (BOD). Pollutant loadings are estimated from a variety of sources, including atmospheric deposition, domestic and industrial point sources, groundwater, springs and nonpoint sources'. Accuracy and timeliness of pollutant loading calculations is critical to development of loading estimates used by the Tampa Bay Nitrogen Management Consortium (NMC) to prepare Tampa Bay Reasonable Assurance (RA) documents. These data also are needed for Basin Management Action Plans (BMAs) and other documents necessary to meet regulatory requirements and for tracking the long-term recovery of the bay (see Action WQ-1).

Although improvements to domestic and industrial wastewater treatment plants (WWTPs) have significantly reduced their water quality impact, they remain a small, but significant source of pollutant loading. In 2015, approximately 122 million gallons of treated wastewater were discharged into Tampa Bay per day. From 2007-2011, industrial and domestic wastewater discharges contributed an average of 6% and 15% of total nitrogen loading to Tampa Bay, respectively.1,2 About a quarter of WWTPs in Florida are authorized to discharge treated wastewater (effluent) directly to surface waters under National Pollutant Discharge Elimination System (NPDES) permits. The remaining plants are authorized to discharge effluent to groundwater through land-application, beneficial use of reclaimed water or deep well injection (see Action WW-1).

Wastewater treatment plants self-monitor and report their own discharges to the Florida Department of Environmental Protection (FDEP) through monthly or quarterly Discharge Monitoring Reports (DMRs), as required by their permits. All permitted facilities are required to monitor and report on the chemical composition of effluent discharges, but the specific parameters they monitor can vary from facility to facility, based on permit requirements. This is particularly problematic for estimating loadings from industrial WWTPs — their permits often require them to only report a subset of nutrient forms (e.g., ionized ammonia, orthophosphate), and often in a way (e.g., without concomitant flow data) that makes it difficult for resource managers to calculate accurate and timely loading estimates for core pollutants.

TBEP’s primary interest is consistent reporting of TN to accurately calculate loading estimates for the Reasonable Assurance process. Consistent reporting of TP, TSS and BOD as appropriate would also be helpful.

Another challenge to calculating accurate and timely pollutant loading estimates for WWTPs was that facilities traditionally could submit DMRs in hand-written or paper format. This required FDEP to enter data into databases by hand, which took time and could lead to data entry errors and significant lags in reporting data.

EPA recently promulgated E-reporting rule 80 FR 64063, which requires NPDES permitted facilities to electronically report and share data.
This improvement will enhance transparency by providing a timelier, complete, more accurate and nationally consistent set of data in a more accessible form. As of December 2016, FDEP requires all NPDES wastewater and stormwater facilities to submit DMRs through their web-based Electronic Discharge Monitoring Report System (EzDMR).

Compliance data from DMRs is accessible to the public through FDEP's OCULUS website. Locally, the Environmental Protection Commission of Hillsborough County also maintains records of DMRs.

**STRATEGY:**

**Activity 1**

Where historic data indicate wastewater discharges contain significant concentrations of pollutants of concern to a waterbody, require standardized measurement and timely reporting of those parameters, particularly TN, and average daily or monthly flow from point-source facilities with defined load allocations in the 2012 Reasonable Assurance document adopted by FDEP. This includes all permittees discharging an average of 100,000 gallons or more of wastewater per day.

**Responsible parties:** FDEP (lead for data collection and database management)

**Timeframe:** Ongoing

**Cost and potential funding sources:** $ FDEP will implement the E-reporting rule and maintain database

**Location:** Baywide

**Benefit/Performance measure:** Standardized monitoring and reporting of significant discharges of TN and average daily or monthly flow will facilitate the accurate and timely calculations of total pollutant loading to Tampa Bay.

**Results:** Accurate and timely monitoring of total pollutant loading to Tampa Bay is essential to adaptive management and resource protection.

**Deliverables:** Standardized monitoring of significant discharges of TN and average daily or monthly flow. Other monitoring parameters may be included as needed to address specific waterbody or estuary impairments. Standardized and timely reporting of these core parameters through FDEP’s EzDMR System and/or E-reporting rule implementation.

**Activity 2**

Improve access to FDEP’s permit compliance databases and wastewater spill databases. Improve the usability of these databases, reduce the need for duplicative reporting and keep databases up to date.

**Responsible parties:** FDEP (lead) with review by Tampa Bay NMC

**Timeframe:** Ongoing. As of December 2016, FDEP requires NPDES facilities to file DMRs electronically through a web-based EzDMR system.

**Cost and potential funding sources:** $ FDEP

**Location:** Baywide

**Benefit/Performance measure:** Timely access to accurate, standardized pollution loading data from WWTPs will increase our understanding of the relationships between pollutant loading and water quality in Tampa Bay.

**Results:** Improved knowledge and understanding of pollutant loading and water quality will improve adaptive management and resource protection in Tampa Bay.

**Deliverables:** Improved access to online data provided in DMRs, data and database management and user interface.

**Activity 3**

Develop Tampa Bay-specific information from discharge monitoring reports that summarizes loading of core pollutants on an ongoing basis, to facilitate timely preparation of documents required for Reasonable Assurance assessments. This information also can be utilized by local governments to meet TMDLs and other water quality regulations, as well as in BMAPs.

**Responsible parties:** TBEP to facilitate in partnership with FDEP and with input and review from the NMC.

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OBJECTIVES:
Encourage proper operation, maintenance and replacement of deteriorating and failing sanitary sewer infrastructure owned by utilities and private property owners. Encourage and support efforts to reduce groundwater and stormwater inflow and infiltration to sanitary sewer systems. Support local government capacity to gain adequate funding for needed capital improvement projects. Encourage communication, coordination and cooperation among regional utilities. Support public education and outreach about best practices for proper use and maintenance of privately-owned lateral sanitary sewer infrastructure (i.e., pipes connecting homes and businesses to municipal lines).

STATUS:
Ongoing. Previously Action PH-1, this action is updated to incorporate new information about operation, maintenance and replacement of sanitary sewer infrastructure in the Tampa Bay watershed. It includes new information about efforts to improve communication, coordination and cooperation among regional utilities and a public education component.

BACKGROUND:
Sanitary sewer systems are closed, underground conveyances designed to collect and transport domestic, commercial and industrial wastewater to centralized wastewater treatment plants (WWTPs). Occasionally, sanitary sewers can overflow and release untreated sewage into the environment — potentially contaminating surface waters and sediments and threatening public health. Reducing the occurrence of sanitary sewer overflows (SSOs) is important to maintaining and improving water quality in Tampa Bay.

Sanitary sewers can overflow for a number of reasons, including improper design and capacity, aging infrastructure, line blockages and breaks, infiltration and inflow of stormwater, and equipment and power failures. Addressing these challenges through proper operation and maintenance, capital improvement projects, education and enforcement will help reduce the incidence of sanitary sewer overflows.

Design Problems and Capacity Exceedance
While initial design and construction problems can underlie some SSOs, it is more common for ongoing urban development to exceed original system capacity and lead to overflows. Solutions include retrofitting existing systems with additional pipes, bigger interceptors, reduced wet weather infiltration and inflow, more underground storage or additional WWTP treatment capacity.

Aging infrastructure, Blockages and Breaks
Wastewater systems in the Tampa Bay Area are showing their age. This is particularly true in older urban areas like the Cities of St. Petersburg and Tampa. Since 2010, the City of Tampa has rehabilitated more than 34 miles of gravity pipeline and 2,000 manholes. The City plans to rehabilitate another 19 miles of gravity pipeline and 500 manholes by 2018. Tampa also completed more than $15 million in maintenance projects at the Howard F. Curren Advanced WWTP. Another $36 M in facility improvements are either under construction, in design or planned. Elsewhere, Hillsborough County is retiring two aging WWTPs and consolidating treatment at the Northwest Regional Water Reclamation Facility to improve treatment efficiency and reduce power use.

Pipes can deteriorate and fail over time, especially those made from older, degradable materials like clay or Orangeburg — made of layers of wood pulp and pitch. For example, the volume of wastewater conveyed per person per day in Pinellas County is significantly higher in the South County system, where many pipes are made of vitrified clay, compared to the North County system, where the majority of pipes are made of PVC. This is likely due to the amount of infiltration and inflow.
WATER AND SEDIMENT QUALITY

Many utilities in the Tampa Bay Area have aggressive programs to replace older, deteriorating infrastructure. For example, Tampa invested $444 M to upgrade two master lift stations to improve wet-weather operations. Hillsborough Basin Management Action Plan participants committed to implement over 75 bacteria reduction projects, 45 of which were categorized as “wastewater infrastructure management” projects.1,2 Hillsborough County lined 214,000 feet of pipe with slip lining at a cost of $10 M, and the City of Largo invested $100 M for a new wet-weather force main. Pipes connecting homes and businesses to the municipal sewer system (private laterals) require similar attention, but are often neglected by property owners.

Inflow and Infiltration
Sanitary sewers in the Tampa Bay Area were not designed to transport groundwater and stormwater. Backups and overflows can occur when excessive amounts of groundwater and stormwater enter and overwhelm system capacity. This can result in sewage backups into homes, spills from manhole covers or lift stations or emergency discharges at WWTPs. Infiltration occurs when groundwater enters sanitary sewer systems through defective, permeable or broken pipes. Inflow occurs when stormwater enters the sanitary system through unauthorized connections (e.g., yard and roof drains, and submersible pumps). Sanitary sewer overflows due to inflow and infiltration are most commonly associated with rainstorms.

For example, unusually heavy rains in summer 2015 overwhelmed the City of St. Petersburg’s sanitary sewer system, and forced the city to discharge 31 million gallons of treated and untreated wastewater into Clam Bayou and Tampa Bay. The storm-related incident was compounded, in part, by loss of system capacity when the Albert Whitted WWTP was closed months earlier. Making matters worse, some homeowners associations, businesses and individual residents piped water out of flooded areas into the City’s sanitary sewers.

Stormwater entering sewer systems through old, permeable red clay or orangeburg pipes during high rainfall events is a significant contributor to sewage overflows.

Equipment and Power Failures
Equipment failures and lack of backup power can also cause overflows. Regular inspections and maintenance are important preventative measures. For example, Tampa installed emergency generators at some of its pump stations.

Climate Change
Climate change will further strain aging wastewater infrastructure. Anticipated changes in storm intensity may escalate inflow and infiltration leading to more frequent sewer overflows and emergency releases. Rising sea levels and associated changes to groundwater may increase infiltration, corrode infrastructure and alter the effectiveness of wastewater treatment. As a result, climate change risks should be considered when planning new wastewater infrastructure. For example, planners may consider locating new wastewater treatment plants away from future surge and flood-prone areas and consider increasing capacity to accommodate anticipated increases in inflow and infiltration during more intense storms. Community resilience planning is underway in several municipalities in the bay watershed.

In retrospect, some overflows and releases due to the storm may have been avoidable if comprehensive system-wide action plans had been in place specifying emergency responses (similar to oil spill response plans), and if additional conveyance and storage capacity in neighboring utilities’ systems were made available. In Fall 2015, the Florida Department of Environmental Protection (FDEP) began convening regular meetings of regional utilities to improve communication, coordination and cooperation among them. One goal is to explore opportunities for cooperative resource and capacity-sharing among utilities during heavy storms or other emergencies.

Infall and outfall events is a significant contributor to sewage overflows.
Strategy:

Activity 1
Support local government efforts to acquire adequate funding to replace substandard or aging facilities.

**Responsible parties**: Local governments, regional utilities (lead) with TBEP and agencies participating in identifying funding opportunities

**Timeframe**: Initiate in 2017

**Cost and potential funding sources**: $ Local government staff time for grant writing; EPA Climate Ready Estuaries grant fund, consider other sustainable funding sources such as user fees

**Location**: Baywide

**Benefit/Performance measure**: Replacing substandard or aging infrastructure will reduce occurrence of sanitary sewer overflows and pollutant loading to Tampa Bay waterbodies.

**Results**: Adequate funding to reduce pollutant loading will protect water quality and public health in the bay watershed.

**Deliverables**: Competitive grant proposals.

Activity 2
Encourage communication, coordination and cooperation among utilities. Support FDEP's ongoing working group to convene and facilitate regular meetings among regional utilities. Examine how utilities here and elsewhere have responded to emergency discharges and incorporate lessons learned and applicable management strategies. Improve communication to residents regarding public health risks posed by sewer overflows, using quick-notification tools such as neighborhood-based web networks and mobile device applications.

**Responsible parties**: FDEP, regional utilities (lead) with TBEP and agencies participating

**Timeframe**: Ongoing

**Cost and potential funding sources**: $ FDEP and local government staff time

**Location**: Baywide

**Benefit/Performance measure**: Improved communication and cooperation among regional utilities will improve best practices for operation and maintenance of regional wastewater systems. Cooperative assistance and agreements for capacity sharing during heavy rainstorms or other emergencies will increase resiliency and capacity of WWTPs and their collector networks. Improved communication with residents during emergency events will protect public health.

**Results**: Improved operating and maintenance BMPs and enhanced resiliency to storms will help reduce sanitary sewer overflows and protect water quality and public health in the Tampa Bay Area.

**Deliverables**: Facilitated meetings and other activities involving regional utilities. Memorandum of understanding or other agreement for cooperative assistance and capacity sharing among utilities during storms or other emergencies.

Activity 3
Encourage and support regional utility efforts to design, operate and maintain wastewater systems comprehensively, including:

- Reducing inflow and infiltration into sanitary sewer systems;
- Maintaining and replacing deteriorating and failing sewer lines owned by utilities and the private sector;
- Installing manhole inserts;
- Conducting regular line inspections and cleanouts;
- Enforcing grease ordinances;
- Identifying and eliminating illicit connections to sanitary sewer systems;
- Developing Actions Plans specifying protocols and responses during emergencies, including identification of nearby facilities with additional capacity, a plan for transporting wastewater to those facilities and timely and ongoing communication with residents in areas where emergency discharges occur;
- Considering impacts of climate change and sea level rise on performance of sewer system infrastructure.

**Responsible parties**: FDEP, regional utilities (lead) with TBEP and agencies participating

**Timeframe**: Initiate in 2017

**Cost and potential funding sources**: $ FDEP and regional utilities staff time

**Location**: Baywide

**Benefit/Performance measure**: Reduced incidences of sanitary sewer overflows.

**Results**: Better protection of water quality and public health in the Tampa Bay Area.

**Deliverables**: Comprehensive management plans for operation of wastewater facilities.

Activity 4
Support public education and outreach about best practices for proper use and maintenance of private wastewater lateral systems. Outreach should address inappropriate items to flush down toilets or wash down sinks, especially information about proper disposal of fats, oils and grease. Education should also address proper maintenance and timely replacement of deteriorated sanitary sewer laterals on private property, and elimination of unauthorized connections.

**Responsible parties**: FDEP, regional utilities (lead) with participation by TBEP and agencies, governments can assist homeowners by identifying...
funding or incentive programs to assist with replacement of lateral lines

**Timeframe:** Initiate in 2018

**Cost and potential funding sources:** $ FDEP, regional utilities staff time

**Location:** Baywide

**Benefit/Performance measure:** Increased public knowledge about best practices for proper disposal of household and business wastes into sanitary sewers, reduction of unauthorized pipe connections and associated behavior change will help reduce blockages and overflows in sanitary sewer systems.

**Results:** Reduced sanitary sewer overflows will protect water quality and public health in the Tampa Bay Area.

**Deliverables:** Education materials and outreach about residential and business BMPs for proper use and maintenance of sanitary sewer systems. Surveys measuring behavior change.

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OBJECTIVES:
Identify and remediate priority “hot spots” of sediment contamination in the bay. Continue sediment quality and benthic monitoring in the bay and expand to tidal tributaries and rivers. Incorporate benthic community targets in management plans.

STATUS:
Ongoing. Using the Tampa Bay Benthic Index, eight priority hot spots were identified in Tampa Bay. A Sediment Quality Action Plan was developed for the highest priority site, McKay Bay, and initial assessment has been completed.

RELATED ACTIONS:
BH-1 Implement the Tampa Bay Habitat Master Plan
BH-8 Continue and enhance habitat mapping and monitoring programs
BH-9 Enhance ecosystem values of tidal tributaries

BACKGROUND:
Monitoring of benthic, or bottom, habitats has been ongoing since 1993 with more than 1,500 samples analyzed for environmental contamination, including chemical and physical indicators and biological indicators like benthic community composition. The Environmental Protection Commission of Hillsborough County (EPCHC) coordinates the monitoring program with participation from Manatee and Pinellas Counties. Over the last 20 years, the condition of Tampa Bay benthic communities baywide has been “Fair” to “Poor”, with “Good” conditions in Middle and Lower Tampa Bay in most years. Based on these long term monitoring data, increased benthic monitoring of major river systems (e.g., Hillsborough, Palm, Alafia and Little Manatee Rivers) and minor tidal tributaries is needed (see Action BH-8), and benthic community indicators and targets should be incorporated into tidal stream habitat management plans (see Actions BH-1 and BH-9).

Benthic monitoring is important for identifying hot spots of sediment contamination. Using monitoring data, the Tampa Bay Benthic Index (TBBI) provides a tool for assessing the health of benthic habitats. This index assesses the severity of contamination based on lack of diversity or abundance of benthic organisms, low dissolved oxygen or high levels of contaminants of concern (COCs). COCs include toxic chemicals like heavy metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenols (PCBs) and organic pesticides. Because COCs can persist for decades in aquatic sediments and some can bioaccumulate in the food web, these hot spots pose health risks to fish, wildlife and humans.

In 2007, the Sediment Quality Assessment Group identified eight priority “hot spot” areas in Tampa Bay with low TBBI scores, indicating elevated contamination and reduced benthic diversity. These are:

- McKay Bay
- East Bay
Through a cooperative effort of TBEP partners, a Sediment Quality Action Plan (SQAP) was developed in 2011 for the highest-ranking hotspot, McKay Bay, where 46% of benthic sediments are contaminated by PAHs, PCBs and metals in concentrations high enough to threaten the organisms living in the bay. Despite its urban location and impacted sediments, McKay Bay provides important wildlife habitat with its diversity of mudflats, mangroves, saltmarshes and oyster bars. The McKay Bay SQAP recommends initial steps to 1) identify and control external sources of COCs from upland sites with known soil or groundwater contamination and from stormwater runoff, and 2) assess ecological and human health risks from contaminated sediments.

Follow-up studies in 2014, funded by the Tampa Bay Environmental Restoration Fund, showed McKay Bay sediments are toxic to some animals. In tests of a variety of fish and shellfish, PAHs found in clam tissues exceeded U.S. Environmental Protection Agency thresholds for ecological effects in some areas, and two PAHs found in test animal tissue exceeded EPA screening levels for human health of subsistence fishers at all McKay Bay sites. These results highlight the need for continuing risk assessments and tracking of updated standards. The last baywide risk assessment for COCs was published in 1995.

**Activity 1**

Continue the baywide benthic monitoring program to analyze sediments for contaminants and assess the health of benthic communities. Expand monitoring in rivers and tidal tributaries. Conduct annual “special studies” as warranted to investigate potential contamination in additional areas of concern.

**Responsible parties:** EPCHC (lead), Pinellas County, Manatee County

**Timeframe:** Ongoing; add river and stream sites as funding becomes available

**Cost and potential funding sources:** $$$ Current benthic program funded by EPCHC with support from TBEP CWA Section 320 funds, new sites could be funded internally by EPCHC or through external grants

**SEDIMENT CONTAMINANTS OF CONCERN FOR PRIORITY AREAS OF TAMPA BAY**

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SOURCE: TBEP
Activity 2
Incorporate benthic community targets in tidal stream habitat management plan.

**Benefit/Performance measure:** Benthic health targets established for tidal streams.

**Results:** Targets will help track progress in maintaining or restoring ecological health and diversity of tidal tributaries.

**Deliverables:** Tidal tributary management plan incorporating benthic targets.

**Cost and potential funding sources:** $ CWA Section 320 funds

**Location:** Baywide

Activity 3
Develop and implement Sediment Quality Action Plans for two priority hot spot areas: McKay Bay and Largo Inlet.

**Benefit/Performance measure:** Risk assessment and source identification of toxic contaminants at upland sites draining to McKay Bay and Largo Inlet. Action plans addressing priority contaminated areas.

**Results:** Identification of land-based sources and relative contributions of toxic contaminants at two priority hot spots. Methods may serve as a model for remaining priority hot spots.

**Deliverables:** Reports assessing ecological and human health associated with upland sites.

**Cost and potential funding sources:** $$–$$$$

**Location:** Baywide

Activity 4
Continue development and implementation of action plans addressing priority hot spots of contamination (as determined by the Tampa Bay Benthic Index), which may include toxicity tests on fish and wildlife. Pursue state or federal grants to implement Sediment Quality Action Plans. Identify most appropriate options to restore sediment quality in impacted areas, including in-bay remediation such as capping with clean fill or dredged material, as well as upland restoration.

**Benefit/Performance measure:** Risk assessment of toxic contaminants at all eight priority hot spots, using existing EPA criteria where appropriate.

**Results:** Identification of land-based sources and source identification of toxic contaminants at two priority hotspots.

**Deliverables:** Comprehensive action plans addressing priority hot spots of contamination.

**Cost and potential funding sources:** $$–$$$$

**Location:** Baywide, beginning with remaining priority hotspots

**Benefit/Performance measure:** Risk assessment of toxic contaminants at all eight priority hot spots, using existing EPA criteria where appropriate.

**Results:** Updated assessments of bay sediments will incorporate applicable results and sampling techniques from McKay Bay-Largo Inlet Brownfields project in assessing additional bay sites with known or suspected toxic contamination.

**Deliverables:** Updated risk assessments utilizing revised standards for allowable levels of toxics deemed harmful for aquatic organisms and/or human health.

**Cost and potential funding sources:** $$–$$$ External grants

**Location:** Baywide

Activity 5
Update risk assessments and impact levels for priority areas of contamination. Track new indicators and standards for human and ecological health and incorporate those into updated risk assessments. Incorporate applicable results and sampling techniques from McKay Bay-Largo Inlet Brownfield project in assessing additional bay sites with known or suspected toxic contamination.

**Benefit/Performance measure:** Risk assessment of toxic contaminants at all eight priority hot spots, using existing EPA criteria where appropriate.

**Results:** Updated assessments of bay sediments will incorporate applicable results and sampling techniques from McKay Bay-Largo Inlet Brownfields project in assessing additional bay sites with known or suspected toxic contamination.

**Deliverables:** Updated risk assessments utilizing revised standards for allowable levels of toxics deemed harmful for aquatic organisms and/or human health.

**Cost and potential funding sources:** $$–$$$$

**Location:** Baywide
OBJECTIVES:
Identify sources and understand impacts of contaminants found in pharmaceuticals, personal care products and microplastics. Promote education to reduce pollution from microplastics and emerging contaminants.

STATUS:
New Action

RELATED ACTIONS:
COC-1 Address hot spots of sediment contamination
FW-5 Continue and expand the Critical Fisheries Monitoring Program
PE-1 Promote public involvement in bay restoration and protection

BACKGROUND:
Aquatic environments are the ultimate reservoirs for many man-made chemical contaminants. The toxicity of pesticides and industrial chemicals, such as DDT, chlordane, dieldrin and PCBs, is well documented and their use banned or discontinued decades ago. Nevertheless, they persist in aquatic sediments and bioaccumulate in fish and wildlife in Tampa Bay (see Action COC-1).

The presence and potential effects of synthetic or natural endocrine or hormone disruptors is an emerging concern for fish and wildlife, as well as human health in Tampa Bay. Endocrine disrupting compounds (EDCs) mimic the functions of natural hormones, affecting growth, reproduction and development in aquatic organisms, especially fish. They include polybrominated diphenyl ethers (PBDEs) — used as a flame retardant in clothing, furniture and electronics) and bisphenol A (BPA — used to make plastic), which can be acutely toxic to fish and wildlife. Even at low levels these compounds can disrupt hormonal systems over time. Another class of EDCs comes from ethinyl estradiol — a synthetic estrogen used in oral contraceptives — which has been found in aquatic environments downstream of wastewater treatment plants. EDCs are also found in pesticides, insecticides and fungicides.

Additionally, a wide variety of pharmaceuticals and personal care products (PPCPs) — including lotions, shampoos, sunscreens, perfumes and cosmetics — contain constituents such as phthalates, parabens, glycol ethers, ultraviolet (UV) filters, polycyclic musks and antimicrobials, that have been linked to adverse endocrine or reproductive effects. Research has documented the presence of these chemical compounds in municipal waste effluent. At present, however, there is great uncertainty surrounding actionable levels of EDCs, and current toxicity testing required of chemical products does not evaluate endocrine-disrupting effects. Research also is needed to assess the efficacy of various wastewater treatment technologies at removing these contaminants prior to discharge or reuse.

Locally, a recent University of South Florida study quantified six estrogen-based EDCs in Tampa Bay Area water, sediment, and sewage influent and effluent. All targeted EDCs were present in 89% of sewage from sewer plant discharge samples, while 100% of the samples contained at least one or more EDCs. The concentrations of EDCs in water and sediment samples tended to decrease with increasing distance from the wastewater treatment plant discharge site.

More research is needed to expand on these findings and to evaluate the ecological and human health implications of indirect reuse to augment ground water or surface water supplies in the Tampa Bay Area.

Microplastics are another emerging contaminant of concern in Tampa Bay. Generally between 1-5 millimeters in size, microplastics are small plastic particles usually derived from the breakdown of larger plastic marine debris. Another source is from the direct manufacture of microbeads, such as those found in cleansers and cosmetics. A 2015 Federal Law bans the addition of microbeads in rinse-off cosmetics by July 2017. In Tampa Bay, fibers derived from the washing of synthetic textiles (consistent with laundry lint) are the most common type of plastic particles.
Microbeads and fibers are often too small to be filtered out by most wastewater treatment systems, and are released into the environment with treated wastewater.

Slow to break down, plastics persist in surface waters and throughout the water column and can become incorporated into organisms and sediments. Fibers can also absorb chemical contaminants and become laden with toxins. Microplastics have been found embedded in the tissue of worms, crustaceans, sea cucumbers and fish through ingestion or respiration and can accumulate in the stomachs of predators. Thus, fish and wildlife can be harmed by physical blockage or damage to the digestive tract, leaching of plastic chemical components into tissues and ingestion and accumulation of toxins adsorbed to the plastic (such as metals, PCBs and PBDEs).

Preliminary research on the presence of microplastics in Tampa Bay shows an abundance of microfibers relative to microbeads, with generally lower abundance at the mouth of Tampa Bay and the greatest amount in Middle Tampa Bay. This work was partially supported by a TBEP Bay Mini-Grant. Microplastics were more abundant in filtered water samples than in samples collected from plankton nets, indicating that filtered water samples may be a more effective method of sampling. Notably, there are no standardized methods for collecting, identifying and quantifying microplastics in the environment. More information is needed to better understand how microplastics enter waterways, how they are distributed and what impacts they may have on aquatic organisms.

Microplastics could be sampled as part of monthly water quality sampling for Tampa Bay conducted by the Environmental Protection Commission of Hillsborough County (EPCHC). Fish tissue samples could be collected to evaluate the presence, types and ecological impacts of microplastics as part of fisheries-independent sampling through an expanded Fish Health Index, as analytical methods, equipment and regional laboratory capacity allow.

**Strategy:**

**Activity 1**

Support bay-specific research on the occurrence, transport, fate and impact of PPCPs and other suspected endocrine disruptors on the ecosystem and public health. Support research on the source and ecological effects of microplastics in Tampa Bay. Identify and assess relative risks of wastewater effluent discharged to ground or surface waters in Tampa Bay, utilizing relevant research to better define information gaps and scope. Utilize existing and future research to inform local policy decisions. Incorporate fish tissue sampling through an expanded Fish Health Index, as analytical methods, equipment and regional laboratory capacity allow.

**Responsible parties:** FDEP, EPA, local cities and counties with Wastewater Treatment Plants, USF and other academic research institutions, Tampa Bay Water

**Timeframe:** 2018–2021

**Cost and potential funding sources:** $$ EPCHC, EPA, NOAA, USGS

**Location:** Baywide

**Benefit/Performance measure:** Adoption of standardized collection and monitoring protocols. Periodic water sampling at locations around Tampa Bay and analysis to assess abundance, source and distribution of microplastics. Fish sampling to assess ecological risk.

**Results:** An ongoing monitoring program to evaluate trends and impacts of microplastics in Tampa Bay.

**Deliverables:** Dataset showing trends in distribution and abundance of microplastics.

**Activity 2**

Promote education about plastic pollution prevention through the Florida Microplastic Awareness Project (UF/IFAS), the Florida Water Stewardship Program (UF/IFAS), the Trash-Free Waters Program (EPA), and student-assisted research at Eckerd College.

**Responsible parties:** UF/IFAS (lead), EPA, NOAA and Trash-Free Waters partners including TBEP, Eckerd College and The Florida Aquarium

**Timeframe:** Initiate within 5 years

**Cost and potential funding sources:** $$ EPCHC, EPA, NOAA, USGS

**Location:** Baywide

**Benefit/Performance measure:** Evaluation and adoption of best management practices to reduce plastic marine debris. Citizen training workshops using the filtered water sample method were held by Pinellas County UF/IFAS Extension in 2016 and 2017, including training for the UF/IFAS Florida Water Stewardship Program and a Pinellas County county-wide workshop on litter. The Florida Aquarium is also a project partner.

**Results:** Information on the risks presented by contamination to fish and wildlife and human health to guide management actions.

**Deliverables:** Peer-reviewed research assessing the impacts of emerging contaminants on bay fish and wildlife.

**Activity 3**

**Responsible parties:** EPA, FDEP, local cities and counties and EPCHC (through Regional Ambient Monitoring Program), TBEP, USF, UF, NOAA, USGS, FWC

**Timeframe:** Initiate within 5 years

**Cost and potential funding sources:** $$ EPCHC, EPA, NOAA, USGS

**Location:** Baywide

**Benefit/Performance measure:** Adoption of standardized collection and monitoring protocols. Periodic water sampling at locations around Tampa Bay and analysis to assess abundance, source and distribution of microplastics. Fish sampling to assess ecological risk.

**Results:** An ongoing monitoring program to evaluate trends and impacts of microplastics in Tampa Bay.

**Deliverables:** Dataset showing trends in distribution and abundance of microplastics.

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**Responsible parties:** UF/IFAS (lead), EPA, NOAA and Trash-Free Waters partners including TBEP, Eckerd College and The Florida Aquarium
**Activity 4**

Support legislation to reduce manufacture and use of household and personal care products containing toxic chemicals of concern and microplastics. Support legislation to require additional water or wastewater treatment to remove chemicals that pose a documented human or ecological threat.

**Responsible parties:** Agency on Bay Management

**Timeframe:** As needed

**Cost and potential funding sources:** No funding required

**Location:** Baywide

**Benefit/Performance measure:** Adoption of regulations phasing out production or sales of personal care products containing hormone/endocrine disruptors, microplastics and other contaminants of concern.

**Results:** Reduction in contaminants entering the environment directly or through municipal waste streams.

**Deliverables:** Adoption of laws to reduce manufacture and use of contaminants of concern.

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OBJECTIVES:
Support and monitor research into microbial indicators of waterborne pathogens harmful to human and environmental health. Support and monitor advancements in analytical techniques to directly detect, identify and track waterborne microbial pathogens. Support adoption of best available detection, identification and source tracking methodologies. Increase public education and awareness about waterborne fecal pathogens, beach advisories and best practices to reduce public exposure.

STATUS:
Ongoing. Action revised from Action PH-2 Continue source and risk assessments of human and ecosystem health indicators suitable for subtropical marine beaches and waters.

RELATED ACTIONS:
PA-1 Provide for and manage recreational uses of the bay
PH-4 Reduce fecal contamination from humans and pets in bay area waters
PH-5 Reduce pollution from recreational boaters
WW-2 Extend central sewer service to priority areas now served by septic systems
WW-3 Require standardized monitoring and reporting of wastewater discharges
WW-5 Reduce the occurrence of municipal sewer overflows to the bay

BACKGROUND:
Tampa Bay Area beaches and recreational waters are nationally recognized for their outstanding natural beauty. They provide recreational opportunities to residents and visitors alike, and support Tampa Bay’s diverse economy, especially its recreation and tourism industries. Maintaining suitable water quality at beaches and other recreational waters is foundational to protecting Tampa Bay’s environment and economy.

Waterborne microbial pathogens (pathogenic microbes) occur naturally in the bay, but many locations experience fecal contamination periodically from various sources including sewer overflows, domestic livestock, pets and humans (see Actions PH-4, PH-5, WW-2, WW-3 and WW-5). Early detection of pathogenic microbes is critical to public health and to public confidence in monitoring and risk assessments of health threats. Bacteria, viruses and protozoa can cause a variety of human illnesses ranging in severity from rashes, ear, nose and throat infections and diarrhea to antibiotic-resistant infections, cholera and typhoid fever. Some naturally occurring bacteria (e.g. Vibrio vulnificus) may also pose human health concerns for those who consume raw seafood or have depressed immune systems. Increasing water temperatures due to climate change may enhance susceptibility to these bacterial infections and facilitate the introduction of potential new pathogens from tropical environments.

Fecal coliform bacteria, especially Escherichia coli (E. coli) are widely used as indicators for waterborne pathogens. Coliform bacteria occur naturally in animal feces, and when detected in high concentrations may indicate the presence of co-occurring harmful pathogens. However, because they are present in the feces of a wide variety of animals, they do not pinpoint human sources of contamination. Moreover, Florida’s subtropical climate allows fecal coliforms to grow and multiply naturally in the environment. These shortcomings can reduce the consistent predictive value of the presence of coliform bacteria as an indicator of more harmful pathogens and their threats to human health.

A study of alternative, more accurate indicators of pathogens sponsored by the Tampa Bay Estuary Program (TBEP) and Pinellas County identified enterococci bacteria (Enterococcus species) as the best fecal indicator bacteria for subtropical marine waters, because 1) they have a greater correlation with water-related gastrointestinal illness in both marine and freshwater than other fecal indicator bacteria, and 2) they can survive longer in saltwater. However, because enterococci bacteria are shed in feces of all warm-blooded animals, they cannot be used to pinpoint human contamination sources. The study ultimately recommended the use of enterococci, along with fecal coliform bacteria, while proposing source tracking of fecal coliform to fingerprint the types of bacteria originating from human sources.

Currently, both the U.S. Environmental Protection Agency (EPA) and the Florida
Department of Environmental Protection (FDEP) use E. coli as an indicator of bacterial contamination in freshwater systems, and enterococci for marine waters. Area county health departments collect water samples weekly at area beaches and analyze them for enterococci and fecal coliform bacteria. City and county water quality departments assist in collecting these samples. Area health departments issue advisories or warnings when conditions warrant, although a consistent link between exposure to indicator organisms and public health risk remains elusive.

Although great gains in protecting public health have been made using fecal indicator bacteria, viral pathogens may actually cause a significant portion of waterborne illness. Because viruses and bacteria respond differently to water treatment processes and environmental degradation, traditional fecal indicator bacteria may not be good indicators for their presence. Research into bacteriophages, or viruses that infect and replicate within bacteria, hold promise for developing better indicators of viral pathogens. EPA suggested that coliphages (viruses that infect and replicate within E. coli) may be better indicators of viruses in fecal contamination. Although great gains in protecting public health have been made using fecal indicator bacteria, viral pathogens may actually cause a significant portion of waterborne illness. Because viruses and bacteria respond differently to water treatment processes and environmental degradation, traditional fecal indicator bacteria may not be good indicators for their presence. Research into bacteriophages, or viruses that infect and replicate within bacteria, hold promise for developing better indicators of viral pathogens. EPA suggested that coliphages (viruses that infect and replicate within E. coli) may be better indicators of viruses in fecal contamination. Although great gains in protecting public health have been made using fecal indicator bacteria, viral pathogens may actually cause a significant portion of waterborne illness. Because viruses and bacteria respond differently to water treatment processes and environmental degradation, traditional fecal indicator bacteria may not be good indicators for their presence. Research into bacteriophages, or viruses that infect and replicate within bacteria, hold promise for developing better indicators of viral pathogens. EPA suggested that coliphages (viruses that infect and replicate within E. coli) may be better indicators of viruses in fecal contamination. Although great gains in protecting public health have been made using fecal indicator bacteria, viral pathogens may actually cause a significant portion of waterborne illness. Because viruses and bacteria respond differently to water treatment processes and environmental degradation, traditional fecal indicator bacteria may not be good indicators for their presence. Research into bacteriophages, or viruses that infect and replicate within bacteria, hold promise for developing better indicators of viral pathogens. EPA suggested that coliphages (viruses that infect and replicate within E. coli) may be better indicators of viruses in fecal contamination.

Advances in direct pathogen identification methodologies coupled with microbial source tracking may soon revolutionize water quality analysis for human health risks. Locally, the Environmental Protection Commission of Hillsborough County (EPCHC) is funding a microbial source tracking study of fecal contamination in the Bullfrog Creek/Sweetwater Creek watersheds. Results will help pinpoint specific sources and inform reduction or prevention strategies.

New methodologies can now detect and identify the genetic material from multiple pathogens in water samples. This direct, multi-target approach has the added benefit of eliminating false negatives (i.e., concluding waters are safe, when they may not be) from measuring the wrong indicator or pathogen.

Finally, advances in quantitative PCR (qPCR) as a rapid test for fecal contaminants enable same-day results, providing more timely information to beach-goers.

**STRATEGY:**

**Activity 1** Continue to support and monitor research into sources and risks of waterborne fecal pathogens harmful to human and environmental health. Support and monitor research into new analytical techniques and indicators to directly detect and identify microbial pathogens.

- **Investigate fecal indicators** that more accurately indicate presence of waterborne pathogens harmful to human and environmental health.
- **Investigate fecal indicators** that provide information about contamination sources, i.e., methods that can discriminate between contamination from sewage versus animals (microbial source tracking).
- **Explore the use of quantitative PCR (qPCR)** as a rapid test to better protect public health.
- **Evaluate the use of multi-target methods** for detecting fecal indicators and pathogens, e.g., DNA sequencing and microarray.
- **Evaluate coliphages as indicators** of viral pathogens associated with fecal pollution.
- **Better establish the link between** exposure to certain pathogens and risk of disease — with special emphasis on at-risk populations (elderly, immunocompromised).
- **Identify sources of fecal indicators** (animal type, septic tank, boating, natural vegetation and sediments).
- **Determine fate of fecal indicators** and pathogens, i.e., how long a bacteria or virus persists before the risk becomes negligible.
- **Predict weather and water conditions** that will intensify or diminish contamination.

**Responsible parties:** USF Healthy Beaches/Healthy Coasts, Florida Healthy Beaches Program (Florida Department of Health), Pinellas, Hillsborough and Manatee County health departments, FDEP, EPA, TBEP

**Timeframe:** Initiate in 2020, pending availability of funds
**Activity 2**

Encourage adoption of best available detection, identification, source tracking and remediation techniques at state and national level. Locally, encourage use of FDEP guidance documents that present low-tech, operational practices, such as removing sediments in stormwater systems, that may substantially reduce bacteria loadings in wastewater and stormwater systems.

**Responsible parties:** USF Healthy Beaches/Healthy Coasts, Florida Healthy Beaches Program (Florida Department of Health), Pinellas, Hillsborough and Manatee County health departments, FDEP, EPA, TBEP

**Timeframe:** Initiate in 2017

**Cost and potential funding sources:** $–$$

**Location:** N/A

**Benefit/Performance measure:** Improved detection, identification and source tracking of pathogens, better understanding of fecal indicator bacteria and associated pathogens.

**Results:** Improved detection of pathogens in recreational waters. Improved public safety. Improved monitoring of stormwater and wastewater management in Tampa Bay watersheds.

**Deliverables:** Research and technical reports with recommendations for best indicators, relative risk by pathogen and tools for identifying sources of fecal indicator bacteria and pathogens.

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**Activity 3**

Enhance public education and awareness about waterborne fecal pathogens, beach advisories and best practices to reduce public exposure. Post beach advisories and Healthy Beaches reports for Hillsborough, Pinellas and Manatee Counties on the Tampa Bay Water Atlas. Update the Is It Safe To Swim In The Bay? fact sheet to include precautions against swimming in stormwater ponds and residential canals. Utilize rapid testing methods to provide same-day notification of contaminated water bodies.

**Responsible parties:** Florida Healthy Beaches Program, TBEP, Tampa Bay Water Atlas

**Timeframe:** Ongoing

**Cost and potential funding sources:** $ Federal, state or local grants

**Location:** Tampa Bay Area

**Benefit/Performance measure:** Improved detection, identification and source tracking of pathogens, better communication and coordination of public health notices/warnings.

**Results:** Improved public knowledge and safety.

**Deliverables:** Outreach on waterborne fecal pathogens, beach advisories and best practices to reduce public exposure. A local up-to-date, database of advisories.

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WATER AND SEDIMENT QUALITY

PUBLIC HEALTH
Reduce fecal contamination from humans and pets in bay area waters

OBJECTIVES:
Reduce pet and human waste fecal contamination in Tampa Bay Area waters designated Class III “fishable and swimmable.” Conduct research to better quantify sources of fecal contamination. Include strategies to address hot spots in these water segments in Basin Management Action Plans (BMAs). Expand waterborne fecal contamination monitoring to additional areas where people and pets congregate. Continue to educate the public about proper disposal of pet waste.

STATUS:

Considerable progress has been made in addressing proper disposal of pet waste. Basin Management Action plans have or will be adopted for bay waters designated as impaired for fecal coliforms, with specific strategies focused on reducing fecal coliform pollution. More information is needed to quantify whether and to what extent fecal contamination associated with recreational areas lacking restroom facilities, or from homeless populations in urban centers, is a problem.

RELATED ACTIONS:
PA-1 Provide for and manage recreational uses of the bay
PH-2 Continue assessments of human and environmental health indicators suitable for Tampa Bay beaches and other recreational waters
PH-5 Reduce pollution from recreational boaters
SW-8 Expand adoption and implementation of best management practices for commercial and urban agriculture
WW-3 Require standardized monitoring and reporting of wastewater discharges
WW-5 Reduce the occurrence of municipal sewer overflows to the bay

BACKGROUND:
Tampa Bay supports a wide range of aquatic recreational activities, including boating, fishing, swimming, and paddle-boarding. The health of Tampa Bay’s waters is linked to our region’s economy, environment and quality of life. Fecal contamination of waterways can contribute bacteria, viruses and parasites that cause a variety of illnesses ranging from rashes, infections and diarrhea to more serious and life-threatening conditions.

Many bay waters and tributaries experience fecal contamination periodically from a variety of sources, including sewer overflows, wildlife, domestic livestock, pets and humans. Potential problem areas include recreational areas without restroom facilities, marinas and mooring fields where discharges of waste from
liveboard boaters may occur (see Action PH-5) or urban waterfronts with large homeless populations. Fecal matter from feral or free-roaming cats, or urban livestock may be a local or seasonal contributor (e.g., horse manure generated during racing season at Tampa Bay Downs). However, little is known about the magnitude of these localized impacts; overall, bacterial levels in waste from these animals are lower than for dogs or humans. Farms and ranches in the upper parts of the watershed can be sources of fecal contamination in more rural areas of the watershed, as well as backyard chicken coops in urban areas (see Action SW-8).

Sewer overflows are addressed elsewhere in this Plan (see Actions WW-3 and WW-5), as is monitoring of formal swimming beaches by area health departments (see Action PH-2) and pollution from liveboard boaters (see Action PH-5). This action focuses on pet waste and human waste stemming from unregulated or underserved waterways in the bay watershed.

Most surface waters in Florida are categorized as Class III waters, meaning they should be “fishable and swimmable” and support the propagation and maintenance of healthy, well-balanced populations of fish and wildlife. Under the Clean Water Act, states are required every two years to identify impaired waters that do not meet their designated uses, including those that exceed fecal coliform standards. The Florida Department of Environmental Protection (FDEP) develops a list of impaired waters in Florida and adopts Total Maximum Daily Loads (TMDL) for priority waterbody segments it identifies as impaired. A TMDL is the maximum amount of an identified pollutant that a waterbody can assimilate while maintaining its designated uses.

**Basin Management Action Plans: A Tool for Addressing Fecal Contamination**

The Tampa Bay Estuary Program (TBEP) and its partners assisted FDEP in creating comprehensive Basin Management Action Plans (BMAPS) for major portions of the Hillsborough, Alafia and Manatee Rivers impaired by fecal contamination. BMAPS present locally-specific strategies to reduce pollutant loadings to levels below established TMDLs, including identifying and assessing the relative contributions of bacterial loadings from sources within a watershed, or watershed segment.

BMAPS identify projects in the following categories: Agricultural BMPs; Restoration and Water Quality Improvement Projects; Regulations, Ordinances, and Guidelines; Education and Outreach Efforts; Basic Stormwater Management Program Implementation; Wastewater Infrastructure Management, Maintenance Repair, and Upgrade; Special Studies, Planning, Monitoring, and Assessment.

**The Hillsborough River BMAP (2009)** was developed by FDEP in collaboration with TBEP, Hillsborough, Pasco and Polk Counties; the Cities of Plant City, Tampa, and Temple Terrace; the Environmental Protection Commission of Hillsborough County and Hillsborough County Health Department; the Florida Department of Agriculture and Consumer Services, the Florida Department of Transportation, the Southwest Florida Water Management District and the University of Florida Institute of Food and Agricultural Sciences.

All surface waters in the Hillsborough River Basin are designated as Class III waters, with portions above the Hillsborough River Dam designated as Class I (potable water) and an Outstanding Florida Water. The Hillsborough River BMAP identified management strategies necessary to achieve the fecal coliform TMDLs for six stream segments: Blackwater Creek, New River, Sparkman Branch, Baker Creek, Flint Creek and the Lower Hillsborough River.

The BMAP process in other urban areas has identified homeless populations as a potential contributor to fecal contamination. This possibility was discussed during development of the Hillsborough River BMAP; research is needed to quantify and address this sensitive issue.

Since BMAP implementation in 2009, fecal coliform levels (an indicator of fecal contamination) have generally improved in all the Hillsborough River sub-basins.

**The Alafia River BMAP (2014)** is a collaborative effort developed by FDEP with area-wide stakeholders, TBEP and the Tampa Bay Nitrogen Management Consortium. This BMAP addresses four waterbody segments impaired for fecal coliform contamination: Turkey Creek, Mustang Ranch Creek, English Creek and Poley Creek.

**The Manatee River BMAP (2014)** is a collaborative effort developed by FDEP with area-wide stakeholders, TBEP and the Tampa Bay Nitrogen Management Consortium. This BMAP addresses four waterbody segments impaired for fecal coliform contamination: Rattlesnake Slough, Cedar Creek, Nonsense Creek and Braden River above Evers Reservoir.

**TBEP Education: Encouraging Proper Disposal of Pet Waste**

TBEP’s Pooches for the Planet pet waste education campaign, launched in 2006, has helped focus regional attention on a significant source of fecal coliform for which prevention is a cost-effective and simple solution.

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**Map showing basins impaired for fecal coliform. SOURCE: Florida Department of Environmental Protection.**

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Numerous studies have shown that pet waste is a significant contributor to bacterial loadings in urban stormwater. The approximately 500,000 dogs in the bay watershed produce about 125 tons of waste daily. Surveys have shown that about 40% of dog owners do not pick up after their pets, meaning 45 tons is left un scooped. This dog waste is carried by stormwater to the closest waterway. Just one ounce of dog feces contains 23 million bacteria — nearly twice that of human waste.

_Pooches for the Planet_ utilized social marketing principles to encourage dog owners to pick up and properly dispose of their dog’s waste. Elements included:

- GPS mapping of dog poop piles prior to and following pet waste education. Three participating neighborhoods demonstrated an average 85.5% reduction in the number of dog poop piles left on the ground in waterfront parks in their communities.
- Eye-catching signs posted at riverfront and bayfront parks in Tampa and Manatee County, and at all dog parks in Pinellas County. Signs and pet waste stations were posted at nine neighborhood or regional parks in St. Petersburg.
- “Scoop That Poop” informational posters, rack cards and business-sized “Scoop That Poop” pledge cards distributed to more than 500 veterinary clinics in the 3-county area.
- A 60-second video PSA about the importance of proper pet waste disposal.
- More than 1,000 “Scoop That Poop” doorhangers distributed as part of a pilot project in three neighborhoods in St. Petersburg. An additional 5,000 doorhangers have been distributed by request to area neighborhoods, condos and apartment complexes.

**Managing Waste at Traditional Bay Recreation Areas**

Several traditional recreational areas along the bay, including the Courtney Campbell Causeway, the Gandy Causeway in northern St. Petersburg and the Pinellas Bayway, are enjoyed by thousands of people and their pets year-round. However, most of these traditional-use beach playgrounds lack bathroom facilities, and bacterial water contamination may result from human or dog waste in specific, localized areas. Funding and ongoing management of these areas remains a challenge for local governments with limited resources.

**STRATEGY: Activity 1**

Evaluate the relative importance of pet and human-based waterborne fecal contamination as part of additional development of BMAPs, updates to existing BMAPs, or local Bacteria Control Pollution Plans to address waters designated as impaired for fecal coliform. Conduct DNA source-tracking research projects to better quantify sources of fecal contamination (see Action PH-2). Include strategies to address hot spots in these water segments in the BMAPs.

**Responsible parties:** FDEP, local cities and counties (potential leads); other partners involved in creating BMAPs, including TBEP, local health departments, USF and other academic institutions (for research)

**Timeframe:** Initiate in 2017

**Cost and potential funding sources:** $FDEP, Florida Department of Health, EPA, USGS

**Location:** Impaired waterbody segments identified by FDEP

**Benefit/Performance measure:** Better understanding of the relative importance of pet and human-based fecal contamination (including homelessness) in impaired waterbody segments.

**Results:** Improved understanding of the sources of waterborne pathogens. Improved water quality management. Improved public safety

**Deliverables:** Basin Management Action Plans.

**Activity 2**

Expand waterborne fecal contamination monitoring to additional areas where people and pets congregate, including bay recreation beaches where restroom facilities are not provided. Prioritize efforts in areas identified or suspected as chronic sources of local waterborne fecal contamination. Encourage local governments to construct restroom facilities and pet waste bag stations at recreational beaches now lacking them, based on monitoring to identify chronic sources of fecal contamination. Encourage local governments to consider appropriate placement of future dog parks, avoiding waterfronts and wetlands.
Responsible parties: Local cities and counties, FDEP, FDOT

Timeframe: Initiate planning in 2017

Cost and potential funding sources: $5
Local health departments and local stormwater departments

Location: Popular recreation areas and other areas that lack facilities where people and pets congregate, especially areas identified to be chronic sources of waterborne fecal contamination

Benefit/Performance measure: Restroom facilities and bag stations at popular outdoor areas where people and pets congregate will help prevent fecal contamination from entering the environment.

Results: Improved water quality and public health protection at popular recreation areas and other Class III waters.

Deliverables: Water quality monitoring results housed and available to the public on Tampa Bay Water Atlas. Restroom facilities connected to central sewer including toilets and sinks with soap and water. Pet waste bag stations and waste receptacles.

Activity 3
Continue public education campaigns to reduce pet waste in the bay watershed. Explore beneficial uses of pet waste; for example, small-scale energy generation using methane digesters to power lighting at dog parks. Expand education to include proper disposal of backyard dog waste in trash cans, and encourage cat owners to keep cats indoors and dispose of used cat litter in trash cans. Encourage best practices for small animal operations, such as horse farms and horse rental operations, that fall under existing regulatory thresholds. Encourage best practices for urban backyard chicken coops.

Responsible parties: Potential implementing entities include local cities and counties, FDEP (through state parks and preserves), FDOT (through rest stops), NGOs, TBEP, UF/IFAS

Timeframe: Ongoing

Cost and potential funding sources: $ Possible TBEP funding through Bay Mini-Grants or TBERF; grants from other sources

Location: Baywide

Benefit/Performance measure: Increased public participation in reducing pet waste in the watershed.

Results: Reduced fecal contamination from human and pet waste will improve water quality and reduce threats to public health and the environment.

Deliverables: Digital and printed public outreach tools, signs and pet waste bag stations.

OBJECTIVES:
Continue to promote marina, boatyard and boater education and best practices. Increase availability of sewage pumpout stations and mobile pumpout vessels. Encourage creation of appropriately sited mooring fields near sewage pumpout facilities or services. Encourage enforcement of rules prohibiting sewage discharges, especially for liveaboards and unmaintained vessels outside of marinas or mooring fields. Survey and identify problem areas for unregulated liveaboards. Support state and local programs to remove derelict vessels.

STATUS:
Moved from Action WQ-2 and revised to focus on waste management issues associated with recreational boating.

RELATED ACTIONS:
BH-3 Reduce propeller scarring of seagrass and pursue seagrass transplanting opportunities
FW-1 Increase on-water enforcement of environmental regulations
PA-1 Provide for and manage recreational uses of the bay
PE-1 Promote public involvement in bay restoration and protection
PH-4 Reduce fecal contamination from humans and pets in bay area waters
SP-2 Evaluate and update spill response plans for priority areas

WATER AND SEDIMENT QUALITY

PUBLIC HEALTH
Reduce pollution from recreational boaters

BACKGROUND:
More than 130,000 boats are registered in Hillsborough, Manatee, Pasco and Pinellas Counties, according to the Florida Department of Highway Safety and Motor Vehicles. Pinellas County ranked second and Hillsborough County fifth in number of registered boats statewide in 2015. The vast majority of these boats are 16 to 26 feet long. The popularity of recreational boating highlights the need for baywide adoption of responsible boating practices to protect water quality, human health and aquatic habitats.

The Florida Department of Environmental Protection (FDEP) promotes clean boating practices through a variety of programs, including the Clean Marina Program, Clean Boatyard Program, Clean Marine Retailer Program and Clean Boater Program. These voluntary recognition and designation programs provide no-cost assistance to marinas and boatyards in implementing Best Management Practices to protect sensitive habitats, manage waste and stormwater, prevent spills and prepare for emergencies. There are 45 designated Clean Marinas or Clean Boatyards in the Tampa Bay region.

Regulating Sewage Discharges from Vessels
Discharging raw sewage into waterways threatens environmental and human health. The Clean Vessel Act of 1992 prohibits discharge of sewage into Florida’s inland and offshore waters extending nine miles out into the Gulf of Mexico. Boaters must legally store sewage generated onboard using an appropriate holding tank and provide for its disposal at marinas or other designated locations.

2016 Florida Boat Registrations by County for Dealer, Pleasure and Commercial Vessels

<table>
<thead>
<tr>
<th>COUNTY</th>
<th>DEALER</th>
<th>PLEASURE</th>
<th>COMMERCIAL</th>
<th>TOTAL</th>
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<tr>
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<tr>
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<tr>
<td>Totals</td>
<td>880</td>
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<td>133,199</td>
</tr>
</tbody>
</table>

SOURCE: Florida Department of Highway Safety and Motor Vehicles
Sewage Pumpout Services

Permits for new marinas and mooring fields, or renovations to existing ones, do not automatically require pumpout facilities or pumpout vessels. They are typically required, however, if the proposed marina or mooring field includes slips for liveaboards, or there are water quality issues in the area. Clean Marinas are encouraged, but not required, to provide pumpout facilities. As of summer 2017, pumpout facilities are available at 55 marinas in the four coastal counties of Tampa Bay, and 26 of these are Clean Marinas.

The Clean Vessel Act established a grant program administered by the U.S. Fish and Wildlife Service, which provides funding for purchase, installation, maintenance, repair and operation of boater pumpout and dump stations. The City of Clearwater purchased a pumpout vessel with Clean Vessel Act funding and provides mobile pumpout and dump stations. The City of Clearwater purchased a pumpout vessel with Clean Vessel Act funding and provides mobile pumpout services one day a week. Facilities receiving funding from the Act must make pumpout services available to the public for free, or for a nominal charge. As of December 2015, the Act has prevented more than 20 million gallons of sewage from contaminating Florida waterways.

Increasing access to authorized waste disposal receptacles and pumpout facilities and improving boater understanding about the legal, environmental and human health consequences of illegal sewage discharges are important strategies to reduce sewage pollution from recreational boaters.

Illegal Discharges from Liveaboards

Special attention is required to identify and address illegal sewage discharges from liveaboards and unmaintained vessels outside of regulated marinas and mooring fields. A unified, shared spatial database of liveaboards or unmaintained boats across the Tampa Bay Area is needed to better understand the distribution and abundance of these vessels in the area and to prioritize management actions (e.g., enforcement, relocation to marinas, creation of regulated mooring fields or additional pump out vessels to service these locations) at local trouble spots.

Enforcement action is hampered by difficulties in catching violators in the act. Trouble spots may include areas around Hurricane Hole, Terra Ciea, Williams Park Boat Ramp, Clearwater Memorial Causeway and Davis Island Boat Ramp. Increasing the availability or capacity of appropriately sited mooring fields may reduce illegal sewage discharges by aggregating boats in managed areas with adjacent or mobile pumpout services.

Derelict Vessels

Abandoned and derelict vessels can cause environmental damage by physically impacting sensitive marine and coastal habitats (see Action BH-4) or by discharging sewage, oil, toxic chemicals and marine debris.

Vessels can be classified by law enforcement as “derelict” if they are “left, stored, or abandoned in a wrecked, junked, or substantially dismantled condition upon any public waters of this state, at any port in this state without the consent of the agency having jurisdiction thereof, or docked or grounded at or beached upon the property of another without the consent of the owner of the property.” Severe storms, such as hurricanes, are often a catalyst for the creation of additional derelict vessels.

It is unlawful in Florida to store, leave or abandon any derelict vessel in state waters. The Florida Fish and Wildlife Conservation Commission (FWC) or any law enforcement agency can relocate or remove any derelict vessel in the state and the vessel owner is liable for all costs. However, the time between initial identification of a derelict vessel and its eventual removal can be a long and drawn-out process, and removal is costly. For 2016, the Florida Legislature allocated $1.4 million for derelict vessel removal statewide.

Hillsborough County owns its own salvage equipment for derelict vessel removal. Pinellas pays a per-foot removal fee to a contracted marine salvage company, with costs covered by the county’s share of boat registration fees.
The FWC’s At-Risk Vessel Program allows law enforcement agents to identify vessels at risk of becoming derelict, before they become a problem. Law enforcement officers can tag these vessels and issue violation notices to owners who refuse to improve a vessel’s seaworthiness and secure mooring or storage. At-risk vessels are tracked in a statewide database.

**STRATEGY:**

**Activity 1**
Encourage greater participation in the Clean Vessel Act grant program to finance sewage pumpout stations at marinas, or mobile pumpout services. Consider rulemaking or changes to comprehensive land use plans to require new and renovated marinas, as appropriate, to provide sewage pumpout facilities or pumpout services. Explore additional incentives to encourage operation and use of mobile pumpout services.

**Responsible parties:** FDEP, local governments for rulemaking or changes to local plans and promotion of Clean Vessel Act grant; Sea Grant to assist in outreach to marinas regarding the Clean Vessel Act.

**Timeframe:** Beginning 2017

**Cost and potential funding sources:** $ The Clean Vessel Act provides funding for purchase, installation, maintenance, repair and operation of boater pumpout and dump stations and for the purchase of pumpout vessels.

**Location:** Baywide

**Benefit/Performance measure:** Increased availability of sewage pumpout facilities in the Tampa Bay Area. Reduced sewage discharges from boaters.

**Results:** Improved water and habitat quality in Tampa Bay.

**Deliverables:** Sewage pumpout facilities and vessels.

**Activity 2**
Create a unified regional database of liveaboard vessels in the Tampa Bay Area to identify extent of problem and prioritize trouble spots. Increase enforcement of rules prohibiting sewage discharges, especially for liveboards and unmaintained or potentially derelict vessels in trouble spots. Encourage creation of appropriately sited mooring fields near sewage pumpout facilities or within service areas of pumpout vessels.

**Responsible parties:** FDEP, FWC, Coast Guard, Sea Grant, local governments, TBEP

**Timeframe:** Beginning 2017

**Cost and potential funding sources:** $ FWC, Federal, state or local grants

**Location:** Baywide, especially trouble spots.

**Benefit/Performance measure:** Relocation of boats anchored over or nearby sensitive habitat to regulated mooring fields. Reduced sewage discharges from boaters. Improved boater knowledge and bay stewardship.

**Results:** Improved water and habitat quality in Tampa Bay.

**Deliverables:** Increased availability of mooring fields. Boater education. Enforcement capacity and action.

**Activity 3**
Continue to promote marina, boatyard and boater outreach, education and best practices. Promote FDEP’s Clean Marina, Clean Boatyard and Clean Boater Programs. Support education and outreach to boaters about proper handling/prevention/disposal of marine debris, sewage and unwanted vessels.

**Responsible parties:** FDEP, local governments, Sea Grant. A new education center operated by St. Petersburg College may offer opportunities for students to assist in education of nearby boat owners and facility managers.

**Timeframe:** Ongoing

**Cost and potential funding sources:** $ Federal, state or local grants

**Location:** Baywide

**Benefit/Performance measure:** Improved boater knowledge. Reduced boater pollution. Reduced runoff pollution from marinas and boatyards.

**Results:** Improved water and habitat quality in Tampa Bay.

**Deliverables:** Education and outreach.

**Activity 4**
Support local and state programs to remove derelict vessels. Continue funding for At-Risk Vessel Program and derelict vessel identification and removal. Support education and outreach to prevent vessel abandonment.

**Responsible parties:** TBEP, FWC, local law enforcement

**Timeframe:** Beginning 2017

**Cost and potential funding sources:** $ Local boat registration fees, state funding for FWC At-Vessel Risk Program.

**Location:** Baywide

**Benefit/Performance measure:** Fewer derelict vessels. Less sewage, oil, toxic chemicals and marine debris discharged into the bay.

**Results:** Improved water and habitat quality in Tampa Bay.

**Deliverables:** Boater education. Derelict vessel removal.
OBJECTIVES:
Implement the Tampa Bay Habitat Master Plan to restore and protect key bay habitats. Reevaluate the Restoring the Balance management paradigm, taking into account anticipated population growth, changing land use patterns and impacts of climate change and sea level rise. Support research and monitoring necessary to meet data and information gaps for priority habitats targets. Continue to encourage restoration and protection of priority habitats, through acquisition and restoration programs.

STATUS:
Ongoing. Strategy revised to incorporate research, monitoring and recommendations from the Tampa Bay Habitat Master Plan update, the Freshwater Wetland Habitat Master Plan, the Tampa Bay Tidal Tributaries Habitat Initiative, the Critical Coastal Habitat Assessment Program and Climate Change Vulnerability Assessment.

RELATED ACTIONS:
BH-2 Establish and implement mitigation criteria for Tampa Bay, and identify priority sites for mitigation
BH-4 Identify hard bottom communities and avoid impacts
BH-8 Continue and enhance habitat mapping and monitoring programs
BH-9 Enhance ecosystem values of tidal tributaries
BH-10 Implement the Tampa Bay Freshwater Wetland Habitat Master Plan
CC-2 Understand and address effects of ocean acidification
WQ-1 Implement the Tampa Bay nutrient management strategy

BACKGROUND:
The Tampa Bay Estuary Program and its partners have made significant progress in restoring and protecting key coastal habitats in Tampa Bay. This work is guided by the 2010 Tampa Bay Habitat Master Plan, and tracked in the Habitat Restoration and Protection Database. The first Tampa Bay Habitat Master Plan set targets for restoration and protection of mangrove forests, salt marsh, oligohaline (low-salinity) habitat in tidal tributaries, isolated small wetlands important as forage areas for estuarine-nesting birds and salt barrens, and introduced the management paradigm of Restoring the Balance. This paradigm recommends the restoration of priority coastal habitats to similar proportions as they occurred historically (circa 1950), to provide a full mosaic of habitats necessary to support fish and wildlife throughout their life cycles. It recognizes that some habitats have been lost in greater proportions than others and prioritizes their protection and restoration.

The 1996 Habitat Master Plan was updated in 2010 and will be updated again starting in 2017.

Priority natural habitats in Tampa Bay include:
- Seagrass meadows
- Emergent tidal wetlands (Mangrove forests, Salt marshes, Salt barrens)
- Tidal flats
- Oyster reef/bars
- Hard bottom
- Tidal tributaries, creeks and rivers
- Coastal uplands
- Freshwater wetlands

The Surface Water Improvement and Management (SWIM) Program of the Southwest Florida Water Management District (SWFWMD) is a lead architect of habitat restoration in Tampa Bay. Since 1989, SWIM has implemented 96 coastal restoration projects with cooperators, restoring 4,617 acres (7.2 square miles) of coastal habitats. This work has created substantial oligohaline and salt barren habitats, priorities identified by Restoring the Balance guidance.

TBEP has set restoration and protection targets for seagrass, mangroves, salt marsh, freshwater wetlands and salt barrens. Research is underway to better understand tidal creeks and the historic and current areal extents of tidal flats, oyster reefs and hard bottom habitats. New monitoring and
Hydroblasting with high-pressure water hoses is an efficient technique for removing spoil mounds from wetlands that were historically ditched and drained for mosquito control. Photo courtesy of SWFWMD.

Habitat restoration at the Cockroach Bay Aquatic Preserve in south Hillsborough features extensive tidal wetlands valuable as fish nurseries. Photo by Donna Bollenbach.

Seagrass Meadows

Seagrasses are keystone species in Tampa Bay. Their lush meadows provide food, create habitat, stabilize bay bottom, filter nutrient pollution and reduce wave action and coastal erosion. They may also play an important role in creating micro-refugia from ocean acidification (see Action CC-2). Seagrasses require sufficient water clarity to receive sunlight. In Tampa Bay, water clarity is mostly affected by the density of suspended microscopic algae, which in turn is directly related to the availability of the most limiting nutrient — nitrogen. Between the 1950s and early 1980s, Tampa Bay lost nearly 20,000 acres of seagrass, mainly due to nutrient pollution and dredging.

In 1995, Tampa Bay Estuary Program set a baywide restoration target of 38,000 acres for seagrasses and implemented a strategy to improve water quality by reducing nitrogen inputs into the bay (see Action WQ-1). Since 1996, partners of the Tampa Bay Nitrogen Management Consortium, an innovative public-private partnership, have implemented more than 500 projects to reduce nitrogen loading. Approximately 500 tons of nitrogen has been prevented from entering the bay. As a result, water quality has improved and seagrasses are recovering. In 2015, for the first time since the 1950s, Tampa Bay achieved 40,295 acres of seagrass, surpassing the baywide target set in 1995. The target was surpassed again in 2017, when 41,655 acres of seagrass were observed. Despite these momentous gains, seagrass communities remain vulnerable to environmental variability and human impacts. Continued biannual mapping of bay-wide seagrass coverage is necessary to identify and protect sensitive and impacted areas (see Action BH-8). Several studies have been conducted to support development of a Tampa Bay Seagrass Restoration and Protection Master Plan (to be developed as an element of the Habitat Master Plan), including a detailed analysis of historic seagrass change, species composition and condition throughout the bay, refined estimates of light requirements, estimates of wave energy and development of an initial bio-optical model. In addition, the relationship between longshore sand bars and seagrass has been studied and seagrass management areas have been established. Emmergent Tidal Wetlands (Mangrove forests, Salt marshes, Salt barrens)

Emergent tidal wetlands occur primarily along the intertidal perimeter of the bay and its tidal tributaries, and include mangrove forests, salt marshes and salt barrens. They provide food and habitat for hundreds of species of bay fish and wildlife, stabilize shoreline sediments and reduce erosion, and filter pollutants from runoff. Dominant threats to emergent tidal wetlands are dredge and fill activities, sea level rise and modifications to bay hydrology. From 1950-1990, almost 21 percent (4,984 acres) of emergent tidal wetlands were lost in Tampa Bay, with salt marshes and salt barrens showing the most disproportionate losses. Between 1995-2007, the areal extent of emergent tidal wetlands increased about 2% (433 acres), with mangroves showing the greatest increase (379 acres). Between 2007-2011, total emergent tidal wetlands increased by 3%, with mangroves again showing the largest gains. Over time, the relative proportion of mangroves in the bay has increased, while the proportions of salt marsh and salt barrens have decreased. Rising sea level is expected to continue to drive these coastal habitat shifts with acreages of mangrove forests increasing at the expense of salt marshes and salt barrens (see Action CC-1).4

TBEP and its partners set restoration and protection targets for all three emergent tidal wetland habitats in the 2010 Habitat Master Plan. Since 2013, more than 1,050 acres and 1,000 linear feet of coastal habitat have been restored through the Tampa Bay Environmental Restoration Fund (TBERF).

Tidal Flats

Tidal flats are non-vegetated intertidal bay habitats composed of sand and organic sediments. They are found primarily along low-energy shorelines and sheltered backwaters. Tidal flats host dense assemblages of benthic invertebrates, which are an important food source for shorebirds and wading birds. SWFWMD has classified tidal flats as part of their biannual seagrass mapping...
work; however, this effort did not consistently distinguish tidal flats from other non-vegetated estuarine shorelines. In 2015, SWFWMD employed new standards for photo-interpreting and characterizing tidal flats. This improved approach is expected to yield more accurate estimates of the distribution and areal extent of tidal flats.

**Hard Bottom and Oyster Reef Habitats**

Hard bottom habitats support a diverse assemblage of invertebrates and fish. Oyster reefs provide food and habitat, reduce erosion, stabilize shorelines and improve water quality. Together, these habitats are relatively rare and sparsely distributed in the bay.

No comprehensive map of hard bottom habitats in Tampa Bay exists. In 2015, SWFWMD employed new, more accurate standards for interpreting hard bottom and oyster reefs from aerial photography, as well as new survey techniques including sidescan sonar and underwater video. This work will contribute important information for setting protection and restoration targets for hard bottom and oyster reef habitats in select portions of the bay (see Action BH-4). Expansion of hard bottom and oyster reef mapping bay-wide is needed.

**Tidal Tributaries, Creeks and Rivers**

Tidally influenced tributaries and streams support fisheries production, nutrient cycling, wading bird foraging and flood prevention (see Action BH-9). The Tampa Bay watershed hosts about 1,400 linear miles of tributaries, creeks and rivers; however, the extent of tidal reach in these water bodies is not comprehensively documented. Baseline research is needed to quantify the total linear miles of tidal tributaries and how they will change with sea level rise, water and land use changes.

The Tampa Bay Tidal Tributaries Habitat Initiative was launched in 2010 to study the health and function of tidal tributaries. Highly variable environmental conditions among tributaries make setting a single optimum water quality criterion difficult. Instead, habitat status may be better characterized by the status of fish populations, or some other biological indicator (see Action BH-9). A 2012 study funded by TBEP identified hundreds of structures in tidal tributaries that potentially block or impede tidal flows and fish movement. Further work to develop biological criteria, monitor fish and wildlife and prioritize tributaries for restoration is needed.

**Coastal Uplands**

Coastal Uplands occur just landward of emergent tidal wetlands, and include mesic flatwoods and hydric hammocks. They provide habitat for a variety of bay wildlife and are important buffers between tidal wetlands and urban and agricultural development.

Analysis of general land cover maps from 2007 indicate there were approximately 12,929 acres of coastal uplands in the Tampa Bay watershed, although this is likely an overestimate due to inclusion of managed agricultural and park lands. Since 2013, 112 acres of coastal upland have been restored in Tampa Bay through the TBERF. The SWIM Program also has promoted the restoration of various coastal upland communities, restoring almost 2,000 acres of pine flatwoods, hardwood hammocks, mixed pine-hardwood forests and grassed prairies.

Improved quantitative assessments are needed to develop restoration and protection targets for coastal uplands.

**Freshwater Wetlands**

Freshwater wetlands support more than 80 species of terrestrial and aquatic fish and wildlife, filter pollutants including nitrogen, reduce flooding and erosion and recharge groundwater. Over the past century, urban development and agricultural production have negatively impacted freshwater wetlands in the Tampa Bay watershed.

From 1950–2007, the Tampa Bay Area suffered a net loss of more than one-third of its freshwater wetlands, amounting to more than 100,000 acres. Non-forested wetlands were disproportionately lost. These findings led TBEP partners to set a specific restoration and protection target of 18,703 acres of freshwater wetlands, including 17,088 acres of non-forested and 1,615 acres of forested wetlands.

The Freshwater Wetland Habitat Master Plan (see Action BH-10) determined that these specific targets were achievable and best accomplished through a combination of publicly financed restoration and privately funded compensatory mitigation. Since 1991, the SWIM Program has routinely incorporated both estuarine and freshwater wetlands into their habitat mosaic designs as components of stormwater treatment — while simultaneously establishing freshwater wetlands, oligohaline habitats, and salinity gradients important for fisheries production.

Regulatory permitting agencies have committed to utilizing the Freshwater Wetland Master Plan to identify and require mitigation of historic wetland conditions. There is a need to provide education and guidance to environmental professionals on how to best utilize the Plan’s recommendations and tools. Pinellas County’s Stormwater Manual provides an innovative model for incorporating wetlands into an integrated stormwater management plan.
Climate Change and Sea Level Rise

TBEP evaluated and published potential impacts and management implications of climate change on critical coastal habitats. Modeled changes to increasing sea level showed that mangrove forests will dominate the overall proportions of future coastal habitats, whereas proportions of salt marshes, salt barrens and coastal freshwater wetlands will decline. Increasing the resilience of coastal habitats and providing them with room to migrate upslope are among the recommended strategies for coping with climate change. The SWIM program already is implementing restoration projects designed to boost resiliency of coastal habitats and help accommodate projected sea level rise.

The Critical Coastal Habitat Assessment Program was developed by TBEP to track long-term changes that may occur as a result of sea level rise and climate change. The monitoring plan will incorporate a hierarchical approach to allow for multiple scales of inference to be made. Scales will include “Bay Wide,” “Bay Segment” and “Habitat Ecotone”, with specific measures for identifying habitat response to climate change. Methods and results of the baseline monitoring program will be included in the 2019 Habitat Master Plan.

Land Acquisition and Protection

The first Tampa Bay Habitat Master Plan identified 28 sites for acquisition, protection, management and/or restoration. Of those, 19 were purchased and 10 have undergone restoration activities. Both SWFWMD and Hillsborough County (through the Jan K. Platt Environmental Lands Acquisition and Protection Program) have acquired lands on the master list.

The 2010 Master Plan Update inventoried public and private parcels in the Tampa Bay watershed that should be prioritized for restoration efforts. Public sites included 12 in Pinellas County, 18 in Manatee County and 19 in Hillsborough County. The Plan recommended developing a federal-state-local-private partnership to provide the framework for linking watershed-level planning goals for restoration with federal, state and local wetland compensatory mitigation.

Coastal land available for restoration and acquisition is dwindling as development expands. Accordingly, projects further in the watershed are gaining importance. This shift in focus recognizes that habitats — such as tidal tributaries and freshwater wetlands far removed from the bay proper — are critical to its health and is consistent with the need to move up slope to accommodate rising sea levels.

**STRATEGY:**

**Activity 1**

Update the 2010 Habitat Master Plan to assess progress toward established habitat targets and to set targets for remaining priority coastal habitats as data becomes available. Components of this update include:

- Reevaluation of the Restoring the Balance management paradigm, taking into account anticipated impacts from population growth, changing land use patterns and climate change.
- A restoration and management plan for tidal creeks, further refining priority tributaries for hydrologic restoration, environmental indicators and criteria, and fisheries and benthic monitoring (see Action BH-9).
- A restoration and management plan for seagrasses in Tampa Bay, incorporating nutrient management, physical impacts and transplanting activities.
- A restoration and management plan for coastal uplands.
- A long-term monitoring program for wetland mitigation sites (see Action BH-2), including a process for agencies to track permitted wetland losses.

**Activity 2**

Implement the Critical Coastal Habitat Assessment Program to assess changes in priority habitats associated with climate change and shifts in land use.

**Responsible parties:** TBEP (lead), FWC

**Timeframe:** TBEP will complete all activities by 2021.

**Cost and potential funding sources:** 8% CWA Section 320 funds, $1.5 million Agreement for Environmental Mitigation for Florida, SWFWMD, FWC, potential implementing partners for monitoring, etc.

**Benefit/Performance measure:** Documented progress towards establishing priority habitats.
Cooperative Funding, TBERF and other grants or funds.

**Location:** Baywide

**Benefit/Performance measure:** Evaluation of change in habitat extent and quality over time.

**Results:** Enhanced management decisions for critical bay habitats, including changes due to effects from climate change, land use changes, population growth and other factors.

**Deliverables:** Final report from initial monitoring, including consistent design for future use. Reports from future monitoring events evaluating changes observed every five years.

**Activity 3** Continue to encourage restoration and protection of priority habitats through acquisition and restoration programs and incorporation into local comprehensive land use plans (see Action Li-1).

**Responsible parties:** TBEP, SWFWMD, Hillsborough County, Manatee County, Pinellas County, Pasco County; and the cities of Tampa, St. Petersburg and Clearwater; local and national land trusts (e.g., Trust for Public Lands, Tampa Bay Conservancy, The Nature Conservancy) and private landowners

**Timeframe:** Ongoing

**Cost and potential funding sources:** $$–$$$$
State or federal funds including 5-Star Restoration Grants, NFWF grant programs, local government land acquisition funds, grants, trust funds.

**Location:** Baywide

**Benefit/Performance measure:** Restored and/or protected habitat

**Results:** Increased quality and quantity of habitats in Tampa Bay and its watershed.

**Deliverables:** Annual Government Performance and Results Act (GPRA) reporting for protected and restored habitat. Maintenance of database of habitat restoration and protection projects in the Tampa Bay watershed. Updated priority acquisition list for bay and watershed.

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OBJECTIVES:
Support progress toward habitat restoration goals by implementing mitigation criteria specific to Tampa Bay watersheds, for unavoidable wetland impacts. Identify priority sites for mitigation banks and off-site mitigation that help to achieve adopted targets for critical coastal habitats, including seagrasses, saltwater wetlands, freshwater wetlands and hard bottom habitats. Collaborate with the private sector to evaluate and improve mitigation. Establish long-term monitoring of mitigation sites across multiple habitats.

STATUS:
Ongoing. Action expanded to include recommendations for on- and off-site mitigation developed through the Mitigation Criteria Working Group. The Freshwater Wetland Master Plan includes tools for directing future mitigation where most ecologically beneficial and to disproportionately impacted freshwater wetland habitats. Evaluations of mitigation success can provide a framework to improve permitting and monitoring programs across multiple habitats, with recommendations incorporated into the next update of the Tampa Bay Habitat Master Plan.

RELATED ACTIONS:
BH-3 Reduce propeller scarring of seagrass and pursue seagrass transplanting opportunities

BH-10 Implement the Tampa Bay Freshwater Wetland Habitat Master Plan

BACKGROUND:
Mitigation involves restoring, enhancing, preserving or creating habitats to offset development-related impacts to wetlands, streams, seagrasses and other aquatic resources.

Unlike restoration or preservation done primarily to enhance or maintain habitat quantity and quality, mitigation is required for permitted impacts that damage or destroy wetlands and other aquatic habitats. Federal, state, regional and local agencies regulate mitigation activities.

Currently, mitigation can be achieved using three mechanisms:
• Mitigation banks (Large mitigation areas that offer "credits" for impacts. Banks must demonstrate successful restoration prior to releasing or selling credits).
• In-lieu fee programs (Monetary contributions to another entity to implement an identified large mitigation project).
• Permittee-responsible mitigation (The permit applicant conducts the mitigation activity).

Preservation, restoration and acquisition of existing wetlands is preferred. However, if wetland impacts are unavoidable, specific guidelines govern how, where and what type of mitigation must be conducted, and monitoring of project success. Mitigation may involve creation, enhancement, restoration or preservation of habitats. It can occur on the same site as the development activities, if space allows; off-site at an appropriate location; or at a mitigation bank. Long-term success of mitigation projects is variable and highly dependent upon the location, size, type of habitat created and maintenance provided.

Regulatory agencies generally prefer mitigation banking or use of in-lieu fees because the larger scale and scope of these tools maximizes habitat benefits — especially when mitigation for smaller wetland mitigation projects (less than a few acres) can be bundled into larger parcels. There are multiple existing and planned mitigation banks in the bay watershed for both private and public development and infrastructure activities. The majority offer freshwater mitigation credits. Several mitigation banks are currently under review by regulatory agencies, but are not yet approved to release credits. Service areas for permitted mitigation banks generally encompass an entire watershed; applicants may
choose to use credits from a bank in the same watershed to fulfill mitigation requirements.

The Environmental Protection Commission of Hillsborough County (EPCHC), in association with the University of South Florida and other regional partners, is evaluating the success of freshwater wetland mitigation projects it permitted in Hillsborough County since 1987. The review compares the original mitigation designs to current status, using standardized wetland assessment methods. Preliminary findings show a 38% loss in total wetland area for the 63 constructed wetlands assessed; the majority of sites evaluated are one acre or less.

Forested wetlands mature more slowly but better mimic functions of comparable natural wetlands than non-forested (grassy) wetland mitigation projects. One solution may be to include both forested and non-forested components in freshwater mitigation efforts.

Fire is critical to the success of grassy wetlands but is rarely employed in management of these areas.

The Tampa Bay Estuary Program (TBEP) Master Plan for the Protection and Restoration of Freshwater Wetlands in the Tampa Bay, Florida Watershed (see Action BH-10) also examined mitigation of freshwater wetlands. Both the EPCHC study and the freshwater master plan reinforce the need for more rigorous mitigation criteria to prevent deterioration of wetland quality and quantity in the bay watershed. Among the issues in need of clarification and consensus:

- Concerns that mitigation banks or in-lieu fee programs will be preferentially established where land is cheaper, even though these areas may be far removed from the actual wetland impacts. This is of particular concern in urban areas, where land costs are higher. Currently, mitigation outside the impacted watershed is rarely approved, but not prohibited. However, mitigation within the same sub-basin is not required, potentially creating wetland deficits in some areas.

- Loss of small isolated wetlands (less than ½-acre) for which mitigation is not required. These “frog ponds” are especially important for amphibians and the wading birds that feed on them.

- Whether private entities should be allowed to conduct mitigation activities on public lands.

Whether public agencies should purchase large tracts of land specifically for future mitigation purposes, and whether acquisition of land alone can be used to satisfy mitigation requirements.

- Whether monitoring is stringent enough, and of adequate duration, to adequately assess long-term success. Additionally, there is no standardization of monitoring reports, so what is approved as successful by permitting agencies varies widely. Improvements in water quality and utilization of mitigation areas by fish and wildlife are rarely considered.

- Whether the current system, which utilizes credits based on type and quality of impacted and restored habitats, adequately compensates for wetland losses. For example, the current “No Net Loss” policy presents challenges to permitting agencies in moving beyond type-for-type mitigation.

- Potential secondary impacts to natural wetlands adjacent to development, such as changes in water quantity and quality. For example, increased runoff may alter hydrology, drowning native vegetation and creating artificial “ponded” wetlands dominated by nuisance plants like cattails and primrose willow that do not provide the same ecological benefits. Research is needed to examine and quantify these impacts and to improve transitional zones from manmade to natural wetlands.

Although existing mitigation criteria focuses on freshwater wetlands, improvements are also needed in mitigating impacts to estuarine habitats such as seagrasses, marshes, mangroves and hard bottom habitats. Options that restore entire communities rather than a single habitat should be investigated, especially with regard to systems as varied as hard bottom communities.

Opportunities for seagrass mitigation are generally limited to transplanting, often at high cost and with varying success (see Action BH-3). Since the vast majority of the bay’s seagrass gains are a result of increased water clarity from reduced nitrogen loadings, port authorities and other entities have requested use of pollution-reduction projects (such as stormwater or wastewater treatment) as mitigation for seagrass impacts in lieu of transplanting. This alternative is generally not permitted; however, a recent project to remove manmade causeways blocking tidal circulation at Fort De Soto Park serves as a successful model. The project, sponsored by SWFWMD, FDOT and Pinellas County, directly impacted about one-quarter acre of seagrasses but resulted in improved water quality and almost 200 acres of seagrass expansion in the interior waters of the park. Seagrass mitigation credits were allowed for this work. Whether water quality in the proposed mitigation site is sufficient to foster seagrass growth is a key factor in such projects. An analysis of 20 seagrass mitigation projects around Florida is now being conducted by FWC and funded by FDEP; this study will help identify successful techniques for future consideration.

Mitigation criteria for other sensitive habitats, including hard bottom and live bottom, have not been established. TBEP will develop protection and restoration targets for hard bottom by 2019; appropriate mitigation strategies could be incorporated into those targets. Monitoring of mitigation associated with ship channel expansion and natural gas pipeline construction projects suggests that recreating structural hard bottom, such as limestone...
or rock reefs or outcroppings, is much simpler and more successful than transplanting the soft corals and sponges that grow on the hard substrates.

**STRATEGY:**

**Activity 1** Complete evaluation of long-term success of constructed freshwater wetlands in Hillsborough County. Incorporate recommendations into future permitting guidance.

*Responsible parties:* EPCHC (lead for evaluation), SWFWMD, USF, USGS, FDEP, USACE


*Cost and potential funding sources:* $5 Work funded by EPCHC through an EPA Region IV Wetland Development Grant

*Location:* Hillsborough County

*Benefit/Performance measure:* Increased percentage of freshwater wetland mitigation deemed successful through development and implementation of recommendations to improve long-term ecological viability.

**Results:** Improved long-term mitigation to achieve adopted targets for restoration and protection of freshwater wetlands, especially for non-forested freshwater wetlands that have been lost in greater proportion in the bay watershed.

**Deliverables:** Summary report of long-term success of constructed freshwater wetlands, including recommendations for improvement.

**Activity 2** Establish a long-term monitoring program to evaluate mitigation success of freshwater wetlands, estuarine wetlands, hard bottom and other habitat types. Incorporate applicable methodologies from EPCHC’s freshwater wetland mitigation assessment. Consider criteria for utilization of mitigation sites by fish and wildlife as a measure of success. Identify funding sources and partners. Conduct monitoring, encompassing on- and off-site mitigation activities across multiple habitat types and mitigation strategies.

*Responsible parties:* TBEP’s TAC (lead on monitoring design), potential pilot implementing partners include EPCHC, SWFWMD, FDEP, FDOT

*Timeframe:* Develop monitoring protocols as part of the 2017–2019 Habitat Master Plan update. Conduct initial pilot monitoring project by 2020

*Cost and potential funding sources:* $5 Potential funding sources to conduct pilot monitoring include external grants such as EPA Region IV Wetland Development Grant, TBERF or other research funds.

*Location:* Baywide

*Benefit/Performance measure:* Increased percentage of successful mitigation activities for coastal wetland habitats and other aquatic resources, such as seagrasses, mangroves and salt marshes.

**Results:** Enhanced long-term mitigation success contributing to achievement of protection and restoration targets.

**Deliverables:** Recommendations for long-term monitoring protocols for wetland and hard bottom mitigation sites. Monitoring reports.

**Activity 3** Evaluate impacts to natural wetlands adjacent to development, considering changes to hydrology, vegetation and water quality. Design, implement and evaluate a pilot project. Develop long-term monitoring protocols to track changes in function and quality.

*Responsible parties:* TBEP’s TAC for project design to assess impacts to natural wetlands adjacent to development, potential pilot implementing partners include EPCHC, SWFWMD, FDEP, local cities and counties

Activity 4
Host a workshop with local environmental managers and mitigation bankers to explore locations and opportunities for mitigation banks and/or regional off-site mitigation areas, especially in areas with wetland deficits and impaired waters. Create incentives such as streamlined permitting for smaller mitigation banks in targeted sub-basins.

**Responsible parties:** ABM (lead), SWFWMD, FDEP, EPCHC, USACE, Pinellas County, Manatee County, Hillsborough County, mitigation bankers, land trusts, non-profit restoration agencies

**Timeframe:** Workshop in 2018 with recommendations for rule revisions following

**Cost and potential funding sources:** $ Planning grants

**Location:** Baywide

**Benefit/Performance measure:** Identification of potential new mitigation banks and/or regional off-site mitigation areas throughout the bay watershed.

**Results:** Improved coordination among publicly- and privately-funded mitigation sponsors leading to achievement of protection and restoration targets.

**Deliverables:** Report evaluating pilot project and recommendations for next steps. Recommendations for monitoring of development-related impacts to adjacent wetlands.

Activity 5
Examine the use of water quality improvement projects in lieu of transplanting seagrass to mitigate development-related seagrass impacts. Using the Fort De Soto recirculation project as a model, develop guidelines, considerations and incentives for acceptable use of water quality enhancement projects as a mitigation tool by permitting agencies.

**Responsible parties:** Tampa Bay NMC (lead), permitting agencies

**Timeframe:** 2018

**Cost and potential funding sources:** $ CWA Section 320 funds for TBEP staff time, in-kind staff support from permitting agencies

**Location:** Baywide

**Benefit/Performance measure:** Regulatory flexibility in allowing water quality improvement projects as mitigation to offset seagrass impacts, where feasible and appropriate.

**Results:** Reduced nitrogen loading leading to natural recruitment and recovery of seagrasses.

**Deliverables:** Guidelines for appropriate use and incentives for utilizing water quality projects as a seagrass mitigation tool.

Activity 6
Develop and maintain a standardized regional database of mitigation projects that includes permitted mitigation designs and monitoring reports for critical coastal habitats, including seagrasses, hard bottom (including artificial reef balls as well as oyster reefs) and freshwater wetlands. The analysis of 20 seagrass mitigation projects now underway could serve as the foundation of a statewide inventory.

**Responsible parties:** FDEP SW District, EPCHC (Leads), FDOT, USACE, SWFWMD, EPCHC, FWC (for seagrass mitigation evaluation), SW Florida Seagrass Working Group

**Timeframe:** 2018

**Deliverables:** Regional electronic databases with timely information about design and scope of mitigation projects and monitoring results.

**Benefit/Performance measure:** Standardized database(s) with timely, updated information about mitigation activities for a broad suite of habitats.

**Results:** Improved tracking and evaluation of mitigation activities that identify best practices and techniques leading to greatest ecological benefit.

**Location:** Baywide

**Cost and potential funding sources:** $ EPA Wetland Development Grant

**Benefit/Performance measure:** Construction of an artificial reef ball to provide a foundation for a statewide inventory.

**Results:** Improved tracking and evaluation of mitigation activities that identify best practices and techniques leading to greatest ecological benefit.

**Deliverables:** Regional electronic databases with timely information about design and scope of mitigation projects and monitoring results.


OBJECTIVES:
Enhance seagrass recovery by reducing propeller scarring of seagrass; evaluate effectiveness of seagrass planting techniques; pursue seagrass restoration opportunities at appropriate sites and continue boater education.

STATUS:
Ongoing. Action updated to reflect adoption of extensive manatee protection zones that also protect seagrasses. Action also updates propeller scarring and seagrass transplanting research. Strategy revised to focus scope of seagrass transplanting program, and to evaluate effectiveness of manatee zones in reducing propeller scarring. Targeted boater education is an important element of this Action.

RELATED ACTIONS:
FW-1 Increase on-water enforcement of environmental regulations
FW-6 Preserve the diversity and abundance of bay wildlife
PE-1 Promote public involvement in bay restoration and protection
PE-2 Promote public education about key issues affecting the bay

BACKGROUND:
Seagrasses create important habitat and forage for many important bay species (see Action BH-1). Seagrass meadows are relatively fragile and can easily be damaged by human activity, such as careless boat operation that leaves propeller scars resembling plowed furrows.

Substantial progress has been made in implementing actions which may reduce seagrass scarring. An extensive network of year-round and seasonal slow speed zones established primarily for manatee protection also serves to safeguard seagrasses in shallow nearshore waters — although adequate enforcement of these zones remains a challenge (see Actions FW-1 and FW-6). Slow speed zones generally encompass waters 6 feet deep or less, mirroring the average depth range of seagrass beds in the bay.

No-motor or “poll and troll” zones at Weedon Island and sections of Fort De Soto Park also help protect manatees and seagrasses by restricting use of internal combustion engines in shallow waters. No-entry security zones around MacDill Air Force Base and Port Manatee provide de facto seagrass protection.

Although limited seagrass transplanting has been implemented in several areas around Tampa Bay, evaluation of...
successes. Monitoring and Preventing Propeller Scars
Seagrass scarring is a persistent problem. New boaters or boaters new to Tampa Bay may find themselves suddenly grounded in the bay's shallows and resort to “propeller dredging” through grass beds to reach deeper water.

A statewide survey of seagrass scars conducted in 1995 found that 65% of seagrasses within Hillsborough County, 45% of seagrasses within Manatee County and 42% of seagrasses within Pinellas County were lightly to severely scarred.1 The 1995 survey preceded adoption of the slow-speed manatee protection and no-motor zones now in place. Slow speed and no-motor zone regulations have not been evaluated in more than 15 years to determine if, and to what extent, they have reduced scarring or promoted healing of scars.

Initial studies indicated that scarred beds may take 3.6 to 6.4 years to return to normal density, if no additional damage occurs during that period.1 However, more recent research conducted by the Environmental Protection Commission of Hillsborough County (EPCHC) and the University of South Florida in the Cockroach Bay Aquatic Preserve showed that prop scars can heal rapidly.2 The EPCHC study, which utilized side-scan sonar, found that shoal grass (Halodule wrightii) relocalized scarred areas within 6 months. Recovery also was observed in turtle grass (Thalassia testudinum) beds. Pinellas County officials also reported success with using “sediment tubes” to facilitate regrowth of shoal grass in prop scars, as part of mitigation for the Belleair Beach Causeway Bridge.

More research is needed to determine whether these results can be reliably replicated in other scarred areas with different sediment types and currents, and for slower-growing manatee grass (Thalassia or Syringodium filiforme). Although the impacts of seagrass scars on fish and shellfish have not been well studied, research conducted in 2002 in Tampa Bay and Charlotte Harbor showed no significant declines in species abundance in beds with up to 50% scarring.3

Boater education about safe navigation in shallow waters is an important solution to reduce seagrass scarring.

Refining Techniques for Transplanting Seagrasses
Only about 100 acres of the 20,000-acre increase in bay seagrasses since 1990 has resulted from transplanting efforts — water quality improvements account for the vast majority of gains. Restoring seagrasses naturally through nutrient management should continue to be the primary focus of restoration efforts.

However, transplanting may be a locally important tool for “jump-starting” restoration where seagrass recovery is lagging. sudden losses occur (e.g., due to a spill or extreme weather event) or as mitigation for unavoidable impacts.

Several methods of transplanting seagrasses have been employed in Tampa Bay. Early efforts utilizing small units of seagrass had poor survival rates, as the newly planted grasses were easily washed away by tides and currents. More recent projects have had success transplanting larger clumps or “sods” of seagrass that include the native soil and intact root systems. These units — measuring about 8 inches by 8 inches — are often able to withstand more turbulent water conditions until the grass is fully established.

A multi-year project conducted by Tampa Bay Watch and the City of Tampa at MacDill Air Force Base transplanted manatee grass from a natural “donor site” to a nearby location using sod technique. After two years, seagrass coverage in the transplant area increased 28-fold. Nearly a decade after the first transplantation effort at this location, seagrass cover has continued to expand. An additional quarter-acre of manatee grass was transplanted in six plots in 2012 by EPCHC and Tampa Bay Watch; by late 2015, a 75% increase was observed. It is difficult to determine whether this recovery, and similar restoration or mitigation efforts, is the result of natural recruitment or transplanting activities.

Seagrass survival is influenced by multiple factors, including water clarity, sediment type, rainfall, epiphyte coverage and wave energy. Location and depth at which plantings occur may be more important than the technique used. Just like land-based plants require specific optimum environmental conditions to flourish, transplanted seagrass, regardless of technique, will not survive if the location and environment are not appropriate.

Mitigation for construction-related impacts typically requires permittees to track and report survival to the permitting agencies for a limited period only. Long-term monitoring (greater than 3 years) of restoration and mitigation projects is needed to determine the most cost-effective and successful methods and to identify appropriate planting strategies.

STRATEGY:

Activity 1
Develop and implement a study to evaluate the effectiveness of no-motor, slow speed zones and voluntary “seagrass caution areas” in reducing propeller scars. Identify Best Management Practices to reduce seagrass scarring. Evaluation can be included as a task in the seagrass management element of the updated Tampa Bay Habitat Master Plan. Identify, map and prioritize scarring “hot spots” around the bay to reduce repeated impact.

Responsible parties: TBEP (lead) with SW Florida Seagrass Working Group

Timeframe: The Habitat Master Plan will be initiated in 2017 and finalized in 2019

Cost and potential funding sources: $5–$55
CWA Section 320 funds

Location: Baywide

Benefit/Performance measure: Identification of best practices to reduce seagrass scarring and “hot spots” of seagrass scarring.

Results: Identification of seagrass scarring “hot spots” and effective techniques to reduce seagrass scarring will direct restoration and protection efforts more cost effectively.

Deliverables: Report on best practices to reduce seagrass scarring. Scanning “hot spot” map.

Activity 2
Continue to maintain effective seagrass scarring reduction practices. Direct new efforts to seagrass scarring “hot spots.”
**Activity 3**  
Continue to refine and expand boater education programs to more effectively reach target audiences, including new boaters and boaters new to Tampa Bay. Improve boater education for rental boat operators and customers. Support and promote the use of digital technologies (including electronic chart displays, smartphones and other emerging platforms) to provide real-time information to boaters and alert them when they are entering slow-speed or no-motor zones (see Action FW-6).

**Responsible parties:** TBEP (lead, through the Manatee Awareness Coalition), FWC, FDEP (through its aquatic preserves and state parks)  
**Timeframe:** Ongoing for TBEP education materials. Digital technologies initiating by 2023  
**Cost and potential funding sources:** $ CWA Section 320 for Boaters Guides and other boater education materials. Bay Mini-Grants supported by Tampa Bay license plate revenues. Enhancement of digital technologies (product providers).

**Location:** Baywide  
**Benefit/Performance measure:** Increased protection of seagrass beds from propeller scarring.  
**Results:** Maintenance and enforcement of effective seagrass scarring reduction actions.  
**Deliverables:** Report on ongoing and new seagrass scarring reduction efforts 5 years after the efforts are implemented.

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**Activity 4**  
Develop and implement a long-term monitoring program for seagrass transplanting and mitigation to assess optimal conditions and techniques for success. Develop a map of areas in Tampa Bay where seagrass transplanting could assist in jump-starting seagrass recovery.

**Responsible parties:** TBEP (lead), Tampa Bay Watch, FWC, SW Florida Seagrass Working Group members, FDEP, public or private entities conducting seagrass transplanting for mitigation  
**Timeframe:** Develop monitoring design by 2019. Initiate monitoring program within 2 years of design completion. Evaluate monitoring results after 5 years of implementation. Create map of optimal transplant sites by 2025.

**Cost and potential funding sources:** $–$$ CWA Section 320 funds, local entity staff time  
**Location:** Baywide  
**Benefit/Performance measure:** Increased seagrass transplanting success.  
**Results:** Coordinated, comprehensive approach to seagrass transplanting that employs most effective techniques in locations with the greatest likelihood of success.  
**Deliverables:** Monitoring design document. Report on monitoring results after 5 years. Map of optimal seagrass transplanting sites.

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OBJECTIVES:
Identify and protect hard bottom and oyster reef habitats in Tampa Bay. Map and monitor existing oyster reef habitat; develop bay-wide goals for oyster reef habitat creation and protection; monitor animal use of reef habitat; support community-based oyster reef habitat restoration; and support mooring fields and buoys to protect hard bottom habitat.

STATUS:
Ongoing. Action revised from “Restrict impacts to hard bottom communities and evaluate the ecological effects of artificial hard bottom habitat.” New action highlights mapping and restoration efforts since 2006, permitting challenges and need for monitoring of ecological effects of artificial hard bottom and oyster habitats.

RELATED ACTIONS:
BH-1 Implement the Tampa Bay Habitat Master Plan
BH-8 Continue and enhance habitat mapping and monitoring programs
FW-6 Preserve the diversity and abundance of bay wildlife

BACKGROUND:
Hard bottom habitats in Tampa Bay include fossilized corals, rubble, limestone, other natural “reef-like” material and artificial reefs. They provide important substrate for the attachment of benthic species, including sponges, corals and oysters, and attract and support a diverse assemblage of marine invertebrates and fish, including many recreationally important species.

Oyster reefs are formed by the cumulative buildup of shell material from successive generations of oysters. They occur predominately in shallow nearshore areas, especially in brackish waters near creek and river mouths. Oyster reefs provide a number of ecological, economic and recreational benefits, including food and habitat for a large number of species. They also can reduce erosion, stabilize shorelines and improve water quality.

Hard bottom and oyster reefs in Tampa Bay are protected submerged habitats under state and federal wetland regulations. They are considered Essential Fish Habitat and afforded additional federal protections under the Magnuson-Stevens Fishery Conservation and Management Act. Both habitats are relatively rare and sparsely distributed in the bay.

In 2016 the Southwest Florida Water Management District (SWFWMD) mapped an estimated 166 acres of oyster reef in Tampa Bay. SWFWMD anticipates regular oyster reef mapping as part of their biannual seagrass surveys in Tampa Bay. Previous mapping efforts have highlighted the difficulty in assessing overall oyster habitat extent in the bay, especially along mangrove and hardened shorelines.1,4

SWFWMD has initiated two other projects to locate, characterize and create finer-scale thematic maps of hard bottom and oyster reef habitats in Tampa Bay. The first project, funded by the Tampa Bay Environmental Restoration Fund (TBERF), will focus on the southeast region of Tampa Bay from the mouth of the Little Manatee River to the mouth of Terra Ceia Bay. The second project, funded by SWFWMD, will focus on Old Tampa Bay, areas adjacent to MacDill Air Force Base, Terra Ceia bay and the mouth of the Manatee River. These mapping projects will include field surveys utilizing a combination of side scan sonar, underwater video and ground truthing. Ground truthing will categorize biological communities associated with various hard bottom habitats, bathymetric relief, natural or artificial hard bottom and contiguous reef or hard rubble.

In 2017, TBEP was awarded a grant from Pinellas County’s settlement funds

**2016 SEAGRASS AND OYSTER REEF EXTENT BY BAY SEGMENT**

<table>
<thead>
<tr>
<th>BAY SEGMENT</th>
<th>PATCHY SEAGRASS (ACRES)</th>
<th>CONTINUOUS SEAGRASS (ACRES)</th>
<th>OYSTER (ACRES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Tampa Bay</td>
<td>4553.6</td>
<td>6592.8</td>
<td>73.6</td>
</tr>
<tr>
<td>Hillsborough Bay</td>
<td>1100.2</td>
<td>907.0</td>
<td>12.2</td>
</tr>
<tr>
<td>Middle Tampa Bay</td>
<td>5500.6</td>
<td>4152.1</td>
<td>12.9</td>
</tr>
<tr>
<td>Lower Tampa Bay</td>
<td>2882.0</td>
<td>4915.4</td>
<td>15.5</td>
</tr>
<tr>
<td>Boca Ciega Bay</td>
<td>2150.2</td>
<td>6919.3</td>
<td>38.3</td>
</tr>
<tr>
<td>Manatee River</td>
<td>472.9</td>
<td>250.7</td>
<td>5.8</td>
</tr>
<tr>
<td>Terra Ceia Bay</td>
<td>491.4</td>
<td>767.0</td>
<td>8.0</td>
</tr>
</tbody>
</table>

**SOURCE:** SWFWMD
from the Deepwater Horizon accident to map hard bottom habitat in bay waters offshore southeastern Pinellas County, using similar techniques as were employed by SWFWMD. Results of this work will add to the mapped extent of these habitats within the bay.

Protecting and restoring hard bottom and oyster reef habitats will contribute to improved water quality, increased habitat and shoreline stabilization in Tampa Bay. While restoration of all lost hard bottom and oyster reef habitats in Tampa Bay is unrealistic, an alternative is to restore the proportion of habitats that existed historically. Comparisons of aerial photography of the same area of Old Tampa Bay between the 1970s and 2014 showed a change from 83.8 acres to 59.3 acres of oyster reef. Historic and modern oyster reef habitat maps can be used to establish restoration and protection targets for oyster reefs in Tampa Bay (see Actions BH-1 and BH-8).

Several organizations are working to create or restore hard bottom and oyster reef habitats in the bay. Tampa Bay Watch is working with community volunteers to create and enhance oyster reefs by deploying clean, fossilized oyster shells as a base upon which live oysters can settle and form natural reefs. Since 2001, more than 4,700 volunteers have created almost 14,000 linear feet of oyster reef in the bay — using more than 1,400 tons of oyster shell. Other projects have installed reef balls to support shoreline stabilization and oyster reef formation along the MacDill Air Force Base peninsula, the Alafia Banks and the Kitchen.

Audubon Florida created more than 2,000 linear feet of new oyster reef to improve water quality, facilitate growth of native salt marsh and mangroves and slow erosion of the Richard T. Paul Alafia Bank Bird Sanctuary. The Sanctuary is one of the largest and most diverse waterbird colonies in the continental United States, but is threatened by erosion from boat wakes and storm waves (see Action FW-6).

The Artificial Reef Program of the Environmental Protection Commission of Hillsborough County (EPCHC) manages eight artificial reefs in Tampa Bay that are popular angling spots. By providing hard bottom substrates and associated biological communities, artificial reefs increase biological diversity and productivity. A 2005 study found that 385 species used EPCHC’s reefs, including popular sport fish like grouper, tarpon and snook, as well as a variety of crabs, shrimp, mollusks and worms. EPCHC will begin a 10-year update of their original study in 2016, enlisting observations from commercial and recreational fishermen. Research on artificial reef design and associated community structure may yield valuable management information.

Threats to hard bottom and oyster reef habitats and their biological communities include changes in sediment accretion and removal from dredge and fill operations, channel modifications and harbor expansions, sea level rise and ocean acidification, boat groundings, cumulative damage from anchors, overfishing, harmful algal blooms, invasive species, parasites and pathogens.

The invasive Asian Green Mussel (Perna viridis) is a noteworthy threat that should be monitored on both natural and artificial reefs in Tampa Bay. Green mussels were first observed in Tampa Bay in 1999 and are known to foul boat hulls, clog power plant cooling water intake structures and displace native oyster and mussel populations. After initial rapid population growth in the bay, anecdotal evidence suggests that populations have stabilized — although the mechanism of their control is unknown.

Construction of the Gulfstream natural gas pipeline in Tampa Bay impacted nearly 20 acres of hard bottom habitat. Impacts were mitigated by installing shallow-water limestone reefs and transplanting soft corals and sponges. The low-relief limestone reefs were quickly colonized by plants and animals; however, the transplants of soft corals and sponges were largely unsuccessful. A hydraulic fracture, or “frac out,” that inadvertently released drilling fluids to the surface during the horizontal drilling also impacted hard bottom.

Additional hard bottom impacts are likely in Tampa Bay as a result of dredging associated with future harbor improvements. “Frac outs” may occur during installation of underwater communications cables or other pipelines in the future.

Impacts to hard bottom and oyster reef habitats are not easily mitigated, and greater recognition and protection of these rare habitats is needed. Therefore, the effectiveness of current permitting and mitigation rules in preserving hard bottom and oyster reef habitats throughout the bay warrants evaluation.

**STRATEGY:**

**Activity 1**
Monitor results and support comprehensive identification, characterization and mapping of hard bottom and oyster reef habitats and their communities in Tampa Bay. Support mapping of historic distributions of hard bottom habitat in Tampa Bay. Utilize protocols and techniques adapted from the SWFWMD pilot project to support baywide mapping and assessment of hard bottom communities.

**Responsible parties:** SWFWMD (lead), TBEP, other state, regional or local agencies

**Timeframe:** Ongoing. Pilot projects complete by 2017 - 2018.

**Cost and potential funding sources:** $$$ SWFWMD, Pinellas County Deepwater Horizon settlement funds; TBERF and federal grants or other funds.

**Location:** Initial mapping in Old Tampa Bay.
southern reaches of the bay, and offshore of southeastern Pinellas County. Future mapping could be baywide.

**Benefit/Performance measure:** Understanding historic and baseline conditions will assist in setting restoration and protection targets.

**Results:** Better understanding of historic and current hard bottom and oyster reef habitat in Tampa Bay.

**Deliverables:** Comprehensive maps of historic and current hard bottom and oyster reef habitat.

**Activity 2**

Develop baywide goals for protection and restoration of hard bottom and oyster reef habitats. Incorporate into the Bay Habitat Master Plan. Track and consider implications of possible FDEP reclassification of bay waters as Class II (Suitable for shellfish propagation or harvesting). Ensure consistency in federal/state definitions used to describe hard bottom types.

**Responsible parties:** TBEP (lead), ABM, SWFWMD, local governments

**Timeframe:** Initiate in 2017

**Cost and potential funding sources:** $–$$ CWA Section 320 funds

**Location:** Baywide

**Benefit/Performance measure:** Measurable targets for hard bottom and oyster reef habitats in Tampa Bay.

**Results:** Protection and restoration targets will support the Restoring the Balance paradigm of natural resource management.

**Deliverables:** Targets adopted by the TBEP Management and Policy Boards. Technical memorandum.

**Activity 3**

Monitor community structure and population dynamics of species associated with natural and artificial hard bottom and oyster reef habitats. Incorporate monitoring of established mitigation sites (such as the limestone reefs created for the Gulfstream pipeline). Monitor populations of the invasive Asian green mussel or other potential invasive species that may emerge.

**Responsible parties:** EPCHC, Tampa Bay Watch, FWC, Audubon Florida

**Timeframe:** Ongoing for some species

**Cost and potential funding sources:** $–$$ grants, TBERF, agency funds

**Location:** Baywide

**Benefit/Performance measure:** Greater understanding of the long-term ecosystem impacts of natural and artificial bottom habitats.

**Results:** Monitoring of habitats for invasive species may allow early risk detection and management.

**Deliverables:** Monitoring reports.

**Activity 4**

Support community-based oyster reef restoration activities and artificial reef creation. Streamline process and support research to aid in permitting restoration activities involving oyster reef and live bottom habitats. Support research on artificial reef design (e.g., high vs low relief structure; reef ball vs wave-attenuating devices vs oyster bags) and evaluate the ecological effects of artificial hard bottom habitats.

**Responsible parties:** EPCHC, Tampa Bay Watch, FWC, Audubon Florida

**Timeframe:** Restoration projects are ongoing; specific research not yet funded, but projects could begin in FY 2017–2020

**Cost and potential funding sources:** $ CWA Section 320 funds, federal grants, TBERF

**Location:** Baywide

**Benefit/Performance measure:** Comprehensive restoration of hard bottom habitats utilizing the most successful techniques and providing the greatest ecological benefit.

**Results:** Enhanced oyster reef and artificial reef habitats in Tampa Bay

**Deliverables:** Final project reports. Research results in technical documents.

**Activity 5**

Evaluate the effectiveness of current permitting and mitigation rules for hard bottom substrate impacts in Tampa Bay. Promote mooring fields and buoys where appropriate to minimize vessel and anchor damage to hard bottom.

**Responsible parties:** FDEP, FWC, Hard Bottom Working Group, EPCHC, SWFWMD

**Timeframe:** Initiate in FY 2017–2018

**Location:** Baywide

**Cost and potential funding sources:** $ Resource agency funding, local government funds

**Benefit/Performance measure:** Rule review and revisions, if appropriate, will improve the success of hard bottom creation and mitigation projects by ensuring that impacts to those habitats are adequately addressed.

**Results:** Additional protection of hard bottom habitat.

**Deliverables:** Revised permitting and mitigation rules if appropriate. Mooring fields and buoys if appropriate.
Activity 6  Assist in the development and implementation of recommendations to protect hard bottom and oyster reef habitats and minimize or mitigate impacts to them (e.g., anchor damage, dredging and channel modification).

**Responsible parties:** US Army Corps of Engineers, TBEP, FDEP, FWC and EPCHC

**Timeframe:** Initiate by 2017-2018

**Cost and potential funding sources:** $ Resource management agencies, local government staff time

**Location:** Baywide

**Benefit/Performance measure:** Development and implementation of hard bottom habitat protection actions.

**Results:** Enhanced protection and restoration of natural hard bottom habitats in Tampa Bay.

**Deliverables:** Technical memorandum of recommendations.

Activity 7  Promote public understanding and stewardship of hard bottom and oyster reef habitats, especially among anglers and divers. Examples may include “Adopt A Reef” cleanup programs for artificial reefs and designation of “Snorkel Reefs” in shallow water that encourage the public to snorkel.

**Responsible parties:** Local cities and counties, EPCHC, TBEP, FDEP, FWC

**Timeframe:** Discussion can start in 2016–2017

**Cost and potential funding sources:** $ Responsible parties

**Location:** Baywide

**Benefit/Performance measure:** Enhanced public stewardship of hard bottom habitat.

**Results:** Potential reef cleanup programs and designated snorkel reefs to increase understanding and public access.

**Deliverables:** Potential stewardship programs.

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OBJECTIVES:
Expand use of living shorelines instead of traditional seawalls along waterfront properties. Support demonstration projects; explore regulatory rule revisions to support living shorelines; assess the use of living shorelines to mitigate climate change; and support education of waterfront homeowners about the benefits of living shorelines.

STATUS:
Ongoing. Revised to broaden focus on softening shorelines of privately and publicly owned waterfront properties to address coastal erosion, as a preferred alternative to coastal armoring. Action also recognizes potential for living shorelines to bolster coastal resiliency to sea level rise.

RELATED ACTIONS:
BH-1 Implement the Tampa Bay Habitat Master Plan
BH-9 Enhance ecosystem values of tidal tributaries
PE-1 Promote public involvement in bay restoration and protection
PE-2 Promote public education about key issues affecting Tampa Bay

BACKGROUND:
Extensive industrial, commercial and residential development has dramatically reshaped the bay's natural shorelines, especially in urban areas. TBEP's first assessment of habitat losses, conducted in the early 1990s, estimated that more than half of the natural shoreline of Boca Ciega bay was altered by widespread dredging of hardened, finger-fill residential canals.

Although new "canal communities" are prohibited, the original developments remain, and vertical seawalls, revetments, riprap and bulkheads still dominate new waterfront development. Property owners in Florida are allowed to replace most existing seawalls without a permit.

A 2015 report from Restore America's Estuaries, Living Shorelines: From Barriers to Opportunities, offers mounting evidence that hardened, artificial shorelines increase erosion, harm water quality and magnify storm damage and flooding. The report also notes that seawalls and other hardened shores provide poor habitat for fish and wildlife.

In contrast, living shorelines embrace "softer," more natural materials that buffer wave action, absorb storm impacts, filter pollutants and provide food and shelter for fish, shellfish and wading birds. Even "living seawalls" (habitat installed in front of existing seawalls) are preferable, as these are superior to a vertical wall structure alone.

Living shorelines also help to reduce impacts associated with climate change and sea level rise by buffering the effects of increased storm and floods. They protect dunes, mangrove forests and other coastal habitats that shield manmade infrastructure and support wildlife. Case studies illustrating how coastal communities throughout the Gulf of Mexico are incorporating living shorelines into habitat restoration and protection projects to improve long-term resiliency to sea level rise are presented in the Gulf Coast Community Handbook prepared by TBEP.

Accurately defining a living shoreline is critical to widespread use and acceptance by permitting agencies and the public. NOAA describes living shorelines as a "broad term that encompasses a range of shoreline

Encourage habitat enhancement along altered waterfront properties

CHARTING THE COURSE: THE COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN FOR TAMPA BAY (AUGUST 2017 REVISION)
stabilization techniques along estuarine coasts, bays, sheltered coastlines and tributaries. A living shoreline has a footprint that is made up mostly of native material. It incorporates vegetation or other living, natural “soft” elements alone or in combination with some type of harder shoreline structure (e.g., oyster reefs or rock sills) for added stability. Living shorelines maintain continuity of the natural land-water interface and reduce erosion while providing habitat value and enhancing coastal resilience.

Examples in Tampa Bay include the Ulele Spring restoration in downtown Tampa (rock revetment and native plants); the MacDill Air Force Base Living Shoreline project (oyster reefs and salt marsh grass); and the oyster reef/breakwater along the Alafia Bank Bird Sanctuary. Examples of “living seawalls” include oyster domes along downtown St. Petersburg and Tampa waterfronts.

The 2015 Restore America’s Estuaries report identifies three major barriers to widespread use of living shorelines:

- Reliance among regulators on familiar, traditional shoreline stabilization techniques, and lack of information about both the shortcomings of those methods and the benefits of living shorelines.
- Lack of a wide-angle view of shoreline management, leading to site-specific permit reviews of individual applications that overlook the cumulative effects of hardening shores and the potential values of living shorelines to mitigate habitat loss, flooding and sea level rise.
- Lack of a coordinated constituency to advocate for living shorelines.

Barriers are both institutional and educational. Creation of a living shoreline requires a permit; replacement of existing seawalls usually does not. In 2017, the U.S. Army Corps of Engineers authorized a new nationwide general permit for living shorelines, making the permitting process easier. However, few waterfront property owners know about eco-friendly alternatives to hard structures. The complex permitting process, length of time it takes to obtain a permit, and the need for a qualified contractor to design and install living shorelines effectively serve as a disincentive to their acceptance and use. In locations where living shorelines alone may not be appropriate, NOAA encourages placing habitat in front of existing seawalls, a so-called living seawall. Sarasota Bay Estuary Program’s Living on the Water’s Edge brochure is an example of practical information about this topic for citizens.

Hardened structures are often necessary to protect property in areas of high wave energy and will remain a visible feature along bay and river shorelines. This action seeks to expand use of living shorelines in areas of moderate to low wave energy.

STRATEGY:

Activity 1

Support funding and implementation of demonstration projects to provide tangible and diverse examples of the ecological and aesthetic values of living shorelines by a) giving priority to Tampa Bay Environmental Restoration Fund (TBERF) and Tampa Bay Estuary Program (TBEP) Bay Mini-Grant applicants that incorporate living shorelines; and b) exploring alternative mechanisms to allow private landowners to obtain grant funds for shoreline softening projects, such as the use of conservation easements or “block grants” to local governments to oversee projects in waterfront neighborhoods.

**Responsible parties:** TBEP, Southwest Florida Water Management District (SWFWMD), Environmental Protection Commission of Hillsborough County (EPCHC), US Fish and Wildlife Service (USFWS), US Environmental Protection Agency, local governments and regulatory agencies

**Timeframe:** Ongoing for prioritizing grant funding; exploring alternative mechanisms for funding private landowners initiated within 5 years

**Cost and potential funding sources:** $–$$$, TBEP TBERF and Bay Mini-Grants, SWFWMD Cooperative Funding, EPCHC Pollution Recovery Trust Fund, USFWS Community Grants, EPA Wetlands Development Grants

**Location:** Baywide

**Benefit/Performance measure:** Increased number of living shorelines in Tampa Bay

**Results:** Improved understanding of the most cost-effective, ecologically beneficial and site-appropriate shoreline softening techniques.

**Deliverables:** Final reports from awarded grants.

Activity 2

Include living shorelines as a tool for mitigating habitat loss caused by sea level rise in the next update of the Habitat Master Plan. Support additional monitoring of current and future living shoreline projects to support habitat goals and climate resiliency.
**Bay Habitats**

**Responsible parties:** TBEP (lead for Habitat Master Plan); potential implementing partners for additional monitoring include SWFWMD, local governments, Tampa Bay Watch, academic institutions

**Timeframe:** Habitat Master Plan completed by 2019. Pending funding, monitoring initiated by 2020

**Cost and potential funding sources:** $–$$

CWA Section 320 Funds for Habitat Master Plan. Potential funding sources for monitoring include TBERF or TBEP Bay Mini-Grants, SWFWMD Cooperative Funding, EPA Wetland Development Grants or other grant funds, EPCHC Pollution Recovery Fund grants

**Location:** Baywide

**Benefit/Performance measure:** Increased knowledge of benefits of living shorelines.

**Results:** Inclusion in Habitat Master Plan would increase visibility and use of living shorelines and provide a formal process for quantifying acreage and success as part of overall habitat restoration goals.

**Deliverables:** Inclusion of living shoreline assessment in Habitat Master Plan. Monitoring reports.

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**Activity 3**

Explore regulatory rule revisions to address the current disincentive for replacing existing seawalls, and expedite regulatory permitting for living shoreline projects. Identify and address regulatory constraints arising from lack of recognition and adequate definition of living shorelines. Explore potential for mitigation credits for design alternatives to seawalls.

**Responsible parties:** Tampa Bay Regional Planning Council’s Agency on Bay Management (lead), local governments, EPA, NOAA, USACE, FDEP, SWFWMD, EPCHC, private entities

**Timeframe:** Initiated by 2018

**Cost and potential funding sources:** $ Minimal funding to support staff from agencies for rule revision

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**Activity 4**

Support education of waterfront homeowners about the benefits of living shorelines and various design options, materials and costs, especially as a more bay-friendly adaptation to sea level rise than armoring. Promote contractor training/education in design and construction of living shorelines. Promote living seawalls if living shorelines are not feasible in some areas.

**Responsible parties:** Florida Sea Grant (lead) for homeowner education and contractor training; Restore America’s Estuaries, Tampa Bay Watch and National Estuary Programs nationwide for education materials; EPCHC, Florida Department of Environmental Protection, local governments

**Timeframe:** Ongoing for education; initiate other activities by 2020.
OBJECTIVES:
Expand habitat mapping and monitoring programs to assess extent and quality of bay habitats, including seagrass, benthic, hard-bottom, emergent coastal and associated upland habitats. Assess new technologies as they become available. Assess the need for additional monitoring of effects of emerging contaminants on benthic habitats and increased monitoring in tidal tributaries.

STATUS:
Ongoing. Action is revised to recognize the evolving role of emerging technologies for habitat assessment (including remote sensing, sonar and digital imagery). Action also assesses the need for additional monitoring and laboratory analyses for emerging benthic contaminants, and monitoring needed to improve understanding of ecological function and stressors in tidal tributaries and river systems.

RELATED ACTIONS:
BH-1 Implement the Tampa Bay Habitat Master Plan
BH-4 Identify hard bottom communities and avoid impacts
BH-9 Enhance ecosystem values of tidal tributaries
BH-10 Implement the Tampa Bay Freshwater Wetland Habitat Master Plan
CC-1 Improve ability of bay habitats to adapt to a changing climate

BACKGROUND:
Substantial progress has been made to map and monitor bay habitats to inform habitat restoration and protection targets (see Action BH-1).

The Southwest Florida Water Management District (SWFWMD) continues to map seagrass acreage every two years using aerial photography, while local government partners have helped ground-truth seagrass quality at selected transects throughout the bay since 1988. In 2016, seagrass coverage measured 41,655 acres, surpassing the Tampa Bay Estuary Program (TBEP) initial goal of 38,000 acres. Despite these gains, seagrass communities are still vulnerable to environmental variability (such as heavy rainfall events) and human impacts (such as boat propellers and groundings). Although overall acreage has increased, there are still areas that experience swings in seagrass coverage due to variable annual conditions (e.g., Feather Sound, Bayshore Blvd. area in Hillsborough Bay). Continued biannual mapping of baywide seagrass coverage is necessary to identify and protect sensitive and impacted areas.

The Environmental Protection Commission of Hillsborough County (EPCHC) coordinates benthic monitoring of animals living on or in bay bottom sediments and chemical conditions, with participation from Manatee and Pinellas Counties. Benthic monitoring has been ongoing since 1993 with over 1500 samples analyzed. Overall, benthic conditions in the bay are considered “Fair” to “Poor” over the last 20 years, with “Good” conditions in Middle and Lower Tampa Bay in many years. There is continued need for benthic monitoring in Tampa Bay, especially in hot spots of contamination (see Action COC-1). Other recommendations include expanding laboratory analysis of sediment contaminants to include new or emerging compounds which
Coastal marshes and mangrove forests have been mapped and quantified using traditional photointerpretation techniques, allowing restoration targets to be established. However, new approaches and techniques to capture large- and small-scale changes are required, especially for understanding and potentially mitigating for climate change. Several new monitoring techniques designed to detect small-scale changes resulting from climate change and sea level rise (SLR) are being tested and compared for effectiveness and cost-saving as part of the Critical Coastal Habitat Assessment initiated in 2014 (see Action CC-1). Large-scale habitat changes could be detected using new automated digital aerial or satellite imagery processing techniques currently in development. If these techniques prove to be accurate, precise and cost-effective, high resolution aerial imagery currently being collected by SWFWMD could yield detailed habitat maps. Combined with digital elevation data, they could help assess the fate of low-lying areas and identify opportunities to restore or purchase land so habitats can migrate landward in response to SLR.

Mapping and monitoring of tidal flats and oyster communities began in 2012 as part of seagrass aerial surveys conducted by SWFWMD. Beginning in 2015, new standards for interpreting oyster reefs and tidal flats from aerial photography were instituted for greater accuracy. New survey techniques, such as sidescan sonar and underwater video, are being used to map hard-bottom habitats (see Action BH-4). Protection and restoration targets will be developed as part of the mapping efforts.

Changes in freshwater wetland habitat was mapped for the entire Tampa Bay watershed using land cover map products derived from aerial imagery taken in 1950 and 2007. Maps were analyzed to compare the change in quantity and quality of wetland habitat over time and show one-third of freshwater wetlands have been lost since 1950 (mostly non-forested wetlands). These data were used to help set restoration and protection targets and to develop the Freshwater Wetland Habitat Master Plan (see Action BH-10).

In the Tampa Bay watershed, coastal uplands are important buffers between sensitive tidal wetlands and urban and agricultural development. Yet, the status of coastal upland habitats in Tampa Bay has not been assessed in detail. Based on generalized land cover maps, an estimated 12,929 acres of coastal uplands exist in the Tampa Bay watershed, and improved quantitative assessments are needed to develop numeric targets for restoration.

A comprehensive mapping program for invasive plants does not exist, although various agencies maintain some location-specific information about invasive plants on their environmental lands. These local data could be augmented via citizen science using mobile devices.

**STRATEGY:**

**Activity 1**

Continue existing mapping and monitoring programs. Continue to identify areas where coastal habitat recovery is lagging, highly variable or threatened. Incorporate data and observations from existing mapping and monitoring programs (e.g., CCHA, seagrass mapping). Periodically summarize mapping and monitoring efforts for critical coastal habitats in a synthesis document, such as the Bay Environmental Monitoring Report (BEMR) or State of the Bay reports.

**Results:** Detailed mapping and monitoring data on habitat extent and quality help set and assess targets.

**Deliverables:** Baywide monitoring reports on status and trends in bay habitats and benthic communities. Habitat Master Plan updates.

**Activity 2**

Use new technologies, as appropriate, to track habitat quantity and quality in the Tampa Bay watershed. Priority habitats include coastal marshes and mangrove forests, tidal creeks (see Action BH-9), oligohaline habitats and freshwater wetlands (see Action BH-10), hard bottom and oyster reef communities (see Action BH-4), and associated uplands, including natural, restored or created habitats. Support new efforts to map invasive plants using mobile devices (see Action IS-2). Collaborate with private sector entities that may be using new technologies in their environmental monitoring programs.

**Responsible parties:** TBEP, SWFWMD, local governments, FWC, FDEP, Florida Invasive Species Partnership

**Timeframe:** Ongoing

**Cost and potential funding sources:** $$$ EPCHC, local governments, USFWS, USGS

**Benefit/Performance measure:** Track conditions and trends in habitats throughout Tampa Bay.

**Location:** Baywide

**Responsible parties:** SWFWMD, TBEP, EPCHC, local governments, FWC, USFWS, FDEP, Tampa Bay Watch, Tampa Bay Water, USGS
**Activity 3**

Evaluate the need and feasibility for additional monitoring for effects of emerging contaminants on benthic habitats (e.g., microplastics, pharmaceuticals, personal care products) and expanded monitoring in rivers and tidal tributaries.

**Responsible parties:** TBEP TAC to evaluate and prioritize additional monitoring needs and identify lead entities to implement additional monitoring

**Timeframe:** Initiate evaluations by 2020

**Cost and potential funding sources:** $-$ $$\$

CWA Section 320 funds, Tampa Bay Environmental Restoration Funds, SWFWMD, USGS, EPA Wetland Development Grants

**Location:** Baywide

**Benefit/Performance measure:** Need and feasibility of additional monitoring will be assessed.

**Results:** New monitoring, if needed, may result in a better understanding of emerging contaminants and the function and condition of tidal tributaries.

**Deliverables:** Report on the need and feasibility of additional monitoring.
**OBJECTIVES:**
Improve the ecosystem value of tidal tributaries of Tampa Bay. Develop indicators of tidal tributary health and function. Continue monitoring in tidal tributaries. Identify and implement projects to remove artificial barriers in tidal tributaries. Improve public awareness of the value and benefits of healthy tidal tributaries.

**STATUS:**
Ongoing. Originally added to the CCMP as a 2012 Amendment, this revision incorporates pilot projects to remove or modify structures, and monitor changes in water quality, vegetation and fisheries use. This update also summarizes new research to characterize tidal tributaries to facilitate development of numeric nutrient criteria.

**RELATED ACTIONS:**
- FW-5 Continue and expand the Critical Fisheries Monitoring Program
- BH-1 Implement the Tampa Bay Habitat Master Plan
- BH-8 Continue and enhance habitat mapping and monitoring programs

**BACKGROUND:**
Tidal tributaries are an important, diverse and often-neglected ecosystem in the bay watershed. Distinctly different from freshwater systems and the open bay, these variable-salinity streams, creeks and back-water systems serve an important niche in fisheries production, nutrient cycling, wading bird foraging and flood prevention or detention.

Since 2006, select tidal creeks of the Tampa Bay watershed have been monitored to evaluate tidal patterns, shoreline vegetation, fish populations, sediment quality and nutrient levels (see Action FW-5). Despite water quality often characterized by low dissolved oxygen levels and higher relative nutrient and chlorophyll levels, these systems have been shown to support high densities of juvenile fishes and baitfish species. Research coordinated by the Tampa Bay Estuary Program (TBEP) found that juvenile snook — a premier sport fish — were up to 36 times more abundant inside the sampled tributaries than outside.1

Current efforts include research supported by US Environmental Protection Agency (EPA) Wetlands Development Grants to develop environmental indicators of tidal tributary health and nursery function. Due to large differences from creek to creek, preliminary results suggest there is no single optimum water quality criterion for setting appropriate nutrient targets and thresholds to maintain ecological productivity. Instead, tidal creek health may be more reliably predicted by the status of its fish populations, especially recruitment and survival of juvenile fishes. Continued and long-term tidal creek biological monitoring is warranted, especially expansion of monitoring efforts to inventory ecological conditions in unsampled creeks (see Action FW-5).

Most of the more than 100 tidal creeks in the bay watershed are less than six miles long and narrow, averaging about 75–150 feet wide. Many have been significantly altered by dredging, road construction, shoreline development and channelization to facilitate flood control. A 2012 inventory commissioned by TBEP identified 344 structures that are potentially blocking or impeding tidal flows and fish movement in bay tributaries.2 These barriers include water control structures, weirs, railroad bridges, culverts and road crossings. Fish and wildlife also are impacted by channelizing and ditching natural creeks for mosquito control, flood prevention and general upland development.

Removing some of these “salinity barriers” could benefit snook and other fish by promoting more natural fluctuations in water levels that occur with rising and falling tides, instead...
of the irregular and often large pulses of nutrient-laden waters released from the highly altered systems during heavy rains. Removal or modification of physical barriers also enhances the overall connectivity of the bay’s tidal habitats.

Restoration efforts are often complicated by such factors as public versus private ownership of the barriers and adjacent land, potential impacts to surrounding property owners, contrasting management objectives (flood control vs. water quality protection) and overall water quality benefits of restoring hydrologic function relative to costs.

Pilot projects sponsored jointly by TBEP and the Southwest Florida Water Management District (SWFWMD) in Pinellas County (Channel S) and Hillsborough County (Channels A and G) have helped to quantify costs, techniques and issues, creating a basic framework by which additional projects can be evaluated and incorporated into future restoration plans.

Modifying a weir and restoring a shoreline near the mouth of Channel S, a highly channelized tributary just east of the St. Petersburg-Clearwater Airport, should attract small baitfish, crabs and other marine creatures that serve as food for larger fish like snook as well as wading birds. Channel S connects to what was originally a natural tidal creek (Badwater Creek) that was ditched in the 1950s to drain the surrounding wetlands for development and agricultural uses. When complete, this project will create more than 76 acres of low-salinity habitat.

Additionally, two water control structures on Channels A and G in the Rocky Creek and Brushy Creek watersheds in upper Tampa Bay are being kept open indefinitely to monitor water quality and fisheries changes resulting from unrestricted tidal flow.

Channels A and G were originally constructed to prevent flooding of nearby lands, and the two structures were installed in the 1970s to prevent salt water from moving upstream and penetrating to the groundwater system through breaches created by construction of the channels.

As part of the pilot study, manatee exclusion barriers on both structures were removed so that all fish and wildlife, including manatees, could travel upstream. Vegetation above and below the structures is being monitored to determine if saltwater wetland plants like marsh grass and mangroves will expand over time.

Public workshops held in conjunction with both of these pilot projects highlight the importance of communicating project goals to nearby residents, and promoting public understanding of tidal creeks as vital nurseries for popular recreational fish, foraging grounds for wading birds, natural stormwater treatment areas and resilient habitats that can adapt to rising seas.

Other techniques currently being used to restore tidal flows to support fish and wildlife include blocking mosquito control ditches and blasting or excavating mounds created by ditching in mangrove forests.

Together, these research, monitoring and restoration efforts represent a comprehensive approach to improved overall management and protection of tidal tributaries throughout the bay watershed.

**STRATEGY:**

**Activity 1**

Continue to develop and monitor environmental indicators of tidal tributary health and nursery function. Participate in collaborative efforts to develop specific environmental indicators and/or biological criteria for tidal tributaries in Southwest Florida estuaries. Continue to track amount of oligohaline habitat restored, protected or enhanced as part of the Tampa Bay Habitat Master Plan. Further refine existing priority list of tidal tributaries with hydrological alterations to identify and assess those with greatest potential for restoration. Continue to monitor fish, water quality and habitat condition in tidal tributaries.

**Responsible parties:** Sarasota Bay Estuary Program (lead) with TBEP, Charlotte Harbor National Estuary Program, FDEP, EPA, FWC, Counties in SW Florida for environmental indicators; TBEP (lead) for priority restoration list; FWC Fisheries Independent Monitoring Program (lead) for monitoring.

**Timeframe:** Ongoing. Initial management recommendations developed as part of Southwest Florida Tidal Creeks Nutrient Study with additional work to refine nutrient sources starting in 2017. Bay Habitat Master Plan will be revised by 2019. Fish and water quality monitoring is ongoing.

**Cost and potential funding sources:** $$$ CWA Section 320 funds for bay Habitat Master Plan; EPA Wetland Development Grant funds for indicator development, FWC (lead), TBERF, PRF grant funds, NFWF grants, EPA, FWC or other agencies for monitoring.

**Location:** Tidal tributaries baywide

**Benefit/Performance measure:** Method to assess status and trends of environmental indicators for tidal tributaries in Tampa Bay.

**Results:** Environmental indicators help set and assess restoration targets.

**Deliverables:** Final Report on environmental indicators for tidal tributaries for EPA Wetland Development Grant. Detailed mapping and monitoring data on fish, water quality and habitat extent and quality in sampled tidal tributaries. Tidal...
Activities chapter in Tampa Bay Habitat Master Plan, including focused short list of projects resulting in higher potential for funding and ecological success.

**Activity 2**

Implement projects to remove priority salinity barriers where partial or complete hydrologic restoration/enhancement/creation would benefit fisheries and wildlife. Enlist stakeholder input (including residents upstream and downstream of project areas) to ensure understanding of benefits and possible changes resulting from implementation of the restoration project. Communicate potential benefits of projects as part of regional sea level rise adaptation.

**Responsible parties:** SWFWMD, FWC, USFWS, NOAA, local governments

**Timeframe:** Initiate after ongoing projects are completed and success is evaluated, by 2022.

**Cost and potential funding sources:** $$$–$$$$ TBERF, PRF grant funds, NFWF grants, EPA, FWC, Sea Grant.

**Location:** Priority tidal tributaries, as defined in Activity 1.

**Benefit/Performance measure:** Increased number of hydrologically-restored tidal tributaries in Tampa Bay.

**Results:** Increased connectivity between watershed and bay, and increased accessibility to low-salinity habitat for fish and other estuarine species.

**Deliverables:** Restoration project reports.

**Activity 3**

Improve coordination among agencies and organizations involved in flood control, habitat protection and water quality improvements to facilitate tidal tributaries restoration that supports comprehensive management goals.

**Responsible parties:** TBRC ABM, FWC, SWFWMD, FDEP, FDOT, Tampa Bay Water, Port Tampa Bay

**Timeframe:** Initiate by 2018

**Cost and potential funding sources:** No additional cost required.

**Location:** Baywide

**Benefit/Performance measure:** Increased coordination between agencies.

**Results:** Improved coordination will achieve cost-effective, dual-purpose restoration that bolsters public safety and property protection while achieving regional restoration goals for low-salinity habitats that sustain fisheries and wildlife.

**Deliverables:** Coordination efforts.

**Activity 4**

Improve public awareness of the importance of tidal tributaries and foster additional citizen stewardship opportunities for these systems in Tampa Bay. Encourage programs that directly involve citizens who live on or near tidal streams in water quality and habitat monitoring/improvement, such as Stream WaterWatch and Adopt A Creek. Promote partnerships with schools that border tidal creeks, and with local universities and community colleges, who could incorporate water quality and vegetation sampling on creeks as part of coursework for students, or offer training and support to volunteers in specific creekside neighborhoods.

**Results:** Public awareness and support can reduce the cost and time for implementing restoration projects, and create community support for protection of tidal tributaries.

**Deliverables:** Potential deliverables include education/stewardship materials for homeowners and school curriculum addressing tidal tributaries.

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OBJECTIVES: Increase acreage of freshwater wetlands in the Tampa Bay watershed through both publicly and privately funded protection, restoration and mitigation. Track freshwater wetland habitat losses and gains. Encourage use of wetland mitigation banks to assist in achieving freshwater wetland goals. Evaluate success of freshwater wetland mitigation.

STATUS: New action implementing key goal of TBEP Habitat Master Plan (see Action BH-1) to quantify freshwater wetland losses and current extent, and set restoration and protection targets.

RELATED ACTIONS: 
BH-1 Implement the Tampa Bay Habitat Master Plan
BH-2 Establish and implement mitigation criteria

BACKGROUND: Most development-related wetland impacts in the Tampa Bay watershed since the 1950s occurred away from the water’s edge, in areas without a direct estuarine connection to the bay. During the nearly 60-year period from 1950–2007, more than 100,000 acres of freshwater wetlands were lost, with about 5,000 acres of coastal mangroves, salt marsh and salt barrens. Losses may have exceeded these estimates because 1950s aerial photographs were not available for analysis.

Cypress trees are found in forested wetlands, along streams and rivers, and in lakes and ponds throughout the bay area. Historic logging operations of the 19th and early 20th centuries harvested most old-growth cypress. Photo by Nanette O’Hara.

For their young, as their nestlings cannot tolerate saltwater prey species. Loss of freshwater marshes has contributed to declines in other bird populations that forage primarily in freshwater habitats, such as the glossy ibis, snowy egret, roseate spoonbill, American oystercatcher, and Caspian, royal and sandwich terns.

Setting Targets for Restoration
The Master Plan for the Protection and Restoration of Freshwater Wetlands in the Tampa Bay Watershed, Florida documented the historic and current extent of freshwater wetlands within the watershed, using the 1950s baseline used in the Restoring the Balance habitat restoration strategy. This research reported a net loss of more than 100,000 acres of freshwater wetlands from the 1950s to 2007.

Additionally, 36,200 acres changed wetland type, for example, transitioning from a grassy marsh to a forested marsh. This work led to the formal adoption by TBEP partners of specific restoration and protection targets for forested and non-forested freshwater wetlands.
wetlands in 2014, as follows:

- The baywide restoration target is 18,703 acres, of which 17,088 acres is non-forested and 1,615 acres is forested.
- The baywide protection target is 229,958 acres, encompassing the existing 149,683 acres of forested and 80,275 acres of non-forested freshwater wetlands.
- Targets also were set for smaller basins within the watershed to enable better local decision-making.

Coordination with Agencies

Because non-forested freshwater systems have experienced the greatest proportional losses, restoration goals focus on recovering a larger percentage of these. Aerial photographs also showed that some wetlands classified as non-forested in the 1950s were classified as forested in 2007 photos. This may be a result of a natural transition, or because of fire suppression and/or hydrologic alterations. For example, some high-quality grassy marshes became dominated by non-native shrubs that do not provide the same benefits as a natural forested wetland.

To encourage restoration of non-forested wetlands, mitigation required for development can be directed to grassy systems if applicants can demonstrate that they previously existed in that location. This provides both flexibility and cost-savings for regulatory agencies and permittees, while supporting bay-wide restoration goals.

Forested wetlands also warrant preservation, enhancement and restoration. Old-growth cypress swamps in the bay watershed are largely gone, while younger forests are more common. Cypress trees are slow-growing, vulnerable to hydrologic changes, and provide critical habitat for creatures as diverse as the alligator gar, river otter, wood duck, and limpkin.

Freshwater wetlands as part of integrated stormwater management

Wetlands can be an effective component of an integrated stormwater management system. They provide functional reduction of nitrogen, while enhancing habitat and aesthetics in highly urbanized areas. Pinellas County’s new Stormwater Manual serves as a model for integrating wetland protection into long-term planning and stormwater treatment programs to support multiple management objectives. The manual promotes a suite of best management systems including enhancement of traditional treatment ponds to mimic natural wetlands.

Large-scale, interconnected greenspaces that include freshwater ponds, streams and wetlands can be encouraged in development master plans, both for new private development and community redevelopment.

STRATEGY:

Activity 1

To assist implementation of the Master Plan for the Protection and Restoration of Freshwater Wetlands, encourage the Southwest Florida Water Management District (SWFWMD) to adopt freshwater wetland restoration targets and recommendations as part of the SWIM Plan for Tampa Bay, and implement priority projects identified in the SWIM Plan. Encourage regulators and planners to incorporate recommendations from the Master Plan into their permitting reviews, comprehensive land use plans and land acquisition programs.

Activity 2

Track freshwater wetland gains and losses during regular updates of the Tampa Bay Habitat Master Plan.

**Source:** TBEP Freshwater Wetland Master Plan 2015
Determine progress towards targets and whether current restoration and protection goals are appropriate. Monitor implementation status of the federal Waters of the United States rule, which clarifies and extends Clean Water Act protections to freshwater streams and wetlands.

**Responsible parties**: TBEP (lead), SWFWMD, EPCHC, local governments, EPA

**Timeframe**: 2017–2019 (Habitat Master Plan Update), then ongoing

**Cost and potential funding sources**: $5–$55 TBEP funding via CWA Section 320

**Location**: Freshwater wetlands throughout the Tampa Bay watershed

**Benefit/Performance measure**: Change in freshwater wetland land uses over time.

**Results**: Ability to measure progress toward adopted freshwater wetland targets will help guide future freshwater wetland restoration and protection efforts.

**Deliverables**: Habitat Master Plan Update (2019, then every 5–7 years). Maps of freshwater wetlands throughout the Tampa Bay watershed

**Activity 4**

Examine success of freshwater wetland mitigation at various time scales and recommend improvements to mitigation practices (see Action BH-2).

**Responsible parties**: EPCHC (lead), SWFWMD, USF and other wetland permitting agencies (USACE, FDEP)

**Timeframe**: 2016–2017

**Cost and potential funding sources**: $5–$55 EPA Wetland Development Grant, EPCHC staff time

**Location**: Hillsborough County

**Benefit/Performance measure**: Assessment of success and failure rates of freshwater mitigation projects.

**Results**: Recommended improvements in mitigation practices will result in more successful long-term ecological benefits of freshwater wetland mitigation.

**Deliverables**: Final Report, including recommendations.

**Activity 5**

Incorporate creation of freshwater wetlands as an option for stormwater treatment. Encourage other local governments to adopt a BMP guide similar to the Pinellas County Stormwater Manual, to expand opportunities for wetland protection and creation in urbanized areas.

**Responsible parties**: Local governments

**Timeframe**: Initiate by 2018.

**Cost and potential funding sources**: $–$5 Grants, local government stormwater funds

**Benefit/Performance measure**: Stormwater manuals incorporating freshwater wetlands as an option for stormwater treatment.

**Results**: Enhanced restoration and creation of freshwater wetland systems in urban areas where natural wetlands are lacking.

**Deliverables**: BMP guides to expand opportunities for wetland protection and creation in urbanized areas.

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Maintain seasonal freshwater flows in rivers

OBJECTIVES:
Establish and maintain minimum seasonal freshwater flows in rivers by completing and fully implementing the Minimum Flows and Levels (MFLs) for Tampa Bay Area tributaries. Evaluate the ecological effects of MFLs on rivers and lakes in the watershed. Assess changes in freshwater inflows over time resulting from both consumptive water use and climate change.

STATUS:
Ongoing. MFLs have been established and adopted for the Hillsborough River, Alafia River and Tampa Bypass Canal. MFLs for the Manatee River and lower Braden River are scheduled for adoption in 2017 and the Little Manatee River in 2020. Lower Hillsborough River minimum flow is currently managed under a recovery strategy with augmented flow from Sulphur Springs and the Tampa Bypass Canal.

RELATED ACTIONS:

**BH-9** Enhance ecosystem values of tidal tributaries

**WW-1** Expand the beneficial use of reclaimed water

BACKGROUND:
Maintaining minimum seasonal freshwater flows and levels (MFLs) in rivers in the Tampa Bay watershed helps maintain the critical hydro-biological habitat characteristics of the estuary. River water volume and flow rates govern depth, salinity, dissolved oxygen, pH, and water temperature, which in turn sustain biological communities.

The timing and volume of freshwater inflow is also critical to enhancing ecosystem services of tidal tributaries, especially as essential fish habitat (see Action BH-9).

State legislation enacted in 1996 directs Water Management Districts to set MFLs for rivers, lakes and springs that define the limits at which further withdrawals would be “significantly harmful to the water resources or ecology of the area.” MFLs are used in the Districts’ water supply planning, water use permitting and environmental resource permitting programs to ensure that withdrawals do not cause environmental harm. Each District takes into account timing and volume of freshwater inflows as well as minimum flows when developing MFLs. Regional water supply development and water reuse plans reflect the challenges of balancing water supply, wastewater disposal and ecological concerns (see Action WW-1).

The Southwest Florida Water Management District (SWFWMD) collects and analyzes a variety of data and seeks reviews from independent scientists and citizens on proposed MFLs and methods used to derive them. At the request of SWFWMD and Tampa Bay Water, the Tampa Bay Estuary Program (TBEP) convened workshops to obtain input from the bay management community on recommended MFLs for the Hillsborough River and the Alafia River.

Minimum flows are continuously monitored at multiple locations on most rivers by SWFWMD and the U.S. Geological Survey through gauge stations that measure flow rates and conductivity. If actual flows are or anticipated to be (within 20 years) below established minimum flows, state law requires the Water Management Districts to develop a recovery or prevention strategy. Strategies might include alternative supply development, conservation measures, augmentation of flows or reductions in permitted withdrawals. Additional monitoring specific to the recovery strategy is usually required, for example, for water quality variables including nutrients and dissolved oxygen or biological communities. Other data are collected by SWFWMD and local partners as needs and opportunities arise.
Activity 2

Assess status of MFLs implemented throughout the bay watershed (springs, rivers and lakes, wetlands and aquifers, if applicable). Summarize changes in consumptive water use. Utilize this data to develop strategies to plan for long-term implications of climate change on freshwater flows to the bay.

- **Responsible parties:** SWFWMD (for assessment of MFLs and recovery strategies), TBEP, USACE for utilization of data to plan for climate-change impacts
- **Timeframe:** Ongoing
- **Cost and potential funding sources:** $$$ SWFWMD, TBERF and other grant funds
- **Location:** Baywide
- **Benefit/Performance measure:** Regular evaluations of MFLs and tracking of freshwater inflows to identify changes over time.
- **Results:** Overall watershed monitoring of freshwater inflow volumes and uses and identification of ecological effects.
- **Deliverables:** Periodic MFL evaluation reports. Periodic updates or projections of impacts of sea level rise on quantity and quality of surface and groundwater resources utilizing data from USACE, TBEP and others.

Managed freshwater discharges to the Hillsborough River just below the dam. Photo courtesy SWFWMD.

As of early 2017, established minimum flows are being met for Crystal Springs, Upper Hillsborough River, Alafia River (including Lithia and Buckhorn Springs), Tampa Bypass Canal and upper Braden River. A 2015 assessment indicated minimum flow requirements for the Lower Hillsborough River are being met most of the time, with full achievement of minimum flows anticipated in 2017 with implementation of all projects identified in the current recovery strategy. Water from Sulphur Springs and the Tampa Bypass Canal has been used to supplement flows on the Lower Hillsborough since 2007-2008. By late 2017, the City of Tampa and SWFWMD will supplement flows by first pumping from Blue Sink, then from Morris Bridge Sink. The withdrawal permit issued by the Florida Department of Environmental Protection (FDEP) for Morris Bridge Sink requires baseline sampling and monitoring during pumping in order to detect any ecological harm to surrounding wetlands.

STRATEGY:

**Activity 1** Complete adoption of MFLs for priority water bodies in the Tampa Bay watershed, including any recovery and prevention strategies identified to ensure that flows are being met.

**Activity 2**

- **Responsible parties:** SWFWMD
- **Timeframe:** Ongoing through 2020
- **Cost and potential funding sources:** $$$ SWFWMD
- **Location:** Manatee River, Braden River and Little Manatee River
- **Benefit/Performance measure:** Minimum flows and levels established for all priority water bodies in Tampa Bay.
- **Results:** Appropriate minimum seasonal freshwater flow to Tampa Bay based upon best available data.
- **Deliverables:** Adopted MFL limits from SWFWMD.

Periodically estimate total freshwater flow from all sources to the bay.

- **Responsible parties:** TBEP (5-year hydrologic and nutrient loading updates as part of the Tampa Bay Reasonable Assurance updates) and SWFWMD
- **Timeframe:** Ongoing. Every 5 years, starting in 2017
- **Cost and potential funding sources:** $-$$ TBNMC contributions to support Reasonable Assurance updates
- **Location:** Baywide
- **Benefit/Performance measure:** Analysis of flow data from gauge stations.
- **Results:** A comprehensive measure and ongoing record of total freshwater flow to the bay.
- **Deliverables:** Total cumulative flow data reported every 5 years, as an element of the Tampa Bay Reasonable Assurance document.

CHARTING THE COURSE: THE COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN FOR TAMPA BAY (AUGUST 2017 REVISION)
FISH AND WILDLIFE
Increase on-water enforcement of environmental regulations

OBJECTIVES:
Improve enforcement of environmental regulations protecting fish and wildlife by supporting marine law enforcement efforts via sustainable funding, education of personnel, adoption of new technologies and boater and angler education.

STATUS:
Ongoing. This action has been expanded to incorporate enforcement of manatee protection zones. Action also expanded to increase compliance with environmental laws through targeted education using new technologies, improve reporting and response times and revive a regional effort to support increased funding for on-water enforcement. Boater and angler education to reduce the need for enforcement is an important element of this Action.

RELATED ACTIONS:
FW-6 Preserve the diversity and abundance of bay wildlife
PA-2 Provide for and manage recreational uses of the bay
PH-5 Reduce pollution from recreational boaters

BACKGROUND:
Adequate enforcement of local, state and federal laws protecting fish and wildlife remains a challenge in the Tampa Bay Area. The need to balance human uses with ecosystem needs will increase as the bay draws more boaters, anglers and other recreational enthusiasts.

The number of registered boats in the three counties bordering the bay actually declined by almost 9% between 2000 and 2016, from 115,721 to 109,063. At the same time, however, local governments reduced or eliminated their marine patrol units when tax revenues sagged during the economic downturn of 2008–2011. The main on-water enforcement agency, the Florida Fish and Wildlife Conservation Commission’s (FWC) Division of Law Enforcement, has been stretched thin in recent years. FWC assumed additional duties related to Homeland Security, especially escorts of large commercial ships transiting the bay.

FWC’s merger of fresh and saltwater law enforcement agencies has expanded the pool of officers trained to enforce both salt and freshwater regulations, with added flexibility to shift officers to “hot spots” or priority problems, such as illegal gill-netting. Additionally, all law enforcement rangers with Florida’s state parks were reassigned to FWC in 2011.

Despite these changes, fewer than 40 FWC officers (including lieutenants and captains who spend limited time in the field) are available to provide continuous on-water coverage in Tampa Bay. That equates to one officer for every 2,636 boats. There are frequent staffing shortfalls as officers typically only remain with FWC for about five years before taking more lucrative positions with federal or local law enforcement agencies. Citizens who report potential violations are often frustrated when officers are unable to respond in a timely fashion, or at all.

The small FWC staff is charged with ever-increasing responsibilities both on and off the water, from enforcing safe boating laws and the bay’s extensive manatee protection zones, to ensuring that sport and commercial fishermen comply with gear and harvest restrictions, to responding to nuisance alligator complaints, enforcing hunting regulations, and even conducting state-required inspections of homemade vessels.

Prospects for a substantial boost in FWC personnel appear dim, and requests to increase the percentage of revenues from the Saltwater Fishing License allocated to marine law enforcement have not been successful. One bright spot may be an increase in local city or county marine officers, as tax revenues

CHARTING THE COURSE: THE COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN FOR TAMPA BAY (AUGUST 2017 REVISION)

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rebound and communities respond to growing natural resource and boating safety concerns within their own waters.

This action encourages utilization of new technologies, such as mobile applications and text messages tagged with GPS locations, to facilitate timely reporting and response to violations. Also recommended is the possible revival of the “Coastwatch” volunteer program that trains citizens who are on the water frequently to identify and report violations directly to local FWC officers. Participants would receive training in key resource protection laws and direct contact numbers for law enforcement officers, bypassing the central dispatch system. This may not result in faster response time to any individual infractions, but would be useful in alerting officers to priority problem areas for targeted enforcement — for example, hot spots of manatee zone violations, illegal netting and boating while intoxicated. The program also would improve communication and collaboration among frequent bay users and law enforcement in general, leading to enhanced enforcement.

Continued education and awareness of boating safety protocols to reduce impacts on wildlife will reduce some of the need for regulatory remedies. The Tampa Bay Estuary Program (TBEP) is a leader in boater education, partnering with FWC to develop the popular Boating and Angling Guide to Tampa Bay (including an interactive, web-based version) and with Audubon Florida on localized guides to Hillsborough Bay, Boca Ciega Bay and Lower Tampa Bay.

As of 2017, about 40 state marine enforcement officers patrol Tampa Bay waters — one for every 2,636 boats. Photo courtesy FWC.

TBEP’s Manatee Awareness Coalition (MAC) helps coordinate boater education efforts among a diverse alliance of boating groups, scientists, bay managers and manatee advocates to increase compliance with the bay’s extensive network of manatee protection zones. Regulated areas include both seasonal and year-round slow speed zones, as well as two no-entry areas adjacent to warm-water outfalls at TECO’s Big Bend Power Plant in Apollo Beach and Duke Energy’s Bartow Power Plant at Weedon Island. The Big Bend plant is among Florida’s most important winter manatee refuges; the Bartow plant is a valuable secondary refuge. The MAC worked with FWC and navigation providers Garmin and Navionics to add Tampa Bay manatee zones to navigation software (and related mobile phone applications) used by boaters. The next innovation should be electronic alarms on personal navigation or smartphone devices that alert boaters when they are about to enter a manatee protection zone.

Ultimately, additional funds for law enforcement are needed to adequately keep pace with increased use (and potential abuse) of the bay and its valuable habitats and inhabitants. Funding for enforcement, as well as marine research and management, could come from reviving the license fee for shoreline anglers. A $9 fee enacted in 2009 was expected to generate $900,000–$1.2 million a year in revenues, but was repealed a year later. The license is now free and voluntary.

Enforcement funds could also come from requiring that residents and/or non-residents using professional fishing guides purchase an individual fishing license. An estimated 2 million tourists fished in Florida in 2014, far outpacing any other state. Currently, charter captains purchase an annual license that covers all anglers on board their boat.

As of 2017, about 40 state marine enforcement officers patrol Tampa Bay waters — one for every 2,636 boats. Photo courtesy FWC.

Tampa Bay has an extensive network of seasonal and year-round slow speed zones to protect manatees.

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about the status and ecology of key resources among scientists, bay managers and enforcement agencies. Sessions should focus on specific resource protection needs and associated regulations. For example, workshops could address colonial waterbird and shorebird areas, manatee and security zones, sea turtle nesting and fisheries laws.

**Responsible parties:** FWC Law Enforcement (lead), local cities and counties with marine enforcement personnel, Port Tampa Bay, Manatee Port Authority, MacDill Air Force Base, Audubon Florida, US Coast Guard Auxiliary, Power Squadron, TBEP, TRBP/C Agency on Bay Management

**Timeframe:** Workshops on Manatee Protection and Bird Protection held in 2017; repeated or new topics scheduled every 2-3 years.

**Cost and potential funding sources:** $ CWA Section 320 funds, in-kind contributions from Port Tampa Bay, appropriate NGOs (such as Audubon)

**Location:** Baywide

**Benefit/Performance measure:** Law enforcement personnel with greater understanding of living resources and regulations designed to protect them.

**Results:** Enhanced protection of fish and wildlife through enforcement of manatee zones, bird and sea turtle nesting areas and fishing laws.

**Deliverables:** Regularly scheduled workshop or webinar for law enforcement personnel.

**Activity 3**

Encourage and assist in development of new technologies to facilitate timely reporting and response to violations. Consider a “Wildlife Alert” mobile application that allows citizens to send reports of infractions, including a GPS-tagged photo or video, directly to their local FWC dispatcher. Explore a tracking system so citizens can be notified of what, if any, action was taken to address their complaint.

**Responsible parties:** FWC Law Enforcement (lead), TBEP

**Activity 4**

Explore reviving the Coastwatch program to train professional fishing guides, members of the Coast Guard Auxiliary, bay stewardship groups, and other interested organizations who deploy regular sampling crews or other on-water personnel, to recognize and report fisheries and other resource violations.

**Timeframe:** FWC Division of Law Enforcement initiated direct text messaging system to report violations in 2016.

**Cost and potential funding sources:** $–$$

New technologies assisted by private sector, FWC activities funded via departmental budget approved by state legislative appropriation

**Location:** Statewide, including Tampa Bay

**Benefit/Performance measure:** More timely reporting of citizen complaints of violations, and improved response to reports.

**Results:** Enhanced protection of bay resources, greater involvement and engagement of public.

**Deliverables:** Mobile application that facilitates citizen reporting of fish and wildlife infractions. Electronic tracking system to apprise citizens of the status of reports of violations.

**Activity 5**

Continue to monitor manatee populations in Tampa Bay to assess effectiveness of existing regulations, pinpoint “hot spots” for targeted enforcement details and identify additional manatee protection zones if warranted as manatee and/or boating patterns change. Maintain and adjust placement of regulatory signs, as needed, to improve boater visibility and awareness of marked zones.

**Responsible parties:** FWC (lead), local governments

**Timeframe:** Ongoing. FWC conducts annual wintertime aerial surveys and special as-needed surveys of manatees in Tampa Bay. Review and inventory of signage should occur every five years, beginning in 2017, and include feedback and recommendations from local enforcement officials and marine safety managers.

**Cost and potential funding sources:** $ Manatee surveys and management funded by FWC and/or local governments

**Location:** Baywide
Benefit/Performance measure: Identification and monitoring of problem areas of manatee/boater conflicts.

Results: Improved coordination between manatee researchers and enforcement personnel to identify problem areas of manatee/boater conflicts in a timely manner.

Deliverables: Annual manatee mortality reports to identify watercraft-related deaths. Annual synoptic surveys to estimate manatee populations in Tampa Bay in winter. Occasional, or as-needed, aerial surveys to estimate manatee distribution and habitat utilization in summer.

Activity 6  
Form a task force of interested bay managers, bay users and others within the Agency on Bay Management to develop and implement a strategy to achieve enhanced funding for on-water enforcement — including support for a minimal shoreline fishing license ($5) with revenues directed toward resource enforcement, research and management. Examine additional funding sources, such as a requirement that anglers fishing aboard a charter boat in inshore waters obtain an individual license.

Responsible parties: Agency on Bay Management, TBEP Manatee Awareness Coalition, local governments

Timeframe: Task Force to be formed in 2018. Alternatively, ABM’s Legislative Affairs Committee could serve as the nucleus of a regional group. Outreach should focus on members of the Tampa Bay Legislative Delegation and key committee chairs in both the Florida House and Senate

Cost and potential funding sources: $ In-kind staff support from TBRPC and TBEP only

Location: Baywide

Benefit/Performance measure: Increase in number of on-water state or local law enforcement officers.

Results: Improved protection of bay fish and wildlife.

FISH AND WILDLIFE
Achieve a sustainable bay scallop population

OBJECTIVES:
Achieve a stable, sustainable population of bay scallops in Tampa Bay.

STATUS:
Ongoing. Goal revised to reflect need to achieve sustainable scallop population rather than population sufficient for recreational harvest. Action also revised to identify additional living resource indicators of seagrass health. Action continues support for collaborative research and scallop restoration and support for citizen monitoring through the Great Bay Scallop Search.

RELATED ACTIONS:
WQ-1 Implement the Tampa Bay nutrient management strategy
CC-2 Understand and address effects of ocean acidification

BACKGROUND:
Scallops are a key indicator of the bay’s health because of their reliance on clear waters and robust seagrasses. Collection and consumption of scallops is a cherished and popular summer pastime enjoyed by thousands of Floridians each year in nearshore waters north of Pasco County where recreational scallop harvests are permitted.

The goal of restoring scallops to sufficient numbers to support a recreational harvest in Tampa Bay remains as elusive as the secretive bivalves themselves. Despite dramatically improved water quality, expanding seagrasses and nearly two decades of research and recovery efforts, scallops in Tampa Bay have not yet returned to healthy, sustainable levels.

Scallops disappeared from Tampa Bay in the 1960s, a likely casualty of both declining water quality and overfishing. Efforts to restore scallop populations began in the mid-1990s, including work to rear them in hatcheries and release them in protected cages to spawn in the bay. As of 2017, recreational harvests remain closed.

In 1996, TBEP and Tampa Bay Watch partnered to create the Great Bay Scallop Search, a one-day event that enlists volunteers to snorkel grass beds in the lower bay looking for scallops. In the early 2000’s, the number of scallops dropped into the teens. In 2007, Scallop Search volunteers tallied 555 scallops during the event, followed by 624 in 2008 and a record 674 in 2009. These positive tallies fueled continued research and monitoring efforts. However, in 2010 scallop counts dropped again, to 32, then to five in 2011. The 2016 Scallop Search documented 54 scallops.

Because they require clear water and seagrasses to flourish, bay scallops are a good indicator of the health of Tampa Bay. Photo by Nanette O’Hara.

Charting the Course: The Comprehensive Conservation and Management Plan for Tampa Bay (August 2017 Revision)
bay scallops are extremely sensitive to changes in water clarity, salinity, temperature and red tide. Their limited life span of only 12-18 months complicates efforts to revive populations in the bay. Additionally, only one egg out of the 12 million or so produced by a single adult scallop may survive. Moreover, new research indicates that the success of scallop recruitment here may depend upon successful dispersal of larvae from important “source sites” in the Big Bend area of Florida, where scallops are most abundant, but harvest pressure is intense. Ocean acidification associated with climate change also may affect the future health of bay scallops and other mollusks by impairing their ability to form hard, calcified shells.

Scientists continue to survey scallop populations in Tampa Bay as part of a coordinated monitoring effort throughout Southwest Florida and to investigate innovative ways to improve spawning success and larval survival. A new restoration approach that encompasses all life-stages is being applied by scientists from Mote Marine Laboratory, the Sarasota Bay Estuary Program, Florida Fish and Wildlife Conservation Commission and volunteers with Sarasota Bay Watch. The team is testing several techniques to boost scallop populations. One method deploys scallop collectors made from mesh produce bags that give larvae an inviting place to settle. In some trials, larvae are raised to the juvenile stage then released into seagrass beds. Finally, adult scallops housed together in protective cages are temporarily located in seagrass beds during their spawning period.

In the next decade, it is unlikely that scallop populations in Tampa Bay will rebound to levels sufficient to support a recreational harvest season. Therefore, this action proposes a revised goal of restoring scallop stocks to a self-sustaining level, with enough adults surviving to spawn each year to create a stable population so larval seeding efforts may one day no longer be necessary.

**STRATEGY:**

**Activity 1** Continue to implement Action WQ-1 to ensure sufficient water quality and seagrasses to foster scallop recovery.

*Responsible parties:* TBEP, All members of the Tampa Bay Nitrogen Management Consortium (NMC)

*Timeframe:* “Reasonable Assurance” documentation of reductions in nitrogen loadings and water quality monitoring to be submitted in 2017, and every five years thereafter, as required by the Florida Department of Environmental Protection

*Cost and potential funding sources:* $$$ CWA Section 320, Nitrogen Management contributions paid once every five years by all Consortium members

*Location:* Baywide

*Benefit/Performance measure:* Water clarity and nitrogen reduction goals being met.

*Results:* Reduction of nitrogen loadings and resulting water clarity sufficient to support seagrasses essential for scallops to thrive in Tampa Bay.

*Deliverables:* “Reasonable Assurance” document summarizing progress in achieving and maintaining nitrogen reductions goals for each bay segment.

**Activity 2** Continue participation in collaborative research, monitoring and restoration efforts in Tampa Bay and other SW Florida estuaries.

*Responsible parties:* TBEP, SBEP, CHNEP, FWC, Mote Marine Laboratory, Tampa Bay Watch, Sarasota Bay Watch and other members of the SW Florida Scallop Restoration Working Group

*Timeframe:* Ongoing. Development of methods and benchmarks for promoting sustainable scallop populations to begin in 2017

*Cost and potential funding sources:* $ CWA Section 320 funds, external grant funds

*Location:* Collaborative effort throughout SW Florida, including Tampa Bay, Sarasota Bay and Charlotte Harbor

*Benefit/Performance measure:* Better understanding of the requirements for self-sustaining population of bay scallops in Tampa Bay.

*Results:* Stable, sustainable population of bay scallops in Tampa Bay and other estuaries throughout SW Florida.

*Deliverables:* Methodology for determining the levels of spawning and recruitment necessary to establish a self-sustaining population of bay scallops in Tampa Bay.
sustainable population of bay scallops. Recommendations for achieving a stable population, including additional research and monitoring needs, and restocking efforts.

**Activity 3** Continue to conduct the Great Bay Scallop Search to foster citizen awareness of the bay’s value and to support monitoring to determine viable, sustainable populations in the bay once benchmarks are established.

*Responsible parties:* Tampa Bay Watch, TBEP

*Timeframe:* Scallop Search conducted annually, usually in August

*Cost and potential funding sources:* $ CWA Section 320 funds

*Location:* Lower Tampa Bay (specifically waters in and around Fort De Soto Park)

*Benefit/Performance measure:* Participation of citizens in monitoring boosts public appreciation of bay’s value and contributes to scientific understanding of scallops in Tampa Bay.

*Results:* Annual estimate of scallop abundance helps to identify long-term trends in scallop recovery.

*Deliverables:* Report summarizing abundance and distribution of scallops in Scallop Search monitoring area.

**Activity 4** Identify appropriate additional living resource indicators of bay health, such as pink shrimp or spotted sea trout, which are less vulnerable to extreme yearly fluctuations. These species may provide a more comprehensive and accurate long-term portrait of bay health.

*Responsible parties:* TBEP, FWC-FWRI

*Timeframe:* Identification and assessment of additional suitable indicators in 2017

*Cost and potential funding sources:* $ CWA Section 320 funds

*Location:* Baywide

*Benefit/Performance measure:* Selection and adoption of monitoring protocols for one or more additional living resources indicators.

*Results:* Use of more predictable living resource indicators provides a more comprehensive assessment of bay health.

*Deliverables:* Report assessing viability and relative merits of additional living resource indicators. Monitoring reports incorporating status of selected indicators.
OBJECTIVES:
Continue the Fisheries Independent Monitoring program to evaluate the status and trends of fisheries in Tampa Bay; secure long-term supplemental funding to enhance monitoring in rivers and tidal streams; and assess the relative importance of various estuarine habitat types to recruitment processes and fisheries productivity.

STATUS:
Ongoing. Continue to support program funding. Action expanded to support long-term monitoring in rivers affected by water withdrawals; representative tidal creeks through the watershed; and research into early life histories of economically important fisheries.

RELATED ACTIONS:
BH-8 Continue and enhance habitat mapping and monitoring programs
BH-9 Enhance ecosystem values of tidal tributaries

BACKGROUND:
The Florida Fish and Wildlife Conservation Commission’s (FWC) Fish and Wildlife Research Institute conducts an ongoing Fisheries Independent Monitoring program (FIM) that evaluates the status and trends of fisheries in Tampa Bay. This program is a key component of overall bay monitoring. The FIM program employs multiple fishing gear types to determine the abundance and distribution of adults and juveniles of a number of fish species. Each month, 108 samples are collected at randomly selected sites stratified by habitat and depth across five bay zones and four river zones of Tampa Bay. Surveys record the number, species length of fish captured, and other environmental parameters.

The FIM program’s estuarine sampling is funded by state saltwater fishing license revenues and by federal dollars from the Sport Fish Restoration Fund. FIM program funding often is supplemented by grants awarded from other agencies, such as Tampa Bay Water, Southwest Florida Water Management District and Tampa Bay Estuary Program. In the 2014–2015 fiscal year, estuarine sampling in Tampa Bay operated on roughly $700,000, which included about $80,000 in supplemental, grant funded sampling.

A comprehensive hydrobiological monitoring program (HBMP) to assess potential impacts of new surface water withdrawals for regional drinking water supplies ended in 2012 in the Hillsborough River and Palm River/Mckay Bay, and in 2014 in the Alafia River. While sampling further upstream did not detect impacts to fisheries from freshwater withdrawals during the study period, it was valuable for characterizing these systems and contributed to a better overall picture of the status of bay fisheries.

Continued monitoring of changes to the system or water withdrawals is warranted. Tampa Bay Water’s current...
In light of the 2010 Deep Water Horizon oil spill in the Gulf of Mexico, there is renewed urgency and opportunity for improving our understanding of how important offshore fisheries species, such as grey snapper and gag grouper, use the full reach of the estuary for critical parts of their life-history. While the important role of the estuary in sustaining offshore adult populations is well documented, long-term, broad-scale monitoring studies are needed to assess the relative importance of various estuarine habitat types to recruitment processes and fisheries productivity (see Actions BH-8 and BH-9).

**STRATEGY:**

**Activity 1**

Continue the Fisheries Independent Monitoring Program and seek long-term supplemental funding to enhance monitoring in river regions affected by water withdrawals. Pursue funding to conduct fisheries monitoring in the Hillsborough River and Palm River/Tampa Bypass Canal.

**Responsible parties:** FWC (lead), SWFWMD

**Timeframe:** FIM sampling conducted annually. Additional sampling dependent upon available funds.

**Cost and potential funding sources:** $$$ Federal funding through Sport Fish Restoration Act; state funding through saltwater fishing license fees; additional federal, state or private grants

**Location:** Baywide, Hillsborough River, Palm River/Tampa Bypass Canal

**Benefit/Performance measure:** Ongoing sampling program to assess habitat utilization of tidal tributaries by commercially or recreationally valuable species.

**Results:** Improved management and restoration of tidal tributaries to support snook and other important fish and shellfish species.

**Activity 2**

Implement the recommendations of the Tidal Creek Monitoring Project for a long-term tidal tributary fish monitoring program following FIM protocols.

**Responsible parties:** FWC, TBEP

**Timeframe:** initiate in 2016

**Cost and potential funding sources:** $$$ TBEP funding via CWA Section 320; additional federal, state or private grants.

**Location:** Selected tidal streams in Tampa Bay

**Benefit/Performance measure:** Ongoing sampling program to assess habitat utilization of tidal tributaries by commercially or recreationally valuable species.

**Results:** Improved management and restoration of tidal tributaries to support snook and other important fish and shellfish species.

**Deliverables:** Annual assessments of fisheries abundance and diversity in Tampa Bay utilizing a variety of sampling techniques. Assessments of fisheries abundance and diversity in river systems, either annually or every 2-3 years.

Bay anchovy is the most abundant species collected by Fisheries-Independent Monitoring crews in Tampa Bay.
**Activity 3**

**Deliverables:** Regular reports of monitoring in tidal streams on timetable recommended by research partners (Tidal Creeks Monitoring Program participants).

Support additional studies into the early life history of commercially and recreationally important species to better understand their growth and distribution, habitat utilization at various life stages and survival rates.

**Responsible parties:** FWC, NOAA (leads), USF

**Timeframe:** Initiate in 2017–2018 (dependent on funding availability)

**Cost and potential funding sources:** $5 Federal funding through Sport Fish Restoration Act; RESTORE Act; state funding through saltwater fishing license fees, additional federal, state or private grants

**Location:** Baywide, specific sampling sites to be identified when project initiated

**Benefit/Performance measure:** Identification of factors and habitats critical to recruitment, dispersal and survival of larval fish and shellfish species.

**Results:** Improved management of key fisheries across multiple habitats and at various life stages.

**Deliverables:** Reports with recommendations for improved management of fisheries, including habitats critical for larval and juvenile stages.

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**Activity 4**

**Deliverables:** Sampling protocols for monitoring use of estuarine habitats by key offshore species.

Improve and expand coordination for regional review of development and restoration projects that may impact federally designated Essential Fish Habitat in Tampa Bay.

**Responsible parties:** ABM (lead), NOAA, FWC, SWFWMD

**Timeframe:** Initiate in 2019-2020

**Cost and potential funding sources:** Federal funding through Sport Fish Restoration Act; RESTORE Act; state funding through saltwater fishing license fees; additional federal, state or private grants

**Location:** Offshore waters in the Gulf of Mexico

**Benefit/Performance measure:** Identification of factors impacting health of fish and shellfish species utilizing both offshore and estuarine habitats at various life stages.

**Results:** Improved management of important fish and shellfish stocks throughout their life cycles and across multiple habitats

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OBJECTIVES:
An umbrella action to protect important fish and wildlife populations in the bay watershed, specifically by supporting research; habitat protection and restoration, compliance with laws to protect fish and wildlife; and education initiatives that foster species diversity and abundance. Support research, management and education to protect listed species and other important wildlife populations in the Tampa Bay watershed. Implement the Bay Habitats Action Plan to achieve targets and goals for critical fish and wildlife habitats. Continue and expand scientific and community-based wildlife monitoring programs. Give priority consideration to TBEP Bay Mini-Grant projects that address listed and potentially imperiled species. Identify species about which more data is needed to assess status.

STATUS:
Ongoing. Action expanded to address a variety of threats to fish and wildlife, including climate change. Revised action specifically addresses colonial waterbirds and beach-nesting shorebirds. Strategy encourages support for research, management and monitoring of listed, threatened and endangered species, as well as unlisted species for which information gaps exist.

RELATED ACTIONS:
FW-1 Increase on-water enforcement of environmental regulations
FW-3 Achieve a sustainable bay scallop population
FW-5 Continue and expand the Critical Fisheries Monitoring Program
BH-1 Implement the Tampa Bay Habitat Master Plan
BH-2 Establish and implement mitigation criteria
BH-3 Reduce propeller scarring of seagrass and pursue seagrass transplanting opportunities
BH-9 Enhance ecosystem values of tidal tributaries
BH-10 Implement the Tampa Bay Freshwater Habitat Master Plan
DR-1 Implement beneficial uses of dredged material in Tampa Bay
DR-2 Continue to minimize impacts to wildlife and their habitats from dredging activities
IS-2 Support prevention, eradication or management of invasive species in Tampa Bay and its watershed
PA-1 Provide for and manage recreational uses of the bay
FE-1 Promote public involvement in bay restoration and protection

BACKGROUND:
The Tampa Bay Area supports more than 40 species listed as Threatened or Endangered by the United States Fish and Wildlife Service (USFWS) or listed as Threatened or Species of Special Concern by the Florida Fish and Wildlife Conservation Commission (FWC). They inhabit a wide variety of habitats from the bay proper to its mangrove islands, rivers, tidal streams, marshes, freshwater wetlands, sandy beaches and upland forests. Many species require different habitats at various life stages.

Many of the bay’s most visible and beloved species are well-documented. For example, Audubon first began protecting and monitoring colonial waterbird populations in 1934; Audubon staff currently manage and assess 30 nesting colonies on islands in and around Tampa Bay. Sea turtle nests on bay area beaches and barrier islands are surveyed and safeguarded annually. In 2016, 1595 loggerhead turtle nests were confirmed. Green and leatherback turtle nests are very rare on Tampa Bay area beaches. Research has shown that the bay itself is an important nursery area for juvenile Kemp’s ridley sea turtles, one of the world’s most endangered species.

The status of many other species is unclear, and basic population assessments are lacking. For example, little is known about diamondback terrapin populations in Tampa Bay because the animals are shy, reclusive and difficult to study.

Protecting and enhancing fish and wildlife populations requires a combination of management and educational strategies, including habitat protection and restoration, assessment and monitoring, enactment and enforcement of laws that protect vulnerable species, and education of citizens and visitors. These overall strategies ideally take into account multiple threats to the long-term health of the bay’s fish and wildlife.

- Habitat loss or degradation
- Competition from invasive species
- Overharvesting
- Pollution
- Natural disasters, such as hurricanes
### Birds

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<th>Common Name</th>
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<td>Falco sparverius paucus</td>
<td>ST</td>
</tr>
<tr>
<td>American Kestrel</td>
<td>Falco sparverius paucus</td>
<td>FBCC</td>
</tr>
<tr>
<td>American Oystercatcher</td>
<td>Haematopus palliatus</td>
<td>FBCC</td>
</tr>
<tr>
<td>American Bittern</td>
<td>Botaurus lentiginosus</td>
<td>FBCC</td>
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<tr>
<td>Bachman’s Sparrow</td>
<td>Amphiola aestivalis</td>
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</tr>
<tr>
<td>Bald Eagle</td>
<td>Haliaeetus leucocephalus</td>
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</tr>
<tr>
<td>Black Skimmer</td>
<td>Rynchops niger</td>
<td>FBCC</td>
</tr>
<tr>
<td>Black Rail</td>
<td>Laterallus jamaicensis</td>
<td>FBCC</td>
</tr>
<tr>
<td>Black-whiskered Vireo</td>
<td>Vireo altiloquus</td>
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<td>Brown Brody</td>
<td>Sula leucogaster</td>
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<td>Brown-headed Nuthatch</td>
<td>Sitta pusilla</td>
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<tr>
<td>Chuck-will’s-nutter</td>
<td>Caprimulgus carolinensis</td>
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<tr>
<td>Common Ground-dove</td>
<td>Columbina passerina exigua</td>
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<td>Gull-billed Tern</td>
<td>Gelochelidon nilotica</td>
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<tr>
<td>Henslow’s Sparrow</td>
<td>Ammodramus henslowii</td>
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<tr>
<td>Le Conte’s Sparrow</td>
<td>Ammodramus leconteii</td>
<td>FBCC</td>
</tr>
<tr>
<td>Least Bitter</td>
<td>Tityra evecta</td>
<td>FBCC</td>
</tr>
<tr>
<td>Least Tern</td>
<td>Sterna antillaria</td>
<td>ST</td>
</tr>
<tr>
<td>Lesser Yellowlegs</td>
<td>Tityra flavipes</td>
<td>FBCC</td>
</tr>
<tr>
<td>Limkin</td>
<td>Aramus guarauna</td>
<td>FBCC</td>
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<tr>
<td>Loggerhead Shrike</td>
<td>Lanius ludovicianus</td>
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<tr>
<td>Long-billed Curlew</td>
<td>Numerius americanus</td>
<td>FBCC</td>
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<tr>
<td>Magnificent Frigatebird</td>
<td>Fregata magnificens</td>
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</tr>
<tr>
<td>Mangrove Cuckoo</td>
<td>Coccyzus minor</td>
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<td>Marbled Godwit</td>
<td>Limosa fedoa</td>
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</tr>
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<td>Peregine Falcon</td>
<td>Falco peregrinus</td>
<td>FBCC</td>
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<tr>
<td>Prairie Warbler</td>
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<tr>
<td>Prothonotary Warbler</td>
<td>Protonotaria citrea</td>
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<tr>
<td>Red Knot</td>
<td>Calidris canutus rufa</td>
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<tr>
<td>Red-headed Woodpecker</td>
<td>Melanerpes erythrophalus</td>
<td>FBCC</td>
</tr>
<tr>
<td>Reddish Egret</td>
<td>Egeria rufescens</td>
<td>FBCC</td>
</tr>
<tr>
<td>Roseate Spoonbill</td>
<td>Platalea aja</td>
<td>ST</td>
</tr>
<tr>
<td>Florida Sandhill Crane</td>
<td>Grus canadensis pratinus</td>
<td>ST</td>
</tr>
<tr>
<td>American Oystercatcher</td>
<td>Haematopus palliatus</td>
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<td>Snowy Plover</td>
<td>Charadrius nivosus</td>
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<tr>
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<td>Sterna antillaria</td>
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<tr>
<td>Swamp Sparrow</td>
<td>Athene cunicularia floridana</td>
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<tr>
<td>Southeastern American Kestrel</td>
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<td>Falco sparverius paucus</td>
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<td>American Bittern</td>
<td>Botaurus lentiginosus</td>
<td>FBCC</td>
</tr>
<tr>
<td>Bachman’s Sparrow</td>
<td>Amphiola aestivalis</td>
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### Fishes

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantic Sturgeon (gulf Subspecies)</td>
<td>Acipenser oxyrhynchus (=oxyrhynchus) desotoi</td>
<td>FT</td>
</tr>
<tr>
<td>Smalltooth Sawfish</td>
<td>Pristis pectinata</td>
<td>FE</td>
</tr>
<tr>
<td>Mangrove rivulus</td>
<td>Kryptolebias marmoratus</td>
<td>SDL</td>
</tr>
</tbody>
</table>

### Mammals

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida Bonneted Bat</td>
<td>Eurymys floridanus</td>
<td>FE</td>
</tr>
<tr>
<td>Florida Panther</td>
<td>Puma (=Fels) concolor concolor</td>
<td>FT SoA</td>
</tr>
<tr>
<td>Puma (=mountain Lion)</td>
<td>Puma (=Fels) concolor (all subs. except concolor)</td>
<td>FT SoA</td>
</tr>
<tr>
<td>West Indian Manatee</td>
<td>Trichechus manatus</td>
<td>FE</td>
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<tr>
<td>Homosassa Shrew</td>
<td>Sorex longirostris</td>
<td>SSSC</td>
</tr>
<tr>
<td>Sherman’s Fox Squirrel</td>
<td>Sciurus niger shermani</td>
<td>SSSC</td>
</tr>
<tr>
<td>Florida mouse</td>
<td>Podomys floridanus</td>
<td>SDL</td>
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### Reptiles

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>American Alligator</td>
<td>Alligator mississippiensis</td>
<td>FT SoA</td>
</tr>
<tr>
<td>American Crocodile</td>
<td>Crocodylus acutus</td>
<td>FT</td>
</tr>
<tr>
<td>Bluetail Mole Skink</td>
<td>Eumeces egregius luidus</td>
<td>FT</td>
</tr>
<tr>
<td>Eastern Indigo Skink</td>
<td>Drymanchon corais cuiperi</td>
<td>FT</td>
</tr>
<tr>
<td>Green Sea Turtle</td>
<td>Chelonia mydas</td>
<td>FE</td>
</tr>
<tr>
<td>Hawksbill Sea Turtle</td>
<td>Eretmochelys imbricata</td>
<td>FE</td>
</tr>
<tr>
<td>Leatherback Sea Turtle</td>
<td>Demochelys coriacea</td>
<td>FE</td>
</tr>
<tr>
<td>Sand Skink</td>
<td>Neoseres reoldisi</td>
<td>FT</td>
</tr>
<tr>
<td>Florida Pine Snake</td>
<td>Pituophis melanoleucus mustigus</td>
<td>FT</td>
</tr>
<tr>
<td>Short-tailed Snake</td>
<td>Lamproles extenuata</td>
<td>FT</td>
</tr>
<tr>
<td>Suwannee cooter</td>
<td>Pseudemys concinna suavannensis</td>
<td>SDL</td>
</tr>
</tbody>
</table>
• Climate change, including increased air and water temperatures, sea level rise, changes in precipitation and ocean acidification

Protecting and restoring key habitats, including priority nesting and nursery areas, seasonal refuges and critical travel or migration pathways, is a fundamental basis for sustaining diverse and abundant fish and wildlife populations. Restoration activities that create habitat mosaics of functional ecosystems will prove more resilient in the future (See Actions BH-1, BH-10 and CC-1).

Connecting Habitats and Wildlife

• Tidal streams are nursery areas for fish

More than 100 tidal streams flow to the bay from major rivers to tiny creeks a person could jump across. Many begin in the far reaches of the watershed. These streams are vitally important to foraging birds and juvenile fish, including snook. Researchers are working to identify tidal stream habitat features most favored by juvenile snook, and to test management techniques. Protecting and restoring tidal streams is expected to bolster the bay's snook populations, which support a recreational fishery that generates more than $1 million in annual revenues (see Action BH-9).

• Beaches are vital for shorebirds

More than 45,000 pairs of beach-nesting birds, such as the snowy plover, American oystercatcher, black skimmer, laughing gull and least tern, lay their eggs and raise their young on area beaches. Fragmentation, degradation and erosion of suitable beach nesting habitat, and increased disturbance by recreational beachgoers, threaten the continued existence of these charismatic birds. FWC, Audubon Florida and Eckerd College staffs work with land managers to protect critical nesting areas at Egmont Key National Wildlife Refuge and Shell Key County Preserve. Volunteer “Bird Stewards” attend to vulnerable beach nesting colony sites on busy weekends, educating beachgoers about the need to steer clear of shorebird colonies.

Enforcement is also needed in critical nesting areas. People and their pets can trample nests and cause parent birds to take flight, leaving eggs or hatchlings vulnerable to predators and hot summer temperatures.

Beach renourishment, where and when appropriate, can help to maintain existing nest sites and create additional habitats. Man-made spoil islands used for disposal of material dredged from the bay bottom can serve a similar benefit (see Actions DR-1 and DR-2).

• Mangrove islands support colonial waterbirds

Bay mangrove islands support some of the most diverse waterbird nesting colonies in North America, annually hosting approximately 40,000 to 50,000 breeding pairs at nearly 30 estuary island sites and another 10 inland colony sites within the watershed. Some 23 species nest in colonies and another six species nest in or near bird colonies. Populations of several species (reddish egret, roseate spoonbill, American oystercatcher) are stable or increasing, while others are in decline (snowy egret, little blue heron, tricolored heron and white ibis).

The two islands comprising the Richard T. Paul Alafia Bank Bird Sanctuary are among the COLONIAL WATERBIRD NESTING IN THE TAMPA BAY WATERSHED, 2016

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>LISTING</th>
<th>REGIONAL POPULATION (NESTS, PAIRS)</th>
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</thead>
<tbody>
<tr>
<td>Brown Pelican</td>
<td></td>
<td>788</td>
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<tr>
<td>Double-Crested Cormorant</td>
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<td>451</td>
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<tr>
<td>Anhinga</td>
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<td>285</td>
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<td>Great Blue Heron</td>
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<td>Great Egret</td>
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<td>Snowy Egret</td>
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<tr>
<td>Little Blue Heron</td>
<td>T</td>
<td>323</td>
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<tr>
<td>Tricolored Heron</td>
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<td>Reddish Egret</td>
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<td>18</td>
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<td>Cattle Egret</td>
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<td>Green Heron</td>
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<td>Black-crowned Night Heron</td>
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<td>Yellow-crowned Night Heron</td>
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<td>White Ibis</td>
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<td>Glossy Ibis</td>
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<tr>
<td>Roseate Spoonbill</td>
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<td>187</td>
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<td>Wood Stork</td>
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<tr>
<td>Snowy Plover</td>
<td>T</td>
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<tr>
<td>Wilson's Plover</td>
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<td>American Oystercatcher</td>
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<td>43</td>
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<tr>
<td>Black-necked Stilt</td>
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<td>12</td>
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<td>Willet</td>
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<td>Laughing Gull</td>
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<td>38,700</td>
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<td>Gull-billed Tern</td>
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<td>35</td>
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<td>Caspian Tern</td>
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<tr>
<td>Royal Tern</td>
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<td>6,500</td>
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<td>Sandwich Tern</td>
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<td>696</td>
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<tr>
<td>Least Tern</td>
<td>T</td>
<td>23</td>
</tr>
<tr>
<td>Black Skimmer</td>
<td>T</td>
<td>260</td>
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</table>

Total nesting pairs 58,760

T = Threatened Species

SOURCE: Audubon Florida

Image: The Richard T. Paul Alafia Banks Bird Sanctuary is among the nation’s most important nesting areas for colonial waterbirds such as roseate spoonbills. Photo courtesy Audubon Florida.

Image: Tidal streams flow to the bay from major rivers to tiny creeks. Photo courtesy Kristen Hart.

Image: T = Threatened Species
largest and most diverse waterbird colonies in the continental United States, with nearly 18,000 nesting pairs of 16 to 20 species of birds. Erosion, caused by storm waves and boat wakes, is a significant threat to these and other nesting island and shorelines in the watershed. More than 2,000 feet of oyster reef was created as a wave break for Alafia Bank to slow erosion, improve water quality, and promote growth of salt marsh and mangroves. Another 4,750 feet of living shoreline is being installed with funds from the federal RESTORE Act.

In November 2016, FWC created 13 new and five expanded Critical Wildlife Areas (CWA) in Florida, designed to protect important habitat sites where wildlife nest, breed and forage. A new CWA was established at Dot-Dash-Dit Island at the mouth of the Braden River, which hosts the bay’s only coastal colony of wood storks. The existing CWA at Alafia Bank was expanded. The designation creates a 100-foot buffer around these bird colonies with year-round closures to protect them. Identification of suitable alternative colony nest sites is needed, as natural disasters may eliminate entire nesting populations or habitats. Additionally, colonies may abandon a nesting site for unknown reasons.

Assessment and Monitoring

A variety of wildlife already is monitored in the bay watershed—from routine sampling of benthic creatures on the bay bottom by the Environmental Protection Commission of Hillsborough County (EPCHC), to stock assessments of popular sportfish by the Environmental Protection Commission of Hillsborough County (EPCHC), to manatee counts conducted in the winter when manatees congregate at power plants. FWC, to manatee counts conducted in the winter when manatees congregate at power plants. County (EPCHC), to stock assessments of popular sportfish by the Environmental Protection Commission of Hillsborough County (EPCHC), to manatee counts conducted in the winter when manatees congregate at power plants. 

The Tampa Bay Estuary Program’s Bay Mini-Grant program has funded baseline surveys of seahorses and pipis, neo-tropical migratory songbirds, diamondback terrapins and a rare freshwater turtle recently “re-discovered” in the Alafia River. Community-based programs enlist citizen volunteers to report sightings of mating horseshoe crabs (FWC), count bay scallops (Tampa Bay Watch), collect abandoned, derelict crab traps that continue to ‘ghost fish’ (Tampa Bay Watch), retrieve and recycle fishing line that can entangle and kill birds (Tampa Bay Watch, Audubon Florida), and train “Bird Stewards” to help protect posted shorebird nest sites.

In 2016, FWC adopted new rules for imperiled species detailed in a comprehensive Imperiled Species Management Plan (ISMP) which became effective January 2017. The ISMP addresses individual species in Action Plans containing specific conservation goals, objectives and actions. In addition, the ISMP describes integrated conservation strategies to benefit multiple species and their shared habitats. It focuses on 57 imperiled species in Florida.

Educational and Partnership Efforts

TBEP participates in collaborative partnerships within the Tampa Bay and Southwest Florida region to review and coordinate habitat restoration and protection initiatives (see Actions BH-1, BH-2, BH-3, BH-9 and BH-10). These initiatives include identification of priority sites for acquisition and mitigation. The Southwest Florida Regional Ecosystem Restoration Plan coordinated by the Tampa Bay, Sarasota Bay and Charlotte Harbor Estuary Programs presents a comprehensive inventory of proposed projects — many of which directly benefit fish and wildlife — that span Florida’s Gulf Coast from the Big Bend to Big Cypress Preserve.

TBEP has been a leader in educating bay users about responsible water recreation, through boating guides, ethical fishing information and sponsorship of “Leave No Trace” outdoor etiquette workshops. TBEP also informs waterfront homeowners about ways to enhance their shorelines for fish and wildlife, and about co-existing with wildlife.

STRATEGY:

Activity 1 Implement the Bay Habitat Master Plan and relevant CCMP actions to achieve targets and goals for critical fish and wildlife habitats, including Actions BH-1, BH-2, BH-9 and BH-10.

The Tampa Bay Electric’s Big Bend Power Plant is an important warm-water refuge for manatees in the winter. Visitors from near and far come to see the animals in the discharge canal. Photos courtesy FWC.

Responsible parties: TBEP (lead), FWC, NOAA, Local cities and counties, SWFWMD, The Nature Conservancy, Tampa Bay Conservancy, private entities

Timeframe: The Bay Habitat Master Plan will be revised in 2017-2018, with updated goals for restoration and preservation of marshes, mangroves, salt barrens and freshwater wetlands. The Master Plan will also establish initial numeric targets for tidal creeks, hard bottom habitats and coastal uplands.

Cost and potential funding sources: $$$$$ CWA Section 320 funds to develop and update Bay Habitat Master Plan (TBEP); Cooperative funding from SWFWMD; external grants from NOAA Fisheries, USFWS, EPA, Tampa Bay Environmental Restoration Fund and others

Location: Baywide

Benefit/Performance measure: Assessment of progress in achieving adopted goals and targets for critical coastal habitats.
**Activity 2**

Support protection and monitoring of Tampa Bay’s colonial waterbirds and beach-nesting shorebirds. Enhance existing rookeries, and identify and create additional habitat suitable for nesting colonies in the event of a natural disaster or widespread colony desertion. Explore beneficial uses of dredged material for habitat creation or restoration (see Actions DR-1 and DR-2). Continue and expand the Bird Steward Program to enlist and train interested citizens in safeguarding posted shorebird nesting areas. Continue and expand the Project Colony Watch Program to enlist and train volunteers to monitor inland nesting sites hosting wood storks, white ibis, and a variety of egrets and herons.

**Responsible parties:** Tampa Bay Dredging Advisory Group, Tampa Bay Migratory Bird Protection Committee, Agency on Bay Management Habitat Restoration Subcommittee, Port Tampa Bay, USACE, Audubon Florida, USFWS, FWC, Eckerd College, Audubon Florida and local Audubon chapters

**Timeframe:** Ongoing. Identification of new or alternate colony sites initiated in 2017

**Cost and potential funding sources:** $ No TBEP funds required for volunteer monitoring programs, although Bay Mini-Grants and the Tampa Bay Environmental Restoration Fund have supported waterbird conservation and monitoring programs; $5–$10,000 for enhancement of existing rookeries and creation of additional nesting areas as opportunities arise, with potential funding via federal, state or regional grants

**Location:** Baywide and known colonial waterbird and shorebird nesting colonies managed by Audubon, FWC or USFWS

**Benefit/Performance measure:** Preservation and enhancement of existing nesting sites. Creation of additional nesting sites to insulate populations from catastrophic losses due to storms, inundation or colony abandonment. Ecologically beneficial use of dredge spoil.

**Results:** Stable or increasing populations of colonial waterbirds and beach-nesting shorebirds.

**Deliverables:** Annual reports on nesting success. Beneficial use of dredge spoil to enhance or create nesting areas incorporated into Dredge Material Management Plan for Tampa Bay.

**Activity 4**

Give priority consideration to TBEP Bay Mini-Grant projects that address listed and potentially imperiled species. Refer to the state Imperiled Species Management Plan for guidance on vulnerable species.

**Responsible parties:** TBEP Community Advisory Committee

**Timeframe:** Initiate in FY 2017–2018 Bay Mini-Grant cycle

**Cost and potential funding sources:** $ based on allocating an average of 10% of annual Bay Mini-Grants, or 1–2 projects per year, to wildlife-related research, monitoring or conservation; TBEP funding for Bay Mini-Grants derived from sales of the Tampa Bay Estuary license plate

**Location:** Baywide

**Benefit/Performance measure:** 10% of Bay Mini-Grant projects devoted to projects addressing listed or imperiled species.

**Results:** Improved conservation of imperiled or potentially imperiled species.

**Deliverables:** Project reports submitted yearly by recipients of Bay Mini-Grant projects.

**Activity 5**

Support training workshops for FWC and other environmental enforcement personnel to review existing or new laws protecting listed species such as manatees, sea turtles, shorebirds and colonial waterbirds (see Actions FW-1 and FW-2).
**Activity 6**: Increase public awareness of the diversity and value of bay wildlife. Inform residents about actions they can take to protect native species and habitats (see Actions PI-1, IS-2 and PA-2). Support citizen-science and monitoring programs that foster appreciation of wildlife while enhancing scientific knowledge (see Actions FW-3 and IS-2).

**Responsible parties**: TBEP, Audubon Florida and local Audubon chapters, local governments, TBEP, FDEP Aquatic Preserves, FWC, USF, Keep America Beautiful affiliates and Tampa Bay Watch

**Timeframe**: Ongoing

**Cost and potential funding sources**: $ CWA Section 320 funds for TBEP, funding of digital and/or printed information, or support of citizen monitoring; Potential funds from TBEP Bay Mini-Grants

**Location**: Baywide

**Benefit/Performance measure**: Assessment of impact of public educational programming (printed materials distributed, social media interaction, workshop or webinar participation, website or other digital platform usage). Participation in citizen monitoring programs.

**Results**: Improved understanding and conservation of fish and wildlife species that might otherwise be overlooked in research and monitoring programs.

**Deliverables**: Priority “watchlist” of bay wildlife species for which significant information gaps exist (TBEP). Summary of recommended research needs to help with population and conservation assessments of “watchlist” species (TBEP).
DREDGING AND DREDGE MATERIAL MANAGEMENT

Develop a plan for beneficial uses of dredged material in Tampa Bay

OBJECTIVES:
Coordinate projects that generate dredged material with those that could use the material for beneficial uses. Complete the Tampa Bay Regional Sediment Management Plan to develop and prioritize locations for utilization of sediment generated through dredging activities. Continue to encourage and implement environmentally beneficial uses of dredged material.

STATUS:
Ongoing. Long-term Dredged Material Management Plan (DMMP) was adopted in 2002 and updated in 2011. High priority projects are: Continued research, dredging and restoration activities included in the Dredged Hole Habitat Assessment; longshore bar creation; McKay Bay dredged hole restoration; and Egmont Key shoreline stabilization. Focus of this action shifted to implementation of beneficial use projects.

RELATED ACTIONS:
BH-4 Identify hard bottom communities and avoid impacts
PA-1 Provide for and manage human uses of the bay

BACKGROUND:
Tampa Bay has three major ports or deep-draft harbors: Port Tampa Bay, Port Manatee and the Port of St. Petersburg. Port Tampa Bay (formerly

At left: bay managers are working with area ports and the U.S. Army Corps of Engineers to beneficially use material that must be scooped from shipping channels and berths to maintain safe navigation. Photo by Nanette O’Hara.

the Port of Tampa) is among the nation’s busiest, handling one-third of the cargo moving in and out of Florida and some 900,000 cruise ship passengers yearly. Port Manatee is the closest U.S. deepwater seaport to the expanded Panama Canal — important exports include citrus juices, phosphate products and construction equipment.

Dredging to maintain the bay’s approximately 80 miles of nautical highways, which can be 43 feet deep in places, generates from 1 to 1.5 million cubic yards of material annually. Dredging is conducted primarily by the United States Army Corps of Engineers (USACE), which maintains all federal channels. Port Tampa Bay and Port Manatee maintain regional channels and port facilities.1

Maintenance dredging occurs on a regular schedule with sections or “cuts” of the channels dredged each year to ensure safe navigation. In general, areas in the upper bay are dredged every 4-6 years; the lower bay is dredged every 8-10 years, and Port Manatee is dredged every 3-5 years. Dredging
to create new channels, port berths or port-related development occurs on an intermittent, less frequent basis. New berths may generate from 300,000 to 400,000 cubic yards of material, while expanding or deepening existing channels could general several million cubic yards of material.

Sediments dredged from the upper bay, where most dredging historically occurred, has traditionally been piped onto two man-made islands in Hillsborough Bay (Dredged Material Management Areas 2D and 3D). Dikes on these islands have been raised over time to increase their total capacity. Material dredged from the lower bay is generally placed on the shoreline of Egmont Key, an island at the mouth of Tampa Bay. Material dredged from Manatee Harbor is typically placed at upland locations on Port Manatee property. Dredged materials are occasionally placed at other upland locations to facilitate habitat restoration projects.²

An Ocean Dredged Material Disposal Site, approximately 18 miles offshore of Egmont Key, is still available, but has not been used since the late 1990s.

USACE is required to develop a Dredged Material Management Plan (DMMMP) for each of its federal navigation projects to demonstrate sufficient disposal capacity for a minimum of 20 years. DMMP describes how much new material will be dredged during any proposed deepening and widening work; the volumes to be dredged to maintain the federal channels; and how dredged materials will be managed in an economically and environmentally sound manner. The Tampa Harbor DMMMP was originally approved in 2002 and updated in 2011.³ Input to Plan updates is provided by the Tampa Bay Dredging Advisory Group, a sub-committee of the Tampa Bay Estuary Program (TBEP) Technical Advisory Committee.

The USACE recently began working with Tampa Bay stakeholders to identify the most viable opportunities for beneficial use of dredged materials. This new effort is referred to as Regional Sediment Management (RSM), a systems approach to managing sediments to maximize environmental and economic benefits. RSM actions implemented in other regions of the country include mitigating for sea-level rise impacts to marsh habitat through the use of thin-layer placement of material, creating bird habitat through the creation of islands, filling dredged holes and stabilizing shorelines. Initial meetings to develop a beneficial use “wish list” were convened in 2016; the formal RSM Plan will be completed in 2017.

Implementing beneficial uses of dredge material can be challenging because USACE must identify the “least-cost, environmentally acceptable” placement option. Transportation costs associated with beneficial uses may be high. A complicating factor is that most dredged material from Tampa Bay is silty material that is not ideal for some beneficial uses, including beach nourishment.

Despite these constraints, USACE can often conduct beneficial use projects at low or no additional cost, if regional consensus about desired projects is proactive and projects are aligned with maintenance dredging schedules. Under USACE’s Continuing Authorities Program small-scale beneficial use projects may be implemented in shorter timeframes.

Filling holes in the bay left from decades-old dredging projects (such as creation of residential finger-fill canals) offers one potential beneficial use, where filling or partially filling the holes will improve habitat value and foster seagrass recovery. TBEP led a research project from 2003–2005 to determine the ecological value of 11 dredged holes in the bay based on water and sediment quality and importance as fish habitat.⁴

In 2012, Port Tampa Bay and the Southwest Florida Water Management District partnered on a project to partially fill the McKay Bay dredge hole to improve water quality. The project utilized dredge material from port expansion and mitigation activities. Two other holes, MacDill Runway and Big Island, have been partially filled since the 2005 study.

TBEP is now coordinating a study of eight dredge holes not previously assessed, as well as three that have been altered since the original study (including the partially filled McKay Bay dredge hole). Results and recommendations from this new initiative are expected in 2017. This information will also be incorporated into USACE’s Tampa Bay RSM study.

Dredged material also could be used to fill old mosquito control ditches, or to re-create shallow-water sandbars in the bay. The longshore bar concept was tested in a pilot project adjacent to MacDill Air Force Base as a strategy for restoring seagrass. The project evaluated the wave-dampening effectiveness of four different materials: riprap, rubble, reef balls and a sandbar covered with small riprap.⁵

Project results to date have been inconclusive regarding seagrass expansion. However, the bars have maintained their structural integrity, provide fish habitat and appear to dampen wave energy. Similar projects in other coastal areas, such as North Carolina, have documented success in improving seagrass habitat. Although not a cost-effective, long-term strategy for seagrass recovery in Tampa Bay, it may be viable when appropriate fill material is available and historic longshore bars can be restored. Another possibility is to create sandbars that will gradually erode, allowing seagrasses to migrate inland as sea level rises.

Use of rocky dredged material to create additional hard bottom habitat in Tampa Bay will be examined in the hard bottom mapping project (see Action BH-4).

Other potential beneficial uses for dredged material include creation of habitat for nesting shorebirds, construction of nearshore bars for coastal storm protection, filling of borrow pits and artificial “lakes” close to the bay and thin-layer placement of sediment within coastal wetlands to prevent erosion as sea level rises.

Two manmade islands in Tampa Bay are important disposal sites for dredged material. Photo courtesy Port Tampa Bay.
**Activity 1** Complete the Tampa Bay RSM Plan to develop and prioritize locations for utilization of sediment generated through dredging activities. Ensure that environmental impacts of beneficial use projects (including impacts from pipeline placement or varying sediment quality, for example) are adequately addressed. Streamline permitting for beneficial uses by identifying and resolving permitting uses associated with project sites before permit applications are submitted. Consider allowing mitigation credits for beneficial use projects, such as habitat restoration that utilizes dredge material.

**Responsible parties:** USACE (lead) with input from Tampa Bay Dredging Advisory Group, Florida Department of Environmental Protection

**Timeframe:** The sediment management plan will be completed in 2017

**Cost and potential funding sources:** $$–$$ USACE

**Location:** Baywide

**Benefit/Performance measure:** Identification of best locations and most effective techniques for beneficial uses of dredge material.

**Results:** Ecologically beneficial uses of dredge material will improve habitat for fish and wildlife (for example, through creation of additional nesting, nursery and foraging areas and expansion of seagrasses).

**Deliverables:** Tampa Bay RSM document. Map of potential sediment disposal locations and management options. Expedited permits for appropriate beneficial use projects.

**Activity 2** Complete the Tampa Bay Dredged Hole Habitat Assessment to develop restoration and protection strategies for additional dredged holes in Tampa Bay. As part of the assessment, ensure that access to holes for filling (by equipment or pipeline) is feasible, and ensure that quality of dredge material is suitable for intended purpose.

**Responsible parties:** TBEP (coordinator), Dredged Hole Project Team, Input from TAC and Tampa Bay Dredging Advisory Group

**Timeframe:** The dredged hole assessment, data analyses and management recommendations will be completed in 2017

**Cost and potential funding sources:** $$ SWFWMD Cooperative Funding, TBERF, Hillsborough County Pollution Recovery Fund, TBEP staff time (CWA Section 320)

**Location:** Baywide

**Benefit/Performance measure:** Evaluation of 11 dredged holes in Tampa Bay for overall bay water quality and habitat benefits.

**Results:** Site-specific restoration or protection recommendations for dredged holes in Tampa Bay, if implemented, will result in improved ecological habitat values for these areas.

**Deliverables:** Tampa Bay Dredged Hole Habitat Assessment Report. Map of studied holes and management recommendations.

**Activity 3** Maintain the Tampa Bay Dredging Advisory Group to provide technical input on proposed dredging projects and beneficial uses. Seek opportunities to expand outreach and coordinate funding and/or cost-sharing for beneficial use projects. Integrate beneficial use projects with larger, Gulfwide efforts.

**Responsible parties:** TBEP (coordinator), Tampa Bay Dredging Advisory Group, USACE, other Gulf NEPs

**Timeframe:** Advisory Group meets as needed, generally annually

**Benefit/Performance measure:** Improved coordination of dredging and material management projects. Enhanced outreach and leveraging of resources for beneficial projects.

**Results:** Protection and improvement of habitat and water quality through review of projects involving dredging and dredged material management by bay managers.

**Deliverables:** Minutes from Dredging Advisory Group meetings
OBJECTIVES:
Improve dredging and dredged material disposal practices to minimize impacts to wildlife and their habitats. Support research to better understand and quantify the effects of dredging on wildlife. Develop recommendations for Best Management Practices (BMPs) for regional beach and shoreline renourishment projects to better safeguard key species. Track development of new technologies to better protect wildlife during dredging.

STATUS:
New Action

RELATED ACTIONS:
BH-2 Establish and implement mitigation criteria
BH-4 Identify hard bottom communities and avoid impacts
BH-6 Encourage habitat enhancement along altered waterfront properties
DR-1 Develop a plan for beneficial uses of dredged material in Tampa Bay

BACKGROUND:
Dredging operations, including removal and disposal of dredged materials, can kill, injure, impact reproduction or alter the behavior of bay wildlife — including shorebirds, sea turtles and manatees. The type of dredging equipment used, as well as the location, timing and duration of the project, influence which wildlife species may be affected.

Potential dredging impacts to Tampa Bay wildlife include:
- Disturbance or destruction of nesting habitats for turtles or shorebirds during placement of dredged material on beaches or spoil islands.
- Smothering of shoreline bivalve and crab populations during placement of dredged materials on beaches, destroying feeding grounds for shorebirds and important recreational fish.
- Reduction of sea turtle nesting success due to incompatible sediment types placed on nesting beaches.
- Physical impacts to manatees and sea turtles during active dredging operations, such as hopper dredge buckets.
- Collisions with wildlife during movement of vessels associated with dredging operations.
- Higher turbidity levels caused by resuspension of sediment during dredging.
- Increased light levels associated with dredging operations at night. Nighttime dredging also poses inherent risks to manatees and other animals, as they are less likely to be visible.
- Displacement, smothering or death of benthic organisms such as worms or snails or small, bottom-dwelling fishes during dredging and transport activities.

Precautions to minimize impacts of dredging activities exist. For example, federal regulations require the United States Army Corps of Engineers (USACE) to consult with the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service (NOAA NMFS) on all federally authorized dredging projects. Prudent scheduling of projects can avoid or minimize disruption to shorebird or sea turtle nesting. Trained observers may alert project personnel to the presence of sea turtles or manatees, and temporarily halt dredging to avoid conflicts. Moreover, gear modifications, such as drag deflectors that prevent sea turtles from being drawn into hopper dredges, can prevent deaths and injuries.

Strategies for protecting wildlife during and after dredging have been developed by agencies such as the Florida Department of Environmental Protection (FDEP), the Florida Fish and Wildlife Conservation Commission (FWC), NMFS and the United States Fish and Wildlife Service (USFWS).

FWC’s standard manatee protection conditions are required protocols during active dredging and include: trained observers who can halt in-water operations when manatees are observed within a 50-foot radius; idle speed/no wake operation of vessels at all times when draft is less than four-feet clearance; use of siltation or turbidity barriers that do not entangle or entrap manatees; immediate reporting of collisions or injuries; and erecting speed zone signs prior to all in-water project activities. Manatee observers were extensively used during excavation and installation of the
Gulfstream natural gas pipeline that runs underneath Tampa Bay. No standardized training or certification is required for observers; they are approved on a case-by-case basis. Additionally, there is no outright prohibition on nighttime dredging with clamshell buckets, although no manatee injuries have been reported from clamshell dredging at night in Tampa Bay.

USFWS has taken the lead on measures to protect nesting sea turtles, while NOAA has led efforts to reduce dredging-related mortality of sea turtles and sawfish. An annual “incidental take” allowance of sea turtles applies to all federal dredging projects using hopper dredges in the Gulf of Mexico.

Audubon Florida’s Coastal Islands Sanctuaries staff plays a critical role in providing guidance to reduce impacts to birds that nest on two large manmade islands in Hillsborough Bay, 2D and 3D, by identifying nesting times and providing observers during dredge disposal operations. These Dredge Material Management Areas (DMMAs) are important disposal sites for ongoing maintenance dredging of shipping channels and port facilities conducted by the USACE and Port Tampa Bay.

Together, islands 2D and 3D annually host nesting pairs of 14 species, including imperiled American Oystercatchers, Least Terns, and Black Skimmers, and one of the most important Laughing Gull colonies in the United States.

Local Audubon managers have worked cooperatively with USACE and Port Tampa Bay to develop a Migratory Bird Protection Policy and detailed Site-Specific Bird Protection Plan for dredging activities on DMMAs 2D and 3D. This Plan is reviewed by the multi-stakeholder Migratory Bird Protection Committee coordinated by Port Tampa Bay. Guidelines in the Plan are incorporated in dredging contracts as requirements or recommended practices.

Dredging offers opportunities to enhance wildlife protection, through beneficial use of dredge material to create or restore habitat. For example, material from the dredging of the turning basin at the mouth of the Alafia River was placed on the shoreline of the Richard T. Paul Alafia Bank Bird Sanctuary to slow erosion of this extremely valuable colonial waterbird nesting colony (see Action BH-6).

In 2015, USACE began development of a Regional Sediment Management Plan for Tampa Bay, offering an unprecedented opportunity for bay managers to suggest and prioritize appropriate beneficial use projects, including those to improve wildlife habitat (see Action DR-1).

Renourishment of area beaches with dredged material from Tampa Bay is generally avoided because the material is typically not of sufficient quality to meet state requirements for use on sandy beaches. These rules offer some protection to nesting turtles and shorebirds; however, concerns about the impact of renourishment on sea turtles and beach-nesting birds remain. Use of coarse

### Nesting Colonies on Dredge Material Management Areas 2D and 3D, 1998-2016

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**Total**: 7,179 9,560 6,266 5,036 5,036 5,916 3,837 5,431 5,564 3,167 617 21 9 9 62 379 512 8,358

T = Threatened species

**Source**: Audubon Florida
material, along with compaction from heavy equipment, may prevent turtles or beach-nesting birds from successfully excavating nests; and the slope and elevation of the completed projects may inhibit nesting, or lead to flooding of nests. Placing fill on beaches during nesting periods may remove important nursery areas for all or a significant portion of that nesting season. Relocation, when necessary, may not be as successful.

In 2015, Egmont Key received dredged material that did not meet state criteria as an emergency measure to reduce erosion threatening historic structures on the island. USACE funded a study by Eckerd College researchers in summer 2016 to assess whether, and to what extent, turtle nesting was affected. Egmont Key also is an important and vulnerable nursery for beach-nesting birds, particularly Laughing Gulls and Royal and Sandwich Terns.

USACE is investigating improvements to operating procedures to better protect wildlife. Current initiatives include more advanced sighting techniques for marine mammals (such as thermal or infrared technology) that can be performed by human observers.

Improved coordination and communication about dredging activities, standardized training of on-water observers, and technological advances can enhance protection of bay wildlife during dredging and disposal activities in the future.

**STRATEGY:**

**Activity 1**

Encourage continued use and compliance with shorebird protection measures specified in the Site-Specific Bird Protection Plan for dredging activities on Dredge Material Management Areas 2D and 3D. Review and update Plan as needed to improve or modify guidelines to avoid, minimize or mitigate impacts to nesting birds.

**Responsible parties:** Port Tampa Bay Migratory Bird Protection Committee and partners

**Timeframe:** Dredging schedule reviewed annually by Migratory Bird Protection Committee, with opportunity to amend plan prior to and following dredging

**Cost and potential funding sources:** $ Research funds or external grants to researchers

**Location:** Baywide

**Benefit/Performance measure:** Improved coordination of dredging activities and collaboration among Committee members.

**Results:** Reduced impact to nesting shorebirds due to scheduled dredging and disposal activities.

**Deliverables:** Updated Site-Specific Bird Protection Plan.

**Activity 2**

Support research to better understand, quantify and minimize or avoid impacts of dredging on wildlife, including impacts from use of dredge material to renourish beaches where sea turtles nest. Support development of alternative dredge techniques that reduce the potential impact on wildlife at the dredge location, such as: improved turtle-exclusion devices; advanced dewatering to make cutter heads more economical than clamshells for small dredging projects; and directional drilling or precision “plowing” of trenches for cables or submerged pipelines to avoid disturbance of live-bottom habitats.

**Responsible parties:** USACE, USFWS, FWC

**Timeframe:** 2016–2017 for Egmont Key sea turtle beach nesting assessment; other studies may be initiated by 2020

**Cost and potential funding sources:** $$$ USACE research funds or external grants to researchers

**Location:** Baywide

**Benefit/Performance measure:** Improved understanding of current dredging practices and impacts to wildlife.

**Results:** Reduced death or injury of wildlife due to dredging and renourishment practices.

**Deliverables:** Research reports summarizing and comparing techniques to avoid or mitigate impacts.

**Activity 3**

Encourage dredging practices that avoid secondary impacts, promote the long-term viability of adjacent habitats or optimize the potential for habitats to form within the project area.

**Responsible parties:** USACE, USFWS, FWC, local port authorities

**Timeframe:** Ongoing

**Cost and potential funding sources:** $–$$$$ Funding from existing budgets for dredge projects

**Location:** Baywide

**Benefit/Performance measure:** Protection or creation or enhancement of underwater habitats
such as seagrasses and hard bottom.

**Results:** Increased populations of fish and other marine organisms (including benthic communities).

**Deliverables:** Post-project monitoring reports assessing habitat health and utilization.

### Activity 4

Encourage and support development of statewide recommendations for Best Management Practices (BMPs) for beach and shoreline renourishment projects to improve protection of key species during and after renourishment. BMPs could include: timing and location of projects to avoid placement during peak nesting seasons; design considerations, including quality of material used for placement and profile or elevation of renourished shoreline; and monitoring and relocation protocols.

**Responsible parties:** USACE, NMFS, FWC and FWS (potential leads) with input from Tampa Bay Dredging Advisory Group and Tampa Bay Estuary Program Technical Advisory Committee

**Timeframe:** Begin in 2017 following results of Eckerd College sea turtle nesting study

**Cost and potential funding sources:** $–$$

**Location:** Baywide

**Benefit/Performance measure:** Identification or adoption of BMPs to reduce impacts to wildlife.

**Results:** Reduced impacts to wildlife associated with dredging operations.

**Deliverables:** BMPs guidance document.

### Activity 5

Track development of new technologies and improvements for training of official observers to better protect wildlife during dredging. Encourage use of new technologies, such as sonar, thermal or infrared imaging, to detect sea turtles, sawfish and marine mammals near active dredging operations, to supplement human spotters. Support improvements to FWC’s manatee observer program and the USFWS Marine Mammal Observer program, including a standardized training program. Consider incorporation of recommendations from NOAA’s Protected Species Observer program for geological and geophysical surveys regarding experience, qualifications and standardized data collection and reporting protocols.

**Responsible parties:** USACE Research and Development Center (lead), with input from NMFS, FWC, USFWS, Tampa Bay Dredging Advisory Group and Manatee Awareness Coalition

**Timeframe:** Research and testing of imaging technology is ongoing

**Cost and potential funding sources:** $$ USACE

**Location:** Baywide

**Benefit/Performance measure:** Widespread adoption of supplemental imaging tools and enhanced training of trained observers.

**Results:** Reduced impact to wildlife during in-water dredging operations.

**Deliverables:** Guidelines for and implementation of supplemental imaging tools. Standard training, performance and reporting requirements for marine mammal observers.

### Activity 6

Continue to avoid and minimize dredging impacts to seagrasses, mangroves and hard bottom communities in the bay. Develop and implement recommendations to mitigate or offset unavoidable impacts from dredging (see Actions BH-2 and BH-4).

**Responsible parties:** USACE, local port authorities (leads for operational dredging practices); TBEP and local government and agency partners (for mitigation recommendations)

**Timeframe:** TBEP Habitat Master Plan incorporating mitigation guidance initiated in 2017, complete in 2019. Habitat Master Plan is updated every 5-8 years.

**Cost and potential funding sources:** $–$$$ TBEP funding through CWA Section 320 funds

**Location:** Baywide

**Benefit/Performance measure:** Protection and restoration of habitats from dredging impacts will support the goals of TBEP’s Habitat Master Plan.

**Results:** Measurable goals adopted by the TBEP Policy Board for hard bottom habitat.

**Deliverables:** Tampa Bay Habitat Master Plan with recommendations for avoiding or minimizing impacts of dredging on underwater habitats. TBEP adoption of measurable goals for hard bottom habitats.
OBJECTIVES:
Secure permanent funding for the PORTS navigational system; track and monitor technological advances in navigation to improve maritime safety; support dedicated funding for Cooperative Vessel Tracking Service; Support development of programming, training and research to improve maritime and port safety, security and sustainability through the Center for Maritime and Port Studies at University of South Florida.

STATUS:
Ongoing.

RELATED ACTIONS:
SP-2 Evaluate and update oil and hazardous material spill response plans for priority preas
FW-6 Preserve the diversity and abundance of bay wildlife

BACKGROUND:
This action has been substantially completed since it was first included in the original Comprehensive Conservation Management Plan (CCMP) for Tampa Bay. However, ongoing funding remains uncertain, including money for navigational enhancements that would expand the versatility of the system and improve the overall safety of maritime operations.

The Physical Oceanographic Real-Time System (PORTS) continues to provide real-time information about tides, winds and currents in Tampa Bay to all mariners, including recreational boaters, through a network of data collection buoys and sensors located at key positions around the bay. PORTS is maintained by NOAA's National Ocean Service and housed at the University of South Florida Department of Marine Science. The system can be accessed online or by telephone.

PORTS is currently funded through $150,000 in annual phosphate severance fees paid to Hillsborough County, along with a $4,800 contribution from the Tampa Bay Pilots Association. Funding covers operations, maintenance, system improvements and enhancements.

Significant additions to the original system include additional monitoring sites and recently added fog visibility sensors and wave sensors. Additional ocean acidification monitoring equipment (with funds provided by EPA's Climate Ready Estuaries Program (CRE) will be co-located on an existing PORTS platform in 2017. The current annual budget is marginally adequate for current system needs, but does not allow for additional proposed sensors, including infrared technology to detect visibility near Egmont Key and at the two branches of the Y-shaped shipping channel inside the bay.

A new wave buoy was installed in 2015 at the Egmont Channel approach, at a cost of about $115,000. It is used by harbor pilots to determine whether it is safe to board their assigned ships. This is currently the only buoy that provides wave heights; as such, it is valuable for professional mariners, ocean researchers and recreational boaters alike.

Recent and future system enhancements will require a funding increase of at least $25,000 per year. Current funding from Hillsborough County cannot be increased and may disappear within the next few years as phosphate mining in the county (and the associated annual
Tampa Bay is on the cutting edge of another evolution in maritime navigation: Virtual, or electronic, Aids to Navigation (ATONs). Full implementation throughout the bay would cost an estimated $4 million, and likely would require funding through federal sources other than the Coast Guard, or through the local port/maritime community. The cost for smaller commercial vessels (such as charter fishing or sailing boats) and recreational boaters to upgrade to the AIS-integrated navigation systems necessary to utilize virtual ATONs is an important consideration.

Research into future tools to reduce the potential for ship groundings or collisions; improve port and vessel security; and foster the overall, long-term sustainability of Tampa Bay’s economically important maritime commerce is being assisted by the development of a new Center for Maritime and Port Studies at University of South Florida. The Center will support research into maritime technologies and train the next generation of maritime professionals, with environmental sustainability as a key component of instruction.

**STRATEGY:**

**Activity 1** Continue to track and support permanent funding and enhancement of PORTS through local, state, federal or private funding sources.
- Explore potential for funding by all three counties bordering the bay, by consortium of maritime industries and area ports, through state-administered sources such as the Coastal Protection Trust Fund, or a combination of those. Stopgap temporary operating expenses could be sought through RESTORE Act funding components.
- Leverage maintenance and operation of existing PORTS stations with enhancements to other needed monitoring programs, such as monitoring of ocean acidification or the Gulfwide sampling network coordinated by the Gulf of Mexico Alliance.

**Activity 2** Continue to monitor implementation of Cooperative Vessel Traffic Service. Explore potential for full-time dedicated staffing.

**Activity 3** Support implementation of new navigation technologies, including use of electronic, or “virtual” channel markers, as appropriate in Tampa Bay.

**Location:** Baywide

**Benefit/Performance measure:** Safe maritime operations and vessel movements; in-bay monitoring from PORTS platforms

**Results:** Improved protection of bay waters, wildlife and economy by avoiding ship groundings and collisions; improved understanding of water quality status from mid-bay continuous monitoring

**Deliverables:** Annual report on status of operation and funding of PORTS presented to ABM (coherent with report on CVTS as noted in Step 1)

**Responsible parties:** Coast Guard (lead), Port Tampa Bay, Agency on Bay Management advocacy and support for funding

**Timeframe:** Ongoing

**Cost and potential funding sources:** $$$-$$$$$ based on salary estimates for 3-4 civilian positions to implement and maintain the Cooperative Vessel Traffic Service; possible funding through Coast Guard

**Location:** Baywide

**Benefit/Performance measure:** Safe maritime operations and vessel movements

**Results:** Improved protection of bay waters, wildlife and economy

**Deliverables:** Annual report on CVTS presented to ABM (possibly concurrent with annual report on status and needs of PORTS)

**Activity 3** Support implementation of new navigation technologies, including use of electronic, or “virtual” channel markers, as appropriate in Tampa Bay.

**Responsible parties:** Coast Guard (lead), HSSC, Port Tampa Bay, Port Manatee, Port of St. Petersburg, Tampa Bay Pilots Association

**Benefit/Performance measure:** Safe maritime operations and vessel movements

**Results:** Improved protection of bay waters, wildlife and economy

**Deliverables:** Annual report on CVTS presented to ABM (possibly concurrent with annual report on status and needs of PORTS)
**Activity 4** Support development of programming, training and research to improve training on maritime and port safety, security and sustainability through the Center for Maritime and Port Studies at University of South Florida.

- **Timeframe**: pilot project underway now; additional implementation pending evaluation
- **Cost and potential funding sources**: $$$$ Responsible Parties; potential grant funds
- **Location**: Baywide
- **Benefit/Performance measure**: Innovative, cost-effective technology to improve bay waters and economic viability.
- **Results**: Enhanced knowledge of bay conditions for safe vessel operations.
- **Deliverables**: Virtual channel markers and associated access to baywide system.

- **Responsible parties**: University of South Florida, Port Tampa Bay
- **Timeframe**: Ongoing
- **Cost and potential funding sources**: $$$$ NOAA, NSF, RESTORE Grants
- **Location**: Center located in Tampa, with baywide reach and benefits
- **Benefit/Performance measure**: Improved knowledge of port safety and environmental sustainability issues by maritime personnel.
- **Results**: Improved protection of vessels and bay waters; enhancement of environmental sustainability at Tampa Bay ports.
- **Deliverables**: Interdisciplinary training and certificate program through the Center for Maritime and Port Systems, University of South Florida.
OBJECTIVES:
Monitor implementation of oil and hazardous material spill response plans. Encourage greater participation of bay area environmental community in review of Area Contingency Plan. Improve communication between stakeholders regarding planning and response for spills. Support maintenance of pre-staged equipment and deployment training for priority areas in the bay.

STATUS:
Maintain and expand action to encourage greater communication and participation among stakeholders, including increased engagement between United States Coast Guard, spill responders and the environmental community and periodic training for partners and volunteers.

RELATED ACTIONS:
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<thead>
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<tbody>
<tr>
<td>SP-1</td>
<td>Continue implementation of advanced technology to improve coordination of ship movements in Tampa Bay</td>
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<tr>
<td>PA-2</td>
<td>Provide for and manage recreational uses of the bay</td>
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<tr>
<td>FW-6</td>
<td>Preserve the diversity and abundance of bay wildlife</td>
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<tr>
<td>PE-1</td>
<td>Promote public involvement in bay restoration and protection</td>
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BACKGROUND:
No major oil spills have occurred in Tampa Bay since 1993, when a three-vessel collision at the mouth of the bay spilled 300,000 gallons of oil. The last major chemical spill was in 2004, when 65 million gallons of acidic process water was released from a containment system at the Mosaic fertilizer manufacturing plant into Archie Creek and Hillsborough Bay during Hurricane Frances.

The United States Coast Guard Area Contingency Plan (USCG ACP) is the guiding document for response and cleanup of oil or other hazardous material spills in Tampa Bay. Now completely digital, the ACP comprehensively describes response protocols, provides an inventory of equipment and personnel and identifies sensitive areas and natural resources. It is reviewed annually, and individual elements are updated as needed. A full-scale test of the Plan is conducted every four years, at a cost of more than $100,000, with smaller “tabletop” tests done more frequently.

Spatial analysis tools developed by the Florida Fish and Wildlife Conservation Commission (FWC) for the Florida Marine Spill Analysis System are an important component of the Plan. The tools allow users to view geographic data, maps and imagery depicting sensitive ecological resources, public beaches and populations — or create custom maps to predict potential spill impacts. The vulnerability of coastal resources to spill impacts is characterized using an Environmental Sensitivity Index, with 10 being most sensitive and 1 being least sensitive. Areas of Tampa Bay considered most at risk from spills include the Cockroach Bay and Terra Ceia Aquatic Preserves, and the waters around Fort DeSoto Park. A powerful feature is the ability to produce real-time maps during a spill, this asset helped coordinate deployment of equipment and personnel in Florida during the 2010 Deepwater Horizon spill in the Gulf of Mexico.

Unannounced drills to test the region’s readiness to respond to a major spill are conducted four times each year by the USCG. These involve agencies across all levels of government, as well as a regional oil spill cooperative of industries that handle hazardous cargo, such as petroleum products and chemicals used in fertilizer processing. The Tampa Bay Regional Planning Council assists with these exercises through the Local Emergency Planning Committee (LEPC). The LEPC also helps to collect and track information about hazardous materials over a 6-county region.

A Tampa Bay Spill Committee composed of representatives of the USCG, local and state environmental agencies, port tenants, law enforcement, and emergency responders meets monthly.
Following the Deepwater Horizon oil spill in 2010, TBEP staff provided input to state and federal damage assessment efforts. Tampa Bay monitoring programs provide important baseline information for assessing pre-spill conditions and for predicting spill trajectories in the bay. Baseline monitoring, coupled with regional, state or national modeling efforts (such as NOAA’s Operational Nowcast and Forecast Hydrodynamic Model Systems), is a powerful tool for forecasting spill behavior and impacts. Post-spill research being conducted by the University of South Florida, FWC and others is providing new and important insights into the long-term ecological effects of spills.

In general, the Tampa Bay region has made significant strides in spill readiness and demonstrated an admirable spirit of cooperation among public and private interests. More active and consistent engagement with the environmental community will help ensure that up-to-date information about vulnerable coastal resources is incorporated in the ACP, and that the Bay’s most vulnerable areas and wildlife populations are broadly recognized priorities for protection in the event of a spill.

**Strategy:**

**Activity 1**

Continue to update the Area Contingency Plan. Conduct drills to test response capabilities. Work with USCG to ensure availability of adequate spill containment equipment to protect the Bay’s most ecologically vulnerable areas.

- **Responsible parties:** USCG (lead), NOAA, FWC, DEP, local governments/agencies, port tenants, LEPC
- **Timeframe:** Annual review and revision prior to start of hurricane season with comprehensive updates to individual elements as needed.
- **Cost and potential funding sources:** $–$$ USCG or industry sponsors
- **Location:** Baywide
- **Benefit/Performance measure:** Timely updates to ACP Large-scale test response protocols every 3–5 years. "Tabletop" exercises annually. Unannounced drills annually.
- **Results:** Comprehensive and coordinated spill planning and response will reduce potential for resource damage and facilitate rapid cleanups.

**Activity 2**

Inspect, repair or replace pre-staged boom, absorbent pads and storage trailers at Cockroach Bay Aquatic Preserve. Conduct periodic training workshops for interested partners or volunteers in deploying equipment. Expand pre-spill equipment staging and deployment training to other sensitive areas, including Weedon Island Preserve, Fort De Soto Park, Terra Ceia Aquatic Preserve and the Richard T. Paul Alafia Bank Bird Sanctuary. Work with on-site managers to develop specific plans for identifying most-sensitive areas and barrier or containment plans. Alternatively, rapid-response trailers could be maintained at central locations in each county or stored on port-owned property, ready to mobilize wherever equipment is needed to keep oil from reaching sensitive areas.

- **Responsible parties:** Hillsborough County, Pinellas County, Manatee County, FDEP Aquatic Preserves Program, Audubon Florida, FWC, NOAA, Tampa Bay Watch
- **Timeframe:** Inspection of equipment at Cockroach Bay in 2016. Repair or replacement in 2017–2018, pending funding. Training workshops and pre-staging of equipment in other priority areas beginning in 2018.
- **Cost and potential funding sources:** $–$$ EPC Pollution Recovery Fund, TBERF, USFWS, TBEP Bay Mini-Grant, RESTORE Act grant programs, mitigation activities
- **Location:** Cockroach Bay Aquatic Preserve, Weedon Island Preserve, Fort De Soto Park, Terra Ceia Aquatic Preserve and the Richard T. Paul Alafia Bank Bird Sanctuary
- **Benefit/Performance measure:** Prevention of contamination of highly sensitive habitats through site-specific planning, pre-staging of containment equipment and deployment of responders.
- **Results:** Protection of key locations in Tampa Bay.
including priority parks and preserves, and important bird-nesting colonies. 

**Deliverables:** Site-specific spill containment and response plans. Pre-staged mobile storage units equipped with oil boom and absorbent pads. Database of trained volunteers willing to deploy equipment.

**Activity 3**  
Increase engagement between the USCG, spill responders and the environmental community. Encourage regular participation in the Agency on Bay Management by the USCG. Designate an alternate from ABM to serve on the Tampa Harbor Safety and Security Committee and encourage participation in this committee by additional environmental partners, such as FDEP Office of Aquatic Preserves, Audubon Florida, NOAA and Florida Sea Grant. Encourage ongoing involvement of area environmental managers in Area Contingency Plan reviews and updates.

**Responsible parties:** USCG, Tampa Harbor Safety and Security Committee, Agency on Bay Management, NOAA, FDEP, Florida Sea Grant, county environmental lands managers

**Timeframe:** 2017-2018

**Cost and potential funding source:** No funding required; staff time only

**Location:** Baywide

**Benefit/Performance measure:** A trained corps of volunteers with expertise in capturing and treating oiled wildlife. Adequate facilities, equipment and supplies to house and care for wildlife at temporary “triage” units as well as permanent rehabilitation facilities.

**Results:** Improved survival rates for wildlife impacted by spills.

**Deliverables:** Database of trained volunteers.

**Inventory of locally available personnel, facilities and supplies. One or more permanent seabird rescue facilities in Tampa Bay.**

**Activity 4**  
Support training of personnel and adequate facilities to care for oiled wildlife, especially birds. Conduct training workshops for volunteers in oiled wildlife response, led by experienced local rehabilitators or outside groups with spill response expertise, such as Tri-State Bird Rescue in Delaware.

**Responsible parties:** USCG, NOAA, FDEP, FWC, ports and port tenants, The Florida Aquarium, Clearwater Marine Aquarium, Lowry Park Zoo

**Timeframe:** Inventory of local personnel and resources updated in 2017. Training workshops initiated in 2018 and ongoing at periodic intervals afterwards

**Cost and potential funding sources:** $5–$5,000 TBERF or other grants; funding from ports and/or port tenants or NGOs

**Location:** Baywide

**Benefit/Performance measure:** Ongoing research conducted by the University of South Florida is providing important insights into the long-term impacts of the 2010 Deepwater Horizon spill in the Gulf of Mexico. Photo courtesy of USF.

**Results:** Improved survival rates for wildlife impacted by spills.

**Deliverables:** Database of trained volunteers.

**Inventory of locally available personnel, facilities and supplies. One or more permanent seabird rescue facilities in Tampa Bay.**

**Activity 5**  
Continue to support research into the long-term impacts of oil spills, projected pathways and distribution of spills in Tampa Bay, and collection of baseline data on resources potentially impacted by spills. Additional monitoring needs are identified in bay Habitats and Research and Monitoring elements of the CCMP.

**Responsible parties:** NOAA, FDEP, FWC, USF College of Marine Science, Gulf of Mexico Program

**Timeframe:** Ongoing for specific research related to Deepwater Horizon spill and baseline monitoring programs for seagrasses and other critical coastal habitats

**Cost and potential funding sources:** $5–$5,000 Grant funding through RESTORE Act programs

**Location:** Baywide

**Benefit/Performance measure:** Improved understanding of the long-term effects of oil and chemical spills, including toxicological and reproductive ramifications, on the ecological resources of Tampa Bay and the Gulf of Mexico.

**Results:** Identification and enhanced protection and monitoring of vulnerable resources.

**Deliverables:** Published research results.

**Monitoring data collected and evaluated on a regular basis to inform management and protection of bay resources during a spill and restoration or mitigation of impacts following a spill.**
INVASIVE SPECIES

Support prevention, eradication or management of invasive species in Tampa Bay and its watershed

OBJECTIVES:
Manage or eradicate existing invasive plants and animals and prevent future invasions, by informing homeowners, landowners, natural resource managers, ecotourism providers and outdoor enthusiasts about the harmful ecological and economic impacts of invasive plants and animals. Involve them in preventing, eradicating or managing invasive species. Support continued research and implementation of appropriate biological controls for invasive plants.

STATUS:
Ongoing. Action title revised from 2006 CCMP Implement a public education program to enlist citizen help in preventing marine bio-invasions. New action expands audience for education; includes terrestrial invasive species as well as aquatic; supports early warning systems to help prevent invasions; and recognizes that eradication and/or management of invasive species are viable strategies where prevention fails.

RELATED ACTIONS:
BH-1 Implement the Tampa Bay Habitat Master Plan
FW-6 Preserve the diversity and abundance of bay wildlife
PE-1 Promote public involvement in bay restoration and protection
PE-2 Promote public education about key issues affecting Tampa Bay

BACKGROUND:
Citizens now have more access than ever to information about invasive plants and animals via web-based sources and tools they can use to eradicate invasive species in their own yards and communities. Some high-profile invaders, such as Burmese pythons and lionfish, have been extensively publicized in mainstream media and are now widely recognized by the public as ecological threats. Unfortunately, efforts to eradicate invasive species almost always come too late, after an invader has spread beyond reasonable hope of control. Even when threats are recognized quickly — as with lionfish — the population may multiply so rapidly and/or into such inaccessible areas that elimination becomes impossible, and management or containment is the only feasible remedy. However, when detected early enough, it is possible to prevent or eliminate invasive species — the toxic invasive marine alga, Caulerpa taxifolia, was successfully eradicated from California — or to limit their spread into critically important natural areas such as parks and preserves.

The Asian Green Mussel: A Close Call for Tampa Bay

In 1999, researchers in Tampa Bay first reported large colonies of the Asian green mussel (Perna viridis) attached to pilings of major bay bridges. The mussel — thought to be a hitchhiker in the ballast water discharged by ships docking at the Port of Tampa — spread...
uncheck for several years, coating dock and bridge pilings and seawalls, clogging water intake pipes and even spreading into shallow, sandy areas on the bay bottom. Fortunately, mussel populations diminished dramatically by the late 2000s, probably due to natural factors such as extreme winter cold snaps and predation by native species, and the Asian green mussel is no longer viewed as a serious problem.

The rapid spread of zebra mussels and other suspected ballast water introductions led to new regulations requiring ships bound for U.S. ports to release ballast water in saltier ocean waters, where any organisms in the ballast are less likely to survive. The Coast Guard enforces the rule and inspects ships for compliance. However, recent research has shown that significant amounts of ballast water are still being discharged to U.S. coastal systems without management and proper treatment.

The Asian green mussel was a highly publicized Florida interloper. This close call was a reminder of the threats posed by intentionally or accidentally introduced species and the need for monitoring programs to detect future invasions. A 2004 study commissioned by the Tampa Bay Estuary Program (TBEP) documented 55 known, or suspected or likely marine invaders in the Tampa Bay ecosystem.1 Charismatic animals as diverse as the Argentine black-and-white tegu lizard and the colorful and voracious lionfish have grabbed recent headlines in the Tampa Bay region.

**Plants Are Prominent and Persistent Invaders**

Smaller or less flamboyant species — including insects, bottom-dwelling organisms and bivalves — may escape early detection and thus the potential for swift eradication. Moreover, invasive plants continue to threaten the ecological integrity and diversity of both coastal wetlands and uplands, requiring costly and resource-intensive control efforts.

The Florida Natural Areas Inventory lists 93 plants that are known or suspected invasive species in and around Hillsborough, Pinellas, Manatee and Pasco counties. In recent years, resource managers have identified another 25 species of potential concern.

Brazilian pepper is a prolific, tenacious and well-established invasive plant in the Tampa Bay watershed. Its tangled, dense canopy forms impenetrable thickets that can crowd out mangroves and other native plants. An urban forest study conducted in Tampa found that Brazilian peppers ranked second only to red mangroves in canopy coverage. Removing this fast-growing plant plague that flourishes in disturbed soils — including coastal and freshwater wetlands that have been altered for farming, development or infrastructure — is a costly component of virtually all habitat restoration projects in the bay watershed.

**Early Detection and Education Are Essential**

A variety of reporting tools are available to encourage reporting invasive plant and animal species and to alert researchers and field personnel to their potential presence. For example, the U.S. Geological Survey’s Nonindigenous Aquatic Species Database collects and distributes data about introduced aquatic vertebrates and invertebrates, and soon it will expand its web-based repository to include plants.

The IveyGot1 website and mobile phone app allows anyone to photograph, geo-tag and submit real-time observations of invasive plants and animals in Florida via a smartphone. This user-friendly system is part of the University of Georgia Center for Invasive Species and Ecosystem Health’s Early Detection and Distribution Mapping System. In conjunction with the Florida Invasive Species Partnership, the Center offers a number of early detection trainings and tools for resource managers and citizens.

A companion effort is the Introduced Reptile Early Detection and Documentation (REDDy) course jointly developed by the University of Florida, The Nature Conservancy and the National Park Service. This free online course teaches how to recognize and report large, invasive reptiles likely to be seen in Central and South Florida. REDDy-trained observers play an important role in detecting and documenting the spread of established species and sightings of new species.

**Empowering Citizens To Help**

Citizens also have a variety of tools available for reporting invasive plants on their own property — recognizing that suburban backyards are often the front line in efforts to prevent expansion and/or continual reinfection of invasive plants into adjacent wetlands and woods. TBEP has been a leader in engaging citizens in the battle against invasive species through its Eyes On The Bay education campaign. Components include:

- Creation of a printed and digital Field Guide to common invasive plants in the bay area in partnership with county extension programs and the Hillsborough Invasive Species Task Force.
- A short “Wicked Weeds” video showing homeowners how to safely remove invasive trees, shrubs and vines, produced in partnership with county extension programs.
- Two children’s books about responsible pet ownership and the hazards of aquarium dumping, in partnership with the University of Central Florida and Florida Sea Grant.
- A middle-school classroom curriculum, “Intruders in Paradise,” that is the first classroom module in Florida devoted exclusively to invasive plant and animals, in partnership with Florida Sea Grant.
- Diver’s Alert and Boater’s Alert laminated cards with photos of existing or potential marine invaders and where to report sightings.
- A popular Invasive Species Poetry Contest held in conjunction with TBEP’s 20th anniversary in 2011. The poetry contest received considerable publicity and submissions were compiled in an online booklet.

Additionally, TBEP’s Bay Mini-Grant Program has provided funding to homeowner associations, condominium associations and schools to remove invasive plants from common areas and pond or lake shorelines, and replace them with native plants. TBEP’s Give A Day For The Bay volunteer workday program focuses on removing
invasive plants at area parks and preserves.

The Florida Fish and Wildlife Conservation Commission (FWC) has dramatically expanded its invasive species outreach to Floridians, sponsoring or co-sponsoring innovative citizen involvement events like the Python Hunt in the Everglades and Lionfish Roundups around the state.

FWC also is utilizing citizen volunteers to assist with research into the distribution and ecological impacts of specific invaders, such as the Argentine tegu lizard, which has an established breeding population in Hillsborough County.

UF's Institute of Food and Agricultural Sciences (UF/IFAS), and its affiliated Sea Grant and county extension programs, are important sources of research-based information. IFAS research has led to early success in using a biological control, the air potato beetle, to manage the highly invasive air potato vine. Local extension programs routinely educate residents about invasive plants and eco-friendly alternatives, as part of the Florida-Friendly Landscaping™ program.

**New Partnership Promotes Regional Cooperation**

The 2012 formation of a multi-county, multi-agency Suncoast Cooperative Invasive Species Management Area (CISMA) offers a promising forum for regional education and coordination among a diverse coalition of stakeholders. Sponsored by the multi-agency Florida Invasive Species Partnership, 17 regional CISMAs coordinate broad-based efforts to address invasive species issues across public and private boundaries. The Suncoast CISMA encompasses Pinellas, Hillsborough, Manatee and Sarasota counties. Members include local and state park and preserve staff, natural resource managers, researchers and education specialists.

CISMA's early accomplishments include a successful Exotic Pet Amnesty Days offer pet owners an opportunity to relinquish exotic animals, like this green iguana, they can no longer keep. The pets can be adopted by new owners pre-certified by state wildlife officials. Photo by Nanette O'Hara.

Brazilian pepper is a prolific plant invader of disturbed coastal habitats in the Tampa Bay watershed. Host, maintain and update a regional inventory of existing educational materials, via downloadable digital files, on a central website accessible to all. This could be done by expanding the existing Florida CISMA website, currently maintained by the University of Georgia's Center for Invasive Species and Ecosystem Health, or via another existing or new website maintained by a local or regional organization such as USF's web-based Water Atlas or the Science and Environment Council of Southwest Florida.

**Activity 2**

Host, maintain and update a regional inventory of existing educational materials, via downloadable digital files, on a central website accessible to all. This could be done by expanding the existing Florida CISMA website, currently maintained by the University of Georgia's Center for Invasive Species and Ecosystem Health, or via another existing or new website maintained by a local or regional organization such as USF's web-based Water Atlas or the Science and Environment Council of Southwest Florida.

**Benefit/Performance measure:** Stakeholder collaboration through maintenance of CISMA.

**Location:** Baywide

**Results:** Improved invasive species education, training and eradication.

**Deliverables:** Education and training materials.

**Responsible parties:** Suncoast CISMA, TBEP, USF

**Timeframe:** Initial inventory compiled, organized and distributed by TBEP in 2013. Additional education materials identified for website inclusion.

**New Partnership Promotes Regional Cooperation**

The 2012 formation of a multi-county, multi-agency Suncoast Cooperative Invasive Species Management Area (CISMA) offers a promising forum for regional education and coordination among a diverse coalition of stakeholders. Sponsored by the multi-agency Florida Invasive Species Partnership, 17 regional CISMAs coordinate broad-based efforts to address invasive species issues across public and private boundaries. The Suncoast CISMA encompasses Pinellas, Hillsborough, Manatee and Sarasota counties. Members include local and state park and preserve staff, natural resource managers, researchers and education specialists.

CISMA's early accomplishments include a successful Exotic Pet Amnesty Day; multi-agency, multi-jurisdictional workdays at parks and preserves; public seminars on "invaders of interest" (such as channeled apple snails, tegu lizards and Japanese climbing fern); and creation of an initial inventory of existing educational materials produced by member organizations, including TBEP. CISMA also offered training opportunities that satisfied CEU requirements for field personnel.

Sustaining momentum and interest has been a challenge, as the CISMA has no formal funding or support; it is entirely a volunteer effort led by staff from the agencies, local governments and non-profit organizations that form its core membership. A formal commitment by policymakers or key managers in member organizations to allocate staff time for participation would be beneficial. This top-down support greatly contributed to the success of a similar group, the Hillsborough Invasive Species Task Force.

Collaborative and consistent messaging to successfully prevent or minimize the impacts by invasive plant and animals will remain a priority need, especially as new residents, unfamiliar with Florida's unique climate and natural systems and extreme vulnerability to invaders, continue to move to the Tampa Bay region.

This action supports early detection networks and seeks to expand opportunities for scientists, resource managers, resource users and the public to share information about potentially devastating invasions and to work cooperatively to prevent or limit their ecological impact.

**STRATEGY:**

**Activity 1** Support continued operation of the Suncoast CISMA or a similar regional alliance focused on invasive species research, management and education. Secure commitments from member organizations to actively participate in the CISMA. Explore potential for a key CISMA member to provide staff support for the group, including meeting organization and communication, on a long-term or rotating basis.

**Responsible parties:** All Suncoast CISMA partners, including TBEP

**Timeframe:** Ongoing. Strategy to formalize participation in CISMA developed in 2018, letters of commitment to be provided by end of 2019
by CISMA in 2015. Inventory should be updated every other year and posted on standalone or existing website starting in 2017

**Cost and potential funding sources:** $ Possible TBEP contribution via CWA Section 320 funds

**Location:** CISMA website

**Benefit/Performance measure:** Central website of regional inventory of educational materials addressing invasive species, accessible to citizens, scientists and resource managers.

**Results:** Improved sharing of educational materials will increase awareness of techniques for managing invasive species.

**Deliverables:** Central website.

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**Activity 3**

Conduct a symposium to update our knowledge of existing or likely invasive plants and animals, innovative treatment and management technologies and monitoring needs. Provide recommendations for improved detection and monitoring of high-priority existing or potential invaders. Incorporate findings into existing bay monitoring programs to track the spread of existing invasive species and provide early warning of new invasive species.

**Responsible parties:** TBEP (lead), FWC, EPCHC, FDEP, U.S. Geological Survey, Florida Sea Grant, Port Tampa Bay, Port Manatee, local cities and counties

**Timeframe:** Symposium conducted in FY 2018-2019; monitoring recommendations incorporated beginning in FY 2019-2020

**Cost and potential funding sources:** $ TBEP contribution via CWA Section 320 funds.

**Location:** Baywide

**Benefit/Performance measure:** Regional symposium on invasive species.

**Results:** Technology transfer highlighting new technologies available to prevent, manage or eradicate invasive species. Monitoring recommendations can be incorporated into existing bay monitoring programs.

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**Activity 4**

Increase awareness and use of existing early warning tools by bay managers and citizens. Incorporate information about tools into existing educational initiatives. Make information available to outdoor enthusiasts at venues such as state and county parks and preserves, through ecotourism providers and municipal communication platforms, including websites and social media channels. Expand reporting tools available on mobile platforms and other appropriate platforms as they develop.

**Deliverables:** Symposium presentations and results of discussion posted on central website and published in a newsletter or other format for distribution.

**Responsible parties:** TBEP, EPCHC, FWC, Suncoast CISMA, FDEP

**Timeframe:** Initiate in 2018 following symposium

**Location:** Baywide

**Benefit/Performance measure:** Measurable removal of invasive species.

**Results:** Reduced abundance and extent of invasive species.

**Deliverables:** Annual volunteer workdays throughout the watershed.

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**Activity 5**

Continue to provide seed funding for community-based invasive species education and removal initiatives, through the Bay Mini-Grants, Give A Day For The Bay workday program and TBEP outreach funds. Maximize cost-effectiveness by collaborating with others engaged in invasive species outreach, such as county extension programs and FWC.

**Responsible parties:** TBEP

**Timeframe:** Mini-Grants and Give A Day programs funded annually as appropriate projects and partnerships are identified

**Cost and potential funding sources:** $ TBEP funding for volunteer workdays and outreach programming via CWA Section 320. Funds for Bay Mini-Grants from sales of the Tampa Bay Estuary license plate

**Location:** Baywide

**Benefit/Performance measure:** Measurable removal of invasive species.

**Results:** Reduced abundance and extent of invasive species.

**Deliverables:** Annual volunteer workdays throughout the watershed.

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**Activity 6**

Support continued research and implementation of appropriate biological controls for invasive plants, through UF/IFAS or other research institutes.

**Responsible parties:** Suncoast CISMA, FDEP, TBEP

**Timeframe:** Ongoing

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Air potato beetles are a useful tool for biological control of air potato on both public and private lands. Photo courtesy Florida Invasive Species Partnership.
**Cost and potential funding sources:** $ Potential funding through university appropriation, supplemented by external research grants to university researchers

**Location:** Baywide

**Benefit/Performance measure:** Increased identification and successful use of biological control methods, especially for invasive plants.

**Results:** Use of biological control methods will have less environmental impact and be more cost-effective than chemical controls.

**Deliverables:** New biological control methods.

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PUBLIC EDUCATION AND INVOLVEMENT

Promote public involvement in bay restoration and protection

OBJECTIVES:
Increase direct citizen involvement in restoring and protecting Tampa Bay via volunteer programs that provide opportunities for citizens to participate in bay restoration, cleanup and monitoring.

STATUS:
Ongoing. TBEP awards about $90,000 in grants annually to support volunteer-based environmental education and restoration projects. In addition, TBEP organizes about six volunteer work days each year for restoration projects at parks and preserves in the Tampa Bay watershed. Numerous non-profit and government partners sponsor environmental volunteer activities as well.

RELATED ACTIONS:
- BH-6 Encourage habitat enhancement along altered waterfront properties
- FW-1 Increase on-water enforcement of environmental regulations on the bay
- PA-2 Provide for and manage recreational uses of the bay
- PE-2 Promote public education about key issues affecting Tampa Bay
- PH-4 Reduce fecal contamination from humans and pets in Tampa Bay Area waters
- PH-5 Reduce pollution from recreational boaters
- SW-1 Reduce nitrogen runoff from urban landscapes
- SW-10 Expand use of Green Infrastructure practices

At left: A volunteer plants salt marsh grass. TBEP Photo.

BACKGROUND:
Direct community involvement in protecting the environment empowers citizens to become better stewards of the bay. Engaging citizens in restoring and protecting Tampa Bay can increase support for and confidence in government actions to fund and regulate natural resource protection. Furthermore, directly involving citizens in restoration provides critically needed labor and materials required to manage thousands of acres of land, wetlands and waters across the region. The Tampa Bay Estuary Program and its government and non-profit partners actively sponsor volunteer programs that provide opportunities for citizens to participate in bay restoration, cleanup and monitoring.

The TBEP Bay Mini-Grant program fosters public participation in bay restoration by awarding grants of up to $5,000 to neighborhoods, schools and non-profit organizations for environmental education, restoration and pollution prevention projects. The grant funds are generated by sales of the Tampa Bay Estuary license plate; more than $1.6 million has been distributed to the community as of 2015.

On average, 20 projects are funded each year with about $90,000 in grants, including habitat restoration projects such as stormwater pond improvements, removal of invasive plants and shoreline plantings. Projects typically occur in neighborhoods, schools or on publicly owned lands. A “Golden Mangrove Award” is given every year to the outstanding Mini-Grant project, as determined by the TBEP Community Advisory Committee (CAC).

In 2015, the CAC embarked on its own initiative to build connections with local college students, both to increase appreciation of the bay’s value and to involve more college students in bay clean-up and restoration (see Action PE-2).

TBEP also organizes the Give A Day For The Bay volunteer program. Each year, workdays involving about 250 volunteers are held at parks and preserves across the watershed. Activities include invasive plant removal, oyster reef building, planting native shoreline plants and trail maintenance. In FY 2015, Give A Day volunteers restored 12 acres, removing 2000 pounds of invasive plants, installing 15,000 plants, creating 150 linear feet of shoreline and building 1,600 square feet of oyster reefs with 20 tons of shell. TBEP works with local non-
Keep Tampa Bay Beautiful (KTBB) is another example of a non-profit partner with volunteer programs that have baywide impact. KTBB is one of four Keep America Beautiful affiliates in the Tampa Bay Area. The group focuses on litter prevention, waste reduction and community beautification. In 2015, the non-profit organization received almost 1,000 events and recruited more than 16,000 volunteers to remove 626,000 pounds of trash and plant 3,700 trees, shrubs and gardens across 13,000 acres in the Tampa Bay Area. One of its largest annual events is the Hillsborough River Cleanup, which in 2015 cleaned 90,000 pounds of trash from 87 sites along the Hillsborough River. Other programs and partnerships include Trash Free Waters, Clean Your Block Party, Adopt-A-Road and Into the Streets, which engages local college students in cleanups.

Manatee County Parks and Natural Resources Division actively recruits volunteers to assist with ongoing restoration, resource monitoring and preserve maintenance across almost 30,000 acres of natural lands and parks. Through an online registration process, interested adult volunteers are matched with volunteer assignments that meet their skills and interests and the needs of land managers. Engagement varies from special one-time events, to once-a-month work days at preserves, to more permanent assignments working several days a week. The RIP (Restoring Important Places) Squad, meets at least monthly at different preserves around the County to work alongside park rangers on land management activities, while learning about local ecology and wildlife. In addition to publicly advertised events, special service learning projects are offered to organized groups, such as homeschoolers, youth groups and clubs, corporate groups, fitness groups and geo-cachers.

A high percentage of dedicated volunteers are active retirees. Families are another significant source of volunteers, as well as students with community service requirements. Many volunteer events, especially those organized for students, provide opportunities for trash cleanups. While this activity is important, it may also reinforce a simplified perception that removing trash is the only way in which they can make a difference. Expanded participation is needed in hands-on restoration and monitoring efforts that include interpretive education on a broad array of watershed issues, especially among “under-involved” groups, like young people and minority communities. Increasing participation among minority communities requires reducing barriers to participation, which could be transportation, free time or peer-to-peer encouragement. Rather than inviting volunteers to join an event, the events could be brought to them at convenient times and places. Self-organized groups within minority communities — such as faith groups, community and youth centers, business groups and large employers — could be engaged with environmental volunteer events organized specifically for their group and neighborhood. Person-to-person connections are critical for establishing trust and maintaining outreach to groups in minority communities.

Young people have similar barriers to participation, so a parallel strategy could be used to reach out to organized youth groups, including scouts, sports teams, faith groups and school clubs. Youth also respond to competition and recognition, so structuring the activity as a contest with prizes could motivate participation. Partnership with local schools and organizations who serve at-risk populations include cleanups and storm drain markings in the Sulphur Springs community in Tampa, as well as work with the Museum of Science and Industry's YES! Team (Youth Enriched by Science, Technology, Engineering, Art, and Math), a service-learning program that involves underserved students in community service activities. Tampa Bay Watch also partners with AMIkids, an

Tampa Bay Watch (TBW) is an important non-profit partner with an enormously successful, long-running volunteer program. TBW engages citizens in a variety of bay restoration and protection projects, including oyster reef restoration, salt marsh planting, seagrass restoration, monofilament line removal from bird nesting islands, derelict crab trap removal, coastal cleanup of marine debris and scallop monitoring. Each year, some 6,000 volunteers participate in 125 events. For example, in 2015, volunteers removed 207 derelict crab traps, constructed 15,471 square feet of oyster shell bar, removed 6,343 pounds of shoreline debris and recovered 237 miles of fishing line from 144 monofilament recycling tubes around Tampa Bay. To date, TBW volunteers have planted more than 854,000 cord grass plugs to help restore 173 acres of salt marsh. Tampa Bay Watch provides opportunities for volunteers of all ages and skill level, including family-friendly events.

Photo by Sara Kane
alternative education program offering experiential training and activities associated with marine industries.

Rollout of a 2-year Let's Move! Outside initiative in Tampa Bay occurred in 2016. Led by the U.S. Department of Interior and facilitated by public-private partnerships at all levels of government, Let's Move! Outside inspires millions of young people to play, learn, serve and work outdoors. A major goal is to involve urban and underserved communities in outdoor activities on public lands (including trails, parks, playgrounds and green spaces) which promote health and wellness. This promising collaboration may help environmental groups increase diversity in their volunteer programs, by connecting Boys and Girls Clubs, YMCAs and community centers with state and local parks and preserves.

Recognition also is an important component of successful volunteer programs, through volunteer appreciation events or awards. TBEP honors outstanding volunteers annually. Tampa Bay Watch, the Keep America Beautiful affiliates, The Florida Aquarium and many other organizations have annual volunteer awards and/or thank-you events.

**STRATEGY:**

**Activity 1**  
Continue to provide opportunities for hands-on citizen involvement in bay restoration. Participate in initiatives such as Let's Move! Outside to expand participation by youth and minority communities.

**Responsible parties:** U.S. Department of Interior, TBEP, Tampa Bay Watch, Keep America Beautiful affiliates, local governments

**Timeframe:** Ongoing

**Cost and potential funding sources:** $–$$$

Section 320 CWA funds for TBEP activities, non-profit organizations receive funding from memberships, donations and grants

**Location:** Baywide

**Benefit/Performance measure:** Varied hands-on volunteer activities with a diverse volunteer base that helps implement restoration and conservation goals.

**Results:** Citizen engagement will build community support for Tampa Bay environmental stewardship and contribute valuable labor resources.

**Deliverables:** Volunteer-based restoration and conservation activities organized and completed by TBEP and partners.

**Activity 2**  
Continue to support community-level restoration and improvement activities through the Bay Mini-Grant program. Coordinate grants with resource managers and Management Board members to ensure projects have net environmental benefit and do not conflict with local government objectives. Continue to explore ways to involve diverse segments of the community in grant submissions and implementation.

**Responsible parties:** TBEP

**Timeframe:** Ongoing

**Cost and potential funding sources:** $$ Tampa Bay Estuary license plate fund

**Location:** Baywide

**Benefit/Performance measure:** Percent of Bay Mini-Grants completed and final reports submitted. Percent of grants awarded to recipients representing or involving key underserved, under-involved communities.

**Results:** Completion of community-based restoration, education and pollution prevention projects that directly contribute to attainment of CCMP habitat and water quality goals.

**Deliverables:** Final reports from completed grant projects detailing expenditures, volunteer engagement and measurable results.

**Activity 3**  
Implement the CAC Action Plan to increase engagement and environmental volunteerism among college students. Encourage and support volunteerism from community and corporate groups. Provide opportunities for out-of-state or international students and visitors to participate in bay restoration.

**Responsible parties:** TBEP CAC (for implementation of CAC Action Plan), non-profits, educational institutions and local parks and preserve programs for broad-based volunteer initiatives

**Timeframe:** Initiative launched in 2015, implementation ongoing, aided by development of a strategic communications plan in 2016 and 2017

**Cost and potential funding sources:** $$ unencumbered Tampa Bay Estuary license plate funds to support development of Communications Plan

**Location:** Baywide

**Benefit/Performance measure:** Number of students involved in TBEP or partner volunteer workdays. Number of colleges represented by student volunteers.

**Results:** Increased participation of college students in bay improvement activities, fostering their continued involvement in community service after graduation as young working adults in the Tampa Bay region or wherever they may relocate.

**Deliverables:** Annual report highlighting CAC progress toward implementation of Action Plan.
PUBLIC EDUCATION AND INVOLVEMENT
Promote public education about key issues affecting the bay

OBJECTIVES:
Educate citizens about key problems facing the bay and how they can participate in solutions.

STATUS:
Ongoing. TBEP has implemented regional education campaigns addressing invasive plants and animals; bay-friendly boating; manatee protection; pet waste disposal; and fertilizer use. TBEP's varied communication tools have included boating guides; doorhangers; posters; children's books; classroom teaching modules; field trips and workshops on specific topics; and a host of social media tools. TBEP has been a regional leader in development of educational programs utilizing principles of social marketing to drive behavior change.

RELATED ACTIONS:
- BH-6 Encourage habitat enhancement along altered waterfront properties
- FW-1 Increase on-water enforcement of environmental regulations on the bay
- PA-2 Provide for and manage recreational uses of the bay
- PE-1 Promote public involvement in bay restoration and protection
- PH-4 Reduce fecal contamination from humans and pets in Tampa Bay Area waters
- PH-5 Reduce pollution from recreational boaters

BACKGROUND:
The Tampa Bay Estuary Program continues to emphasize the importance of environmental education to the long-term health of the bay by creating a constituency of informed, involved citizens. This mission is aided by a Community Advisory Committee (CAC) composed of residents from a variety of backgrounds and interests who support TBEP's community outreach. With limited staff and financial resources, TBEP has adopted a strategic approach to educational programming:

- Identify and close gaps in environmental education
- Emphasize cost-effectiveness
- Maximize partnerships

This three-pronged guidance has allowed TBEP to develop highly focused, innovative and measurable education programs, including the Pooches for the Planet pet waste disposal initiative, the Be Floridian fertilizer education campaign, and most recently, #LoveTampaBay, a multimedia social sharing campaign.

Closing Gaps in Educational Programming
TBEP strives to avoid duplication of educational programming already being successfully delivered by other agencies or organizations with greater personnel and financial resources. Instead, TBEP focuses on audiences and issues that other organizations are not addressing, specifically emerging issues that have been identified as important to bay improvement. In this way, TBEP's efforts serve as pilot or foundational programs that can be adopted and adapted by TBEP partners.

Recent examples of key issues for which TBEP has provided regional leadership in education include:

- Be Floridian Fertilizer Education Campaign

TBEP was tasked by its Policy Board to develop a regional campaign to support local fertilizer ordinances. Be Floridian implemented and evaluated a 5-year behavior change marketing campaign in Manatee, Pinellas and Tampa using multiple social media tools.
tools — including billboards, bus wraps, digital ads and retail store outreach — to reduce use of nitrogen lawn and landscape fertilizers in the summer rainy season. The campaign has since been adopted by Pinellas and Sarasota counties, and the Indian River Lagoon watershed, with elements incorporated in other statewide and national stormwater education programs. (see Action SW-1).

- **Pooches for the Planet Pet Waste Education**

  This innovative campaign encourages dog owners to bag and properly dispose of pet waste to prevent harmful bacteria and excess nutrients from entering the bay (see Action PH-4). The campaign utilized pledges, signs, pet waste bag stations, partnerships with animal shelters, pet-related businesses and neighborhoods, direct outreach to veterinary clinics, and GPS mapping of dog waste piles in several parks and preserves to document a positive change over time as a result of these educational efforts.

  **Emphasizing Cost-Effectiveness**

  TBEP's outreach has always sought to be cost-effective. In recent years, evolving digital technology has led to a dramatic shift in TBEP's outreach has always sought to be cost-effective. In recent years, evolving digital technology has led to a dramatic shift in

  **Wild and Wonderful Tampa Bay Training Workshops for Recreation Departments**

  TBEP developed a one-week module for recreation department summer camps using fun, hands-on activities to provide basic information about our local environment, and individual actions to protect it, to urban kids who might not otherwise have access to these lessons (see Action PE-1). TBEP also held workshops to train recreation department instructors and other informal environmental educators in using the module and activities.

  **Maximizing Partnerships**

  TBEP seeks out and collaborates with partners who have specific expertise and resources to contribute to key education initiatives. These partnerships amplify and expand the reach of our messaging, while ensuring a strong scientific foundation.

  A recent example is Eyes On The Bay (see Action IS-2). TBEP developed this comprehensive, multi-year project to enlist citizens’ help in preventing and managing plant and animal bio-invasions. Eyes On The Bay targeted specific audiences with tailored information and tools. Products included:

  - A compact, spiral-bound field guide to invasive plants in the bay watershed;
  - The Wicked Weeds DVD for homeowners with step-by-step instruction in eradicating common backyard invasive plants;
  - Laminated Boaters Alert and Divers Alert waterproof cards for boaters and divers on existing and potential marine invaders, with info on how to report sightings;
  - Intruders in Paradise, an in-depth classroom module for middle-school students; and
  - Two children’s books about the hazards of dumping aquarium fish into marine waters, one for children in pre-K through 2nd grade, and the other for grades 3-5.

  Key partners joining TBEP in development and distribution of these products included Florida Sea Grant, Hillsborough County Extension, the University of Central Florida, the Florida Native Plant Society and the Hillsborough Invasive Species Task Force.

  **CAC Action Plan**

  TBEP’s Community Advisory Committee provides important support for educational efforts. CAC members contribute a wide range of services, such as:

  - Reviewing Bay Mini-Grant applications annually;
  - Selecting the winner of the Golden Mangrove award for most outstanding Mini-Grant project;
  - Participating in Give A Day For The Bay workdays;
  - Providing language translation services for specific audiences.

  **TBEP’s Bay Mini-Grant program provides funding for community-based restoration and education programs, including hands-on learning opportunities for children.**
• Representing TBEP at tabling events such as community festivals;
• Providing input on TBEP goals and programs; and
• Serving as a liaison between the Program and the public.

CAC members may be appointed by Policy Board members, or elected to at-large posts by the committee members. A maximum of 27 CAC members are allowed. In 2015, Policy Board approved the CAC's proposal to develop a specific plan to engage local students in volunteering to improve the bay. CAC members are currently building a pilot community engagement effort to involve Eckerd College students in bay restoration. Long-range goals are for this effort to become a self-sustaining partnership and continue to find partners at local universities (see Action PE-1).

In 2017, as part of its Strategic Plan, TBEP contracted an evaluation of the effectiveness of the Program’s education and outreach. Recommendations will be considered by Policy Board as part of a 5-Year Communication Plan for priorities and CAC involvement.

As education will always be needed, this action should remain in the CCMP in perpetuity. Future implementation should capitalize on existing programs and partnerships wherever possible, but TBEP should also continue its leadership role in identifying areas of need and developing innovative, effective and measurable programs to inform citizens about the bay and involve them in its protection.

**STRATEGY:**

**Activity 1**

Continue to provide education and key messages tailored to the demographic, cultural and generational characteristics of key audiences, utilizing social science research methods to analyze and understand audiences and develop messages. Improve evaluation of the effectiveness of products and programs. Implement a long-range Communications Plan to assist in prioritizing and implementing educational programs and enlisting partners, including the CAC.

*Responsible parties:* TBEP, TBEP Community Advisory Committee

*Timeframe:* Communications Plan to be finalized in 2017

*Cost and potential funding sources:* $-$$$$ CWA

Section 320 funds, federal or state education grants

*Location:* Baywide

*Benefit/Performance measure:* Number of people reached. Number of people engaging in recommended behaviors.

*Results:* Educational programs that engage diverse audiences in meaningful, relevant and measurable ways.

**Activity 2**

Continue to deliver targeted messages via diverse methods to diverse audiences by incorporating evolving communication tools to reach people effectively, including expanded use of platforms and applications designed for mobile devices, video storytelling and learning, mapping and virtual reality experiences. Coordinate and share lessons learned and new technologies through a regional education group.

*Responsible parties:* TBEP, FWC, FDEP, EPCHC, FIO, The Florida Aquarium, local cities and counties with environmental education programs; TBRPC Agency on Bay Management Public Information Committee could assist with regional coordination

*Timeframe:* Ongoing

*Cost and potential funding sources:* $-$$$$ CWA

Section 320 funds

*Location:* Baywide

*Benefit/Performance measure:* Number of people reached. Number of people engaging in recommended behaviors.

*Results:* Increased cost-efficiency and overall effectiveness of educational programming.

Activity 3

Expand availability of educational messaging in Spanish or other languages as appropriate to target key demographic sectors in the Tampa Bay community.

*Responsible parties:* TBEP, FWC, FDEP, EPCHC, local cities and counties

*Timeframe:* Ongoing

*Cost and potential funding sources:* $-$$$$ CWA

Section 320 funds

*Location:* Baywide

*Benefit/Performance measure:* Number of products and programs available in Spanish and other languages.

*Results:* Educational programming that reaches the full diversity of the Tampa Bay community.

*Deliverables:* Evaluation summaries analyzing audiences reached and success of various communication tools and programs for informing and fostering behavior changes to benefit the bay.

Activity 4

Allocate a portion of the annual Bay Mini-Grant funding to help meet priority outreach needs identified
in TBEP’s Communications Plan and Workplan. See Action FW-1 for recommendation to allocate percentage of Mini-Grants to address management of imperiled species in bay watershed, including education about them.

**Responsible parties:** TBEP, TBEP’s Community Advisory Committee

**Timeframe:** Beginning in 2018

**Cost and potential funding sources:** $–$$
Revenues from sales of Tampa Bay Estuary License Plate

**Location:** Baywide

**Benefit/Performance measure:** Percentage of Bay Mini-Grant funding dedicated to priority needs.

**Results:** Implementation of priority educational initiatives.

**Deliverables:** Final reports from each Mini-Grant recipient summarizing project, community involvement, educational metrics achieved and environmental benefits.
OBJECTIVES: Provide adequate and appropriate public access to the bay, and support responsible recreational use and enjoyment.

STATUS: New Action

RELATED ACTIONS: BH-3 Reduce propeller scarring of seagrass and pursue seagrass transplanting opportunities
BH-4 Identify hard bottom communities and avoid impacts
COC-4 Identify and understand emerging contaminants
FW-1 Increase on-water enforcement of environmental regulations
FW-6 Preserve the diversity and abundance of bay wildlife
PE-1 Promote public involvement in bay restoration and protection
PE-2 Promote public education about key issues affecting Tampa Bay
PH-5 Reduce pollution from recreational boaters

BACKGROUND: Tampa Bay is renowned for its spectacular waters, bay habitats and fish and wildlife. It provides popular recreational opportunities to residents and visitors alike and is foundational to the community's quality of life. Every year, outdoor recreation in Florida generates over $38 billion in consumer spending, resulting in over 329,000 direct jobs, $10.7 billion in wages and salaries and $2.5 billion in state and local taxes.1,2

Almost 3 million residents call the Tampa-St. Petersburg-Clearwater Metropolitan Area home.3 Another 5 million people visit the area each year. Continued growth of resident and tourist populations will create challenges for managers to ensure adequate and appropriate public access, while managing suitable and responsible recreational uses, natural resource protection and user conflicts.

Public Access

Providing adequate and appropriate access to recreational opportunities in Tampa Bay is essential to supporting the economy and quality of life of residents. Nurturing interest and personal connections to the bay is important to building public support and partnerships for community-based stewardship. In addition, preserving coastal habitats and open space will be critical over the long term for maintaining options to adapt and respond to sea level rise and other climate change stressors.

Private ownership and development of bay shorelines must be balanced with adequate opportunities for public access in appropriate locations. Recreational opportunities should be accessible to residents of all physical abilities and income levels; important fishing piers and shoreline fishing areas, for example, have been lost in recent years, decreasing opportunities for anglers without boats.

Cities like Tampa, Bradenton and St. Petersburg are leveraging their public waterfronts as recreational and cultural centerpieces and seeking to expand access to them. Use of the area's impressive network of city, county, and state parks and conservation lands is increasing as the region's population surges. Encroaching development presents challenges in maintaining the integrity of these green spaces. Furthermore, conservation and recreation lands are often managed by the same staff, creating potential conflicts in stewardship of those lands.

Acquisition of Parks and Preserves

The State of Florida, Southwest Florida Water Management District (SWFWMD) and local government land-buying programs in Hillsborough, Pinellas, Manatee and Pasco Counties work to secure public access and responsible recreational opportunities in Tampa Bay.

Fishing from boats, kayaks, piers or shore is the most popular water-based recreational activity in the bay area. Photo by Neil Taylor.
The State of Florida has a long history of citizen-driven and bipartisan political support for purchasing conservation land. The Florida Legislature created the Land Acquisition Trust Fund in 1963 to acquire and improve natural areas, including conservation easements, wildlife management areas, wetlands, forests, beaches and shores, recreation trails and parks, urban open space and lands protecting water. The Fund also improves public access and recreational use of conservation lands.

Florida Forever, the state’s signature conservation and recreation lands acquisition program, together with its predecessor Preservation 2000, has purchased more than 2.4 million acres of environmentally sensitive and recreational lands. On average, these programs spent $275 million a year from 1990 to 2008. In 2009, the Legislature did not fund Florida Forever, and between then and 2016 an average of only $129 million per year has been allocated to the program, despite a large back-log of priority projects.

In 2014, seeking to restore greater funding for acquiring conservation lands, 75% of Florida voters approved an amendment to the Florida Constitution to direct 33% of net revenue from the existing excise tax on documents to the Land Acquisition Trust Fund. Despite this historic intervention, funding for acquisition and restoration of conservation and recreation lands has not increased.

In recent years, most acquisition within the Tampa Bay watershed has been accomplished by Southwest Florida Water Management District (SWFWMD) or local government partners:

- Every year, about 2.5 million people visit public conservation lands acquired by the SWFWMD and its partners to protect Florida’s water resources. Many state and local parks are owned by SWFWMD and managed cooperatively for recreational uses with local or state government agencies. Those uses are as wide-ranging as hunting, hiking, wildlife watching, bicycling and picnicking.

- Hillsborough County’s nationally recognized, voter-approved Jan K. Platt Environmental Lands Acquisition and Protection Program (ELAPP) manages more than 61,000 acres of environmentally sensitive wildlife habitat and corridors. ELAPP is the largest local environmental land acquisition program in Florida.

- Manatee County has provided notable leadership in expanding its popular network of coastal nature preserves, such as Perico, Robinson, Neal, Rye and others. Manatee also has constructed dedicated nature centers that offer citizens opportunities to learn about and enjoy bay habitats and wildlife.

- Pinellas County has a parks network that is a model nationwide, and its two major preserves, Brooker Creek and Weedon Island, provide access to the largest remaining tracts of undeveloped land in the county. Large education centers at Brooker Creek and Weedon Island deliver a variety of educational programs and guided outdoor experiences, and support training for citizen-science monitoring efforts. In FY 2015, Brooker Creek Preserve hosted 21,158 visitors to its Education Center and 6,315 program attendees. Weedon Island Preserve hosted 12,391 visitors at the Education Center and 5,114 program participants.

**Water Access via Boat and Kayak Launches**

Boat ramps are typically funded by local governments and the state Boating Improvement Trust Fund. Local governments have expanded existing ramps with additional launch bays (e.g., Fort De Soto and Salty Sol at Gandy Bridge); however, on fair-weather weekends the ramps are often full to capacity, so more ramp capacity or additional access points will be needed to satisfy demand.

The Florida Fish and Wildlife Conservation Commission (FWC) maintains an online Public Boat Ramp Finder, which provides important information for hundreds of boat ramps in Florida. The Finder includes information about 44 ramps in Pinellas County, 22 in Manatee County, 33 in Hillsborough County and 13 in Pasco County. The Tampa Bay Boating and Angling Guide also lists boat ramps and marinas. Bay Area counties provide web-based maps and information about paddling trails and kayak launch sites.

FWC’s Boating and Waterways Section works to identify sites for potential new boat ramps and those in need of renovation or expansion. FWC also builds and renovates boat ramps on state-owned lands and administers grant programs for ramps and other boating-related activities. Identifying sites for new boat ramps must take into consideration potential impacts to adjacent natural areas, as well as proper storage of waste, fuels and oil from vessels (see Action PH-5). Prioritizing areas where shoreline or development impacts have already occurred is one solution.

The federal Sport Fish Restoration Act uses taxes collected on fishing tackle and motor fuels and import duties on tackle and yachts to fund research, management and development of activities related to sport fishing and boater access. Federal law stipulates that 15% of these funds go to building and repairing boat ramps. Some funds are also used for boater and angler education.

**Responsible Enjoyment of the Bay**

A wide range of recreational opportunities exist in Tampa Bay, including wildlife viewing and photography, boating, kayaking, paddle-boarding, fishing, diving and snorkeling. Public land managers address issues as diverse as illegal hunting and fishing; damage to plant and wildlife from users who ignore access restrictions and stay from marked trails; illegal dumping; and release of unwanted pets and/or invasive species into conservation areas. Emerging issues include use of drones that may disturb wildlife or recreational users.

Kayakers explore Clam Bayou, a restored habitat spanning Gulfport and St. Petersburg. Photo by Marcia Biggs.
Wildlife Viewing

Wildlife viewing is a popular activity to learn about and promote conservation. However, irresponsible viewing practices can disturb and injure animals and impact sensitive habitats. For example, birdwatchers and photographers sometimes get too close to colonial nesting birds on mangrove islands. Such disturbance can frighten birds from their nests, exposing their young to the elements and predation. It can even cause birds to abandon nests permanently (see Action FW-6 for other concerns related to beach-nesting and colonial nesting birds).

In 2016, the FWC created and expanded Critical Wildlife Areas (CWA) to protect colonial nesting birds on bay mangrove islands. The Alafia Banks CWA was re-established with 100-foot buffers, the addition of Sunken Island and year-round closure. The Dot-Dash-Dit CWA, three mangrove islands at the mouth of the Braden River, was newly established with 100-foot buffers and seasonal closure.

Ethical standards and best practices for bird photographers are published by the American Birding Association and Audubon. The National Oceanic and Atmospheric Administration (NOAA) publishes guidelines for viewing protected sea turtles and marine mammals, including dolphins and manatees. General guidelines for other wildlife viewing and photography are available from the National Wildlife Federation.

Boating/Mooring Fields

As Florida’s largest estuary, Tampa Bay is a boating paradise. According to the Florida Department of Highway Safety and Motor Vehicles, 130,648 boats were registered in Pasco, Pinellas, Hillsborough and Manatee Counties in 2015. Improper boating can damage habitat and harm fish and wildlife. For example, boat groundings and improper anchoring can impact hard bottom habitats (see Action BH-4) and seagrass (see Action BH-3). Excessive wakes can cause shoreline erosion and habitat loss (see Action FW-6). Inattentive operators can run over manatees, dolphins and sea turtles. Fuel spills, improper disposal of wastewater, and marine debris can pollute waterways (see Action FW-1).

Mooring fields provide a mechanism for both increasing and managing boating access. They can reduce boating-related impacts (such as waste discharges and anchoring damage to seagrasses) associated with liveaboards and concentrate boats where essential services are more easily provided. Sarasota and Gulfport have popular mooring fields that are consistently at capacity in the winter, when seasonal boaters arrive. Appropriate siting of mooring fields is critical. DEP recently adopted a new environmental resource general permit for public mooring fields. This rule allows public mooring fields for up to 100 boats under certain conditions, including a demonstration of minimal adverse environmental effect on water resources.

On-water enforcement of environmental regulations is primarily handled by FWC, whose resources are stretched thin (see Action FW-1). As a result, boater education and the adoption of ethical boating practices are key to preventing environmental impacts, before enforcement is necessary.

Marine Debris

Marine debris describes any manmade material lost or discarded into the ocean. Roughly 80 percent of marine debris originates from land-based sources; the remaining 20 percent enters the ocean through dumping. The most common marine debris includes...
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plastics, glass, metals, paper, cloth, rubber and wood. Plastics, which are durable and slow to degrade, make up about 60 to 80 percent of floating marine debris. Every year, about 8 million metric tons of plastic become marine debris in the world’s oceans. As plastics degrade, they may release toxic pollution or promote adhesion of toxins to small debris, which can be consumed and accumulate in the marine food chain. Most plastics do not fully degrade in the ocean, but instead break down into smaller and smaller pieces (see Action COC-4).

Marine debris can scour, break and smother important marine habitat. Wildlife can ingest marine debris, causing malnutrition, internal injury or blockage, leading to starvation and death. Wildlife can also become entangled in marine debris, especially derelict fishing gear like abandoned nets, traps and monofilament fishing line, leading to injury, illness, suffocation, starvation and death. Federal law prohibits dumping of any plastic in U.S. waters. Keep America Beautiful Affiliates, Tampa Bay Watch and other local non-profits engage citizen volunteers to clean up marine debris and derelict fishing gear (see Action PE-1).

Ethical Recreational Fishing

Florida is world-renowned for its recreational fishing. In 2012, recreational anglers in Florida spent nearly $5 billion, supporting more than 80,000 jobs. Overfishing has imperiled many fish populations, resulting in adoption of strict fishing regulations. Both NOAA and FWC promote ethical fishing and boating practices, including catch-and-release of valuable sportfish, proper disposal of monofilament line and tackle, and proper stowage and disposal of trash.

The Tampa Bay Estuary Program (TBEP) has been a leader in providing boater and angler education, partnering with FWC, Audubon and other organizations to produce printed and web-based boating and angling guides to the bay; an Ethical Angler Wallet Card showing harvest and bag limits for popular sportfish, in both English and Spanish; and Bay-Friendly Boater Kits coordinated by TBEP’s Manatee Awareness Coalition (see Actions PE-2, FW-1 and FW-6).

Hunting

Hunting is an important outdoor sport in areas of the bay watershed. As waterfowl populations have increased, duck hunting has become a popular activity in southern Hillsborough County from the Bullfrog Creek area south to the Little Manatee River. Hunters can be important advocates for land acquisition and management; however, conflicts between hunters, fishermen and even waterfront residents in duck-hunting areas will need to be addressed with growth and increased recreational use of the bay’s southeast shore.

Strategy: Activity 1

Support adequate and appropriate public access to fish, paddle, sail, view wildlife, hike, or simply enjoy unobstructed natural and scenic views of the bay and its watershed. Support acquisition, restoration and comprehensive management of conservation and
recreational lands. Support appropriately sited boat and kayak launches, mooring fields and paved or unpaved trails. Collect data necessary to identify areas where additional access is warranted.

**Responsible parties:** Local government partners, SWFWMD, FWC, FDEP (for mooring fields, state parks and preserves), TBEP, Florida Sea Grant (potential partner for research on boating patterns and needs analysis of marinas, boat ramps, mooring fields)

**Timeframe:** Ongoing

**Cost and potential funding sources:** $$$$ Florida Land Acquisition Trust Fund, Florida Forever, ELAPP, Florida Boating Improvement Trust Fund, city- and county-directed ad valorem revenues, Deepwater Horizon economic damage recovery funds

**Location:** Baywide

**Benefit/Performance measure:** Adequate and appropriate public access to Tampa Bay for recreational uses.

**Results:** Improved public access to Tampa Bay. Increased public awareness of bay habitats, fish and wildlife. Protection and restoration of important bay habitats and populations of fish and wildlife. Increased support for bay management.

**Deliverables:** Improved public access to Tampa Bay through additional public lands, kayak launches, boat ramps and mooring fields. Maps of public access paired with recreational activities.

**Activity 2**

Support existing initiatives that foster ethical outdoor recreation, including Leave No Trace, the Florida Master Naturalist Program and youth programming provided by FWCS Youth Conservation Center in Apollo Beach. Support responsible enjoyment of the bay through demographically and culturally targeted outreach and education to residents and visitors, as well as research and enforcement including:

- **Fishing:** fishing regulations, ethical fishing practices including proper catch and release procedures and monofilament and trash disposal.
- **Wildlife Viewing:** ethical wildlife interactions with birds, manatees, dolphins, sea turtles and other wildlife.
- **Boating:** safe boating practices, fuel spill prevention, observed speed zones, reduced impacts to habitats including prop-scar damage to seagrass and impacts to hard bottom communities, boater pollution prevention including wastewater discharge, marine debris and derelict vessels.

**Responsible parties:** FWC, TBEP, local government partners, tourism agencies such as Visit St. Pete/Clearwater and Visit Tampa Bay for messages about responsible enjoyment for visitors

**Timeframe:** Ongoing

**Cost and potential funding sources:** $–$$$

**Location:** Baywide

**Benefit/Performance measure:** Improved public understanding about best practices regarding recreational uses of the bay including wildlife viewing, boating and fishing. Behavior changes resulting in reduced per capita impacts to bay resources from improper recreational practices.

**Results:** Reduced damage and loss of bay habitats and fish and wildlife. Increased public awareness and support for bay management.

**Deliverables:** Research, education, outreach and enforcement of best management practices and regulations for responsible recreational uses.

**Activity 3**

Support education, outreach and enforcement to reduce user conflicts among competing uses (e.g., kayakers versus boaters versus personal watercraft enthusiasts, commercial versus recreational users, hunters versus hikers or anglers, public versus private access and use.)
OBJECTIVES:
Identify coastal habitats vulnerable to climate change and potential buffer areas upslope of coastal habitats. Identify methods to improve the resiliency of vulnerable bay habitats to sea level rise. Continue to investigate the carbon sequestration benefits of coastal habitats (“blue carbon”). Enhance community understanding of the potential impacts of changing climate on coastal habitats, and encourage actions to help mitigate effects.

STATUS:
New action adopted in 2014 to support ongoing and future research and restoration or mitigation of sea level rise and other projected climate change impacts on coastal habitats.

RELATED ACTIONS:
BH-1 Implement the Tampa Bay Habitat Master Plan
BH-6 Encourage habitat enhancement along altered waterfront properties
BH-8 Expand habitat mapping and monitoring programs
BH-9 Enhance ecosystem values of tidal tributaries
CC-2 Understand and address effects of ocean acidification

BACKGROUND:
Estuaries like Tampa Bay are particularly vulnerable to many climate change stressors, such as sea level rise (SLR), warming temperatures and changes in precipitation and storm intensity. These stressors pose a variety of risks to coastal habitats. Sea level rise may increase shoreline erosion and lead to loss of beaches, salt marshes and coastal wetlands. As higher salinity waters move upslope and upstream, plant zonation will shift, where adjacent areas are developed and there is no room to migrate, coastal wetlands will become submerged. Warmer waters may promote the spread of existing or new invasive species, increased algal growth rates, decreased water clarity and low dissolved oxygen. Frequent drought or extreme flooding may alter hydrologic conditions resulting in changes to species composition and ecological function of habitats. Increased storm intensity may lead to increased nutrient pollution to the bay and shoreline erosion.

Blue Carbon
Coastal habitats are among the first to experience these impacts, but also have an important role in mitigating their effects. Tidal wetlands and seagrass habitats take up carbon dioxide and store so-called “blue carbon” in plant biomass and associated wet soils. Blue carbon ecosystems — seagrass beds, mangroves and salt marshes — store carbon at roughly 25 times the annual rate of temperate and tropical forests. This is due to high primary productivity and efficiency in trapping sediments and associated carbon transported by runoff and tidal flow. In addition, seagrass beds may have a localized mitigating effect on ocean acidification (see Action CC-2).
Climate Change. The projections are regionally corrected to the NOAA tide gauge in St. Petersburg and range from 0.5 to 2.5 feet in 2050 and 1 to 7 feet in 2100.

TBEP evaluated potential impacts and management implications of sea level rise on Tampa Bay’s critical coastal habitats such as mangroves, salt marshes and salt barrens. Modeled habitat changes showed an overall loss of critical coastal habitats by 2100, with mangrove forests increasing at the expense of salt marshes and salt barrens. Protecting remaining coastal wetland ecosystems remains an important priority for TBEP (see Action BH-1).

In 2016, baseline monitoring was completed at five permanent transects throughout Tampa Bay as part of the Critical Coastal Habitat Assessment (CCHA) program. The overall goal of the long-term monitoring program is to track and assess the effects of sea level rise on the natural zonation of critical coastal habitat (i.e., mangroves, saltmarsh, salt barrens and coastal uplands) in Tampa Bay. The monitoring design seeks to collect comparable data on sites with human-related impacts, as well as other ancillary effects, such as shifts in plant or animal communities. The CCHA will be expanded to five more sites in 2017, with the assistance of a Wetland Development Grant from the U.S. Environmental Protection Agency. Future assessments at these locations will allow comparison of habitat zonation and condition over time.

Establishing upslope habitat ‘refugia’ may allow coastal wetlands to persist under anticipated climate change and SLR impacts and provide new areas for recreational opportunities. Where upslope migration of coastal habitats is impeded by development, strategies such as implementing rolling easements, funding public land acquisition, requiring wetland conservation as part of new infrastructure, prohibiting construction of hardened shorelines and promoting living shorelines may be recommended (see Action BH-6). Where downstream sediment transport is necessary to protect wetlands and promote blue carbon, removal of barriers may be recommended (see Action BH-9).

Already, sea level rise is being addressed in habitat restoration projects conducted by the Southwest Florida Water Management District’s (SWFWMD) Surface Water Improvement and
tides. Citizen photos were featured on a photo-sharing website, and a traveling exhibition was viewed by more than 155,000 people at county buildings, libraries and museums throughout the Tampa Bay watershed.

**STRATEGY:**

**Activity 1**
Identify coastal habitats most vulnerable to impacts of climate change and potential buffer areas upslope of coastal habitats. Identify effective methods to improve the resiliency of vulnerable bay habitats to sea level rise.

*Responsible parties:* TBEP (lead), SWFWMD, USFWS, local governments

*Timeframe:* Initiated in 2017, through the Tampa Bay Habitat Masterplan

*Cost and potential funding sources:* $$ CWA Section 320 funds, RESTORE Act, local partners

*Location:* Baywide

*Benefit/Performance measure:* Evaluation of coastal and adjacent upland habitat quality and methods for conservation and restoration appropriate to projected sea level rise scenarios.

*Results:* Better information for management decisions on critical bay habitats.

*Deliverables:* Updated list of vulnerable areas to be prioritized for acquisition and restoration activities. Report on best practices for habitat conservation and restoration in the face of sea level rise.

**Activity 2**
Continue to implement Critical Coastal Habitat Assessment monitoring at permanent transects to track long-term changes from climate change and other stressors to coastal habitats and species.

*Responsible parties:* TBEP (lead), local government and agency partners

*Timeframe:* Finalize baseline data collection in 2017, then every 5 years after that

*Cost and potential funding sources:* $$$ CWA Section 320 funds, grants

*Location:* Permanent transects throughout the bay

*Benefit/Performance measure:* Evaluation of change in habitat extent and quality over time.

*Results:* Proactive management decisions for critical bay habitats that consider climate change, land use changes and effects from other factors.

*Deliverables:* Final report of initial baseline monitoring, then reports evaluating successive changes observed every five years.

**Activity 3**
Support and assist with purchase, protection and/or restoration of priority sites to serve as climate change refuges and upslope buffers for critically important habitats and species. Support adoption of land management strategies such as rolling easements, coastal construction setbacks and living shorelines.

*Responsible parties:* SWFWMD, USFWS, FDEP, other state, federal and local government land acquisition programs and land trusts; FDOT, CSX, TECO and other entities that own or manage linear properties, easements or infrastructure, as appropriate

*Timeframe:* Priority list of environmental lands is updated every 10 years as part of the update to the Habitat Master Plan, scheduled for completion in 2018

*Cost and potential funding sources:* $$$-$$$$ federal, state, regional and local land acquisition programs, grants

*Location:* Baywide

*Benefit/Performance measure:* Restored and protected habitat used by fish and wildlife and for recreational opportunities resilient to near-term sea level rise projections.

*Results:* Increased quantity and quality of climate-resilient coastal habitats.

*Deliverables:* Annual reporting of protected and restored habitat, as required by the Government Performance and Results Act.

**Activity 4**
Continue to identify carbon sequestration benefits and economic incentives to preserve coastal habitats through voluntary carbon markets or other mechanisms. Assist land management agencies in developing site management plans that maximize carbon sequestration benefits of appropriate coastal habitats held in preservation or conservation.

*Responsible parties:* Restore America’s Estuaries, TBEP, academic institutions, SWFWMD, local governments, FDEP

*Timeframe:* Initiate by 2019

*Cost and potential funding sources:* $$$ External grants, TBERF, EPA CRE

*Location:* Baywide

*Benefit/Performance measure:* Evaluation of blue carbon cost-benefit solutions.

*Results:* Better information for management decisions and incentives for conserving and restoring critical bay habitats.
**Deliverables:** Updated report on blue carbon storage potential for Tampa Bay habitats. Site management plans for maximizing carbon sequestration benefits of coastal habitats.

**Activity 5** Enhance community understanding of the potential impacts of climate change on coastal habitats, and encourage actions by state and local entities and citizens to help adapt to or mitigate effects. Develop metrics to measure citizen outreach effectiveness.

**Responsible parties:** Florida Sea Grant, local government sustainability programs, TBEP, UF/IFAS Extension, St. Petersburg College Sea Level Rise Group

**Timeframe:** Ongoing

**Cost and potential funding sources:** $$$ Operating budgets of partner organizations; CWA Section 320 funds and/or Bay Mini-Grants for TBEP activities, other grants

**Location:** Baywide

**Benefit/Performance measure:** Public education and outreach programs with metrics for engagement and behavior change.

**Results:** Citizen engagement in habitat restoration volunteer projects and behavior changes to adopt recommended mitigation actions.

**Deliverables:** Educational outreach materials and program metrics.

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CLIMATE CHANGE

Understand and address effects of ocean acidification

OBJECTIVES:

Improve understanding of acidification status of Tampa Bay. Examine potential role of seagrasses in Tampa Bay to buffer ocean acidification trends in the Gulf of Mexico and provide refuges for organisms vulnerable to increasing acidification. Include ocean acidification issues and mitigation solutions in outreach and education materials.

STATUS:
New Action

RELATED ACTIONS:

BH-1 Implement the Tampa Bay Habitat Master Plan
CC-1 Improve ability of bay habitats to adapt to a changing climate
FW-3 Achieve a sustainable bay scallop population
FW-6 Preserve the diversity and abundance of bay wildlife

BACKGROUND:

Despite the vast size of the oceans, data show that ocean chemistry has shifted in response to increased carbon dioxide in the atmosphere. Carbon dioxide reacts with sea water to produce carbonic acid, increasing the acidity (lowering the pH) of seawater. This phenomenon, known as ocean acidification (OA), has produced a 30% increase in ocean acidity since the Industrial Revolution (a decrease in pH of 0.11). As the concentration of carbon dioxide in the atmosphere increases, the ocean absorbs more of it, and as surface layers gradually mix into deep water, the entire ocean is affected.

The decrease in ocean pH disrupts the balance of minerals in the water and makes it more difficult for marine organisms such as shellfish, plankton and corals to produce and maintain calcium carbonate, the primary component of their hard skeletons and shells. Ocean acidification can cause deformities in larval stages of organisms, increasing mortality. In some species of shellfish and fish, especially in the juvenile stages, OA can also impair metabolism, immune system, sensory functions and reproduction. This can impact the entire marine food web and negatively affect recreational and commercial fisheries.

Long-term water quality monitoring data from the Environmental Protection Commission of Hillsborough County (EPCHC) indicates that pH in the Tampa Bay estuary has actually steadily increased (become more basic) since the 1980s, as local management strategies improved water quality and seagrass abundance. Seagrasses are expected to benefit from elevated atmospheric carbon dioxide through increased primary productivity, and photosynthesis can increase seawater pH and availability.

TAMPA BAY SEAGRASS ACREAGE VERSUS PH LEVELS

Green bars represent seagrass acreage; points represent average mid-depth pH. SOURCE: EPCHC and SWFWMD

Ocean carbon versus ocean pH. SOURCE: Intergovernmental Panel on Climate Change.
In 2016, Tampa Bay Estuary Program (TBEP) along with the United States Geological Survey (USGS), Florida Fish and Wildlife Commission’s Fish and Wildlife Research Institute (FWC FWRI) and University of South Florida (USF) College of Marine Science (with equipment funded by a U.S. Environmental Protection Agency grant) initiated an intensive OA monitoring program in Tampa Bay. The program will examine the extent to which seagrass recovery has helped buffer the chemical impacts of ocean acidification.

Sampling in seagrass beds and adjacent bare substrates will evaluate the role of seagrass beds in maintaining and elevating pH. Spatial and temporal differences within the estuary, as well as the effects of inflow and circulation, will be evaluated. Additionally, a continuous pH monitoring system will be co-located with an existing monitoring platform in the middle of the bay; a companion station is proposed for Gulf waters near Port Manatee. Results from these studies will be useful to examine implications for Tampa Bay shellfish populations, identify potential habitat protection and restoration activities and support regional and Gulfwide ocean acidification assessments.

Actions already being taken to reduce CO2 emissions from the burning of fossil fuels will help slow the effects of ocean acidification. Furthermore, conserving and restoring marine habitats will strengthen ecosystem resilience to climate change and enhance ecosystem health (See Actions CC-1, BH-1, FW-3 and FW-6).

Reducing nutrient loading to estuaries can also help prevent acidification caused by excess CO2 production when nutrient-fueled algal blooms die and decay. Continuing to manage nutrient loading to Tampa Bay is therefore an important action that also helps address global ocean acidification (see Actions WQ-1, WQ-3, SW-1, SW-8 and SW-10).

**STRATEGY:**

**Activity 1**

Improve understanding of ocean acidification levels in Tampa Bay. Establish at least one long term monitoring station within the Tampa Bay estuary and one directly outside the bay to track changes in Tampa Bay estuarine and Gulf of Mexico pH conditions. Co-locate stations with existing ecological or meteorological monitoring platforms.

**Responsible parties:** USGS (lead), USF College of Marine Sciences, FWC FWRI, TBEP

**Timeframe:** Initiated in 2016. Funding for bay pH monitoring station through 2018; funding not yet secured for Gulf of Mexico pH monitoring station.

**Cost and potential funding sources:** $$ EPA grants, additional federal grants, TBERF

**Location:** Baywide

**Benefit/Performance measure:** Long-term measurements of seawater pH inside and outside the bay.

**Results:** Better understanding of environmental conditions important for conservation and restoration of critical habitats, fish and shellfish populations.

**Deliverables:** Periodic reports on water quality parameters tracking long-term changes in pH.

**Activity 2**

Investigate the potential role of seagrass in Tampa Bay to buffer ocean acidification trends in the open Gulf and provide refuge to organisms vulnerable to acidification.

**Responsible parties:** USGS (lead), USF College of Marine Science, FWC FWRI, TBEP, academic and agency partners

**Timeframe:** Initiate in 2017

**Cost and potential funding sources:** $$ federal grants, TBERF

**Location:** Baywide

**Benefit/Performance measure:** Measures of water chemistry in seagrass beds and adjacent bare substrates over time.

**Results:** Increased seagrass coverage may provide OA refugia and contribute to the overall resilience and health of the bay’s ecosystem as climate changes.

**Deliverables:** Reports evaluating the spatial and temporal effect of seagrass buffering.

**Activity 3**

Expand education about ocean acidification, including economic impacts related to OA, such as reduced shellfish harvest, reduced blue crab or stone crab harvests, impact on oyster and scallop restoration efforts and reduced fitness of important juvenile fishery species.

**Responsible parties:** USGS (lead), USF College of Marine Science, FWC FWRI, TBEP, academic and agency partners

**Timeframe:**

**Cost and potential funding sources:** $$

**Location:**

**Benefit/Performance measure:**

**Results:**

**Deliverables:**

Increasing acidification of coastal waters can affect the viability of oysters and other organisms that produce calcium carbonate for their shells. Photo by Nanette O’Hara.
**Responsible parties:** Florida Sea Grant, TBEP

**Timeframe:** Initiated by 2018

**Cost and potential funding sources:** $ Grant funds, staff time

**Location:** Baywide

**Benefit/Performance measure:** Public education and outreach programs with metrics for engagement and behavior change.

**Results:** Citizen engagement in habitat restoration projects and community behavior changes that adopt recommended, locally-relevant mitigation.

**Deliverables:** Education and outreach materials and program metrics.
Incorporate CCMP goals and actions in local government comprehensive plans, land development regulations or ordinances.

**OBJECTIVES:**
Encourage local government stakeholders to identify and prioritize goals and actions from Tampa Bay Estuary Program’s Comprehensive Conservation and Management Plan (CCMP) that relate to their own efforts. Demonstrate links between CCMP goals and actions to the most appropriate elements of local government comprehensive plans, land development regulations, code of ordinances or other guidance documents. Provide model language based on CCMP goals and actions that can be adopted or adapted by TBEP local government partners in their planning and guidance documents.

**STATUS:**
New Action

**RELATED ACTIONS:**
All CCMP Actions

**BACKGROUND:**
The Tampa Bay Estuary Program (TBEP) first adopted a science-based Comprehensive Conservation and Management Plan (CCMP) for Tampa Bay in 1997. Major updates were completed in 2006 and 2017. The CCMP presents strategies for addressing water and sediment quality, bay habitats, fish and wildlife, dredging, spill prevention and response, invasive species, climate change and public involvement, access and education throughout the bay watershed.

Through the Interlocal Agreement, TBEP and its partners have made significant, measurable progress in restoring and protecting Tampa Bay. Many local government partners already have adopted goals, objectives and policies consistent with the CCMP as part of their local comprehensive plan. Some have adopted ordinances that address specific actions, such as restricting urban fertilizer use.

While comprehensive plans are critical big-picture blueprints that set the direction for a community’s growth, a diverse suite of tools — including land development regulations, guidance manuals and codes of ordinances — are vital to implementing the broader vision. Enhanced bay restoration and protection could be achieved by incorporating CCMP goals and actions directly into these existing planning tools. For example, TBEP’s habitat restoration targets could be formally adopted in conservation and coastal management elements of local comprehensive plans, and supported by specific regulations. This would support acquisition and restoration of critical coastal habitats, as well as policies for adaptation and/or mitigation of climate change impacts. Similarly, CCMP actions to reduce vehicular sources of atmospheric nitrogen pollution and greenhouse gases could be incorporated into policies to diversify public transit options.

The 2017 CCMP Update provides multiple additional areas in which concrete, actionable guidance could be incorporated into both comprehensive plans and land development regulations, such as expanding the use of Green Infrastructure (see Action SW-10) or non-structural “Living Shorelines” (see Action BH-6) instead of hardened seawalls.

In 2016, TBEP contracted with the Tampa Bay Regional Planning Council (TBRPC) to provide guidance to local governments on how to incorporate elements of the CCMP into existing comprehensive plans, land development regulations or other guidance documents. The agreement represents a pledge by TBEP’s partners to work together to accomplish CCMP goals and actions.

Through the Interlocal Agreement, TBEP and its partners have made significant, measurable progress in restoring and protecting Tampa Bay. Many local government partners already have adopted goals, objectives and policies consistent with the CCMP as part of their local comprehensive plan. Some have adopted ordinances that address specific actions, such as restricting urban fertilizer use.

While comprehensive plans are critical big-picture blueprints that set the direction for a community’s growth, a diverse suite of tools — including land development regulations, guidance manuals and codes of ordinances — are vital to implementing the broader vision. Enhanced bay restoration and protection could be achieved by incorporating CCMP goals and actions directly into these existing planning tools. For example, TBEP’s habitat restoration targets could be formally adopted in conservation and coastal management elements of local comprehensive plans, and supported by specific regulations. This would support acquisition and restoration of critical coastal habitats, as well as policies for adaptation and/or mitigation of climate change impacts. Similarly, CCMP actions to reduce vehicular sources of atmospheric nitrogen pollution and greenhouse gases could be incorporated into policies to diversify public transit options.

The 2017 CCMP Update provides multiple additional areas in which concrete, actionable guidance could be incorporated into both comprehensive plans and land development regulations, such as expanding the use of Green Infrastructure (see Action SW-10) or non-structural “Living Shorelines” (see Action BH-6) instead of hardened seawalls.

In 2016, TBEP contracted with the Tampa Bay Regional Planning Council (TBRPC) to provide guidance to local governments on how to incorporate elements of the CCMP into existing comprehensive plans, land development regulations or other guidance documents. The agreement represents a pledge by TBEP’s partners to work together to accomplish CCMP goals and actions.
The resulting Comprehensive Conservation & Management Plan – Local Government Comprehensive Plan Crosswalk Project aims to 1) prioritize CCMP goals and actions suitable for inclusion in local government comprehensive plans, land development regulations or other guidance documents, 2) identify relevant elements, goals, objectives and policies in local government regulatory frameworks to serve as the most appropriate vehicle for incorporating CCMP priority goals and actions, and 3) provide model language based on CCMP goals and actions for local government consideration.

The Crosswalk Project will share final recommendations and model language with local government officials, planners and resource managers at a regional workshop in 2018. Ongoing technical assistance will be provided to local governments as they consider adapting and adopting these recommendations in their comprehensive plans, land development regulations and other guidance documents.

Activity 1
Engage local government stakeholders to identify and prioritize CCMP goals and actions and create a matrix that relates those goals and actions to the most appropriate elements of local government comprehensive plans, land development regulations or other guidance documents.

Activity 2
Recommend model language, based on CCMP goals and actions, that can be adopted or adapted by TBEP local government partners in their comprehensive plans, land development regulations or other guidance documents.

Activity 3
Conduct a regional workshop to provide technical assistance to local governments and professional planners regarding strategies to incorporate relevant portions of the CCMP into comprehensive plans, land development codes or other guidance documents.

The Crosswalk Project will share final recommendations and model language with local government planners. These recommendations will be provided to local governments at a regional workshop in 2018. Ongoing technical assistance will be provided to local governments as they consider adapting and adopting these recommendations in their comprehensive plans, land development regulations and other guidance documents.

Responsible parties: TBRPC (lead), TBEP, local government partners (Hillsborough, Pinellas, Manatee and Pasco counties and the cities of Tampa, St. Petersburg and Clearwater)

Cost and potential funding sources: $5 TBEP, TBRPC

Location: Baywide

Benefit/Performance measure: Coordination and facilitation of incorporation of CCMP goals and actions in local government comprehensive plans, land development regulations or other guidance documents.

Results: Improved coordination and implementation of CCMP goals and actions by local government partners to restore and protect Tampa Bay Area natural resources.

Deliverables: Stakeholder meetings providing directed technical assistance to local governments and professional planners regarding strategies to integrate relevant goals and actions of the CCMP into comprehensive plans, land development codes or other guidance documents. A matrix of actions and goals from the CCMP cross-referenced with the appropriate elements, goals, objectives and policies of local government comprehensive plans.

Responsible parties: TBRPC (lead), TBEP, local government partners (Hillsborough, Pinellas, Manatee and Pasco Counties and the cities of Tampa, St. Petersburg and Clearwater)

Cost and potential funding sources: No additional cost, staff time only

Location: Baywide

Benefit/Performance measure: Coordination and facilitation to incorporate CCMP goals and actions in local government comprehensive plans, land development regulations or other guidance documents. Number of model goals, objectives and policies (GOPs) developed for consideration by local governments. Number of model GOPs incorporated into comprehensive plans, land development codes or other guidance documents. Number of participating local government partners.

Results: Improved coordination and implementation of CCMP goals and actions by local government partners to restore and protect Tampa Bay Area natural resources.

**Cost and potential funding sources:** $ CWA Section 320 funds

**Location:** Baywide

**Benefit/Performance measure:** Number of representatives of TBEP partner agencies and organizations participating. Number of CCMP goals, objectives and policies subsequently adopted as part of local government/agency planning tools and regulatory frameworks.

**Results:** Enhanced protection and restoration of bay habitats and water quality.

**Deliverables:** Report summarizing workshop, including matrix of goals and actions and suggested model language.
This chapter describes how Charting The Course: The Comprehensive Conservation and Management Plan for Tampa Bay will be implemented by local governments, agencies and other bay stakeholders, and discusses financing mechanisms to ensure that the goals of the Plan are achieved.

THE INTERLOCAL AGREEMENT

In 1998, local government and regulatory partners of the Tampa Bay Estuary Program formally affirmed their commitment to implementing the goals of Charting The Course through the adoption of a precedent-setting Interlocal Agreement.

The agreement, the first of its kind among the nation’s 28 NEPs, represented a binding pledge by TBEP’s major partners to work together to achieve bay recovery targets. The 1998 Interlocal Agreement also established the Tampa Bay Estuary Program as an Independent Special District under Florida Statutes; spelled out the governance structure of the program, and established funding contributions by the signatories based on population.

In 2015, the Interlocal Agreement was revised and restated to update or delete components deemed necessary by the Policy Board. In late 2015, Pasco County and the Manatee County Port Authority joined TBEP by executing a Joinder to the 2015 Interlocal Agreement, further strengthening the regional partnership. A key component of the update included a revised funding schedule and dues of our local government partners. The changes in funding are listed elsewhere in this section.

OTHER HIGHLIGHTS OF THE 2015 AGREEMENT INCLUDE:

- Participation by local governments, regulatory agencies and other organizations with a stake in the bay’s health. The seven largest local governments in the Tampa Bay region — the counties of Hillsborough, Pinellas, Manatee and Pasco and the cities of Tampa, St. Petersburg and Clearwater — are parties to the agreement, along with the Southwest Florida Water Management District, and the Florida Department of Environmental Protection. The Tampa Port Authority, Environmental Protection Commission of Hillsborough County, Florida Wildlife Commission’s Florida Fish and Wildlife Research Institute, Tampa Bay Water, Tampa Bay Regional Planning Council and Manatee County Port Authority are also signatories. A separate agreement was signed by the Region 4 of the U.S. Environmental Protection Agency, defining its support for implementing the Plan.
- The TBEP partners agreed to work together to collectively address CCMP Goals, and adopted measurable and achievable goals to maintain important water quality and seagrass gains.

FINANCING THE PLAN

TBEP has historically and will continue to pursue at least eight separate avenues to secure funding or in-kind support to finance operation of the base program and to advance implementation of the CCMP. The updated financing plan includes a balance of both dedicated and variable funding sources at federal, state, and local levels as well as private and non-profit sources.

The major objectives of the financing strategy are:

- Developing dedicated sources of funding to sustain the base operations of the TBEP, including personnel, administrative cost, community outreach, environmental monitoring and technical support.
- Securing dedicated and variable sources of funding that enhance implementation of the CCMP and maintain adequate progress toward bay restoration goals.

Dedicated Funding Sources

Currently, the following four funding sources provide dedicated or reasonably secure funding to support the base program and/or enhance CCMP implementation, over both the short-term and long-term.

- Federal NEP Funding. Each action plan in the Revised CCMP indicates whether it will be funded under the Clean Water Act Section 320, versus other funding sources. While the specific future annual appropriations under Section 320 are uncertain, there is strong Congressional support for the community-based conservation efforts of Tampa Bay and the 27 other estuaries that are part of...
the NEP. In 2016, Congress and the President signed into law the first reauthorization of the National Estuary Program (NEP) since it expired in 2010. The new law authorizes spending up to $26.5 million per year nationwide for the next five years, with 80% of the annual appropriations dedicated for NEP Programs. This reauthorization equates to a maximum of about $757,000 per NEP per year for the next 5 years, if annual appropriations equaled the authorized amount.

**Funding Commitments in 2015 Interlocal Agreement.**
The Interlocal Agreement (IA) through which the CCMP is implemented obligates local government and agency partners to fund TBEP costs approved by the Policy Board in the annual program budget. A key component of the 2015 IA update included a revised funding schedule and dues from local partners. The revised funding strategy calls for a minimum increase in annual dues of 2.5% per year for 5 years for those member governments contributing to the Tampa Bay Environmental Restoration Fund, and slightly higher annual dues for those members that do not contribute to TBERF. This funding commitment will allow TBEP to keep up with inflation and continue to provide support to our partners. When coupled with the anticipated federal NEP allocation administered through EPA and other external grants, local government and agency cash contributions are expected to meet the amount required to fully support program operations through 2021.

**Specialty License Plate.** Revenue from the Tampa Bay Estuary specialty license plate has generated more than $20 million since 2000, the first full year of plate sales. The Policy Board is authorized under the state law that created the Tampa Bay Estuary plate to use those funds for any type of projects that contribute to CCMP implementation. Over the last 10 years, the majority of these funds have been authorized to support TBEP’s successful Bay Mini-Grant Program. Bay Mini-Grants generate tens of thousands of dollars in grants for developing management tools and strategies, and comply with penalties. As of 2017, TBEP has five projects on the “approved priority funding list” for RESTORE funds, with another project in the planning phase. The six projects total $1,630,000 and include funds for TBEP as project coordinators. Several of our local partners have also submitted projects for other RESTORE funds that meet our CCMP objectives.

**Funding and Finances.**

**• Non-Federal Overmatch Fund.** TBEP maintains a Non-Federal Overmatch Fund that provides a source of matching funds for grants helping to implement the CCMP and serves as a contingency fund for continuing program operations in the event a major funding source is lost. Expenses which cannot be paid for with federal money such as the program’s dues to the Association of National Estuary Programs are also funded from the Overmatch Fund. The fund balance as of May 2017 was about $389,000.

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**Variable Funding Sources**
The following funding sources supplement CCMP implementation through local action plans of TBEP partners, grants, cooperative agreements and other mechanisms. While variable from year to year, they represent significant funding sources to support both short- and long-term resource needs as identified in the CCMP Actions for TBEP and its partners.

**• External Grants and Cooperative Agreements.**

TBEP staff have had significant success partnering with federal, state and local agencies to secure hundreds of thousands of dollars in grants for developing management tools and equipment, new monitoring, habitat restoration, water quality improvement and environmental education projects as called for in the CCMP. Funding sources for these external grants include FDOT, USFWS, NOAA, EPA and SWFWMD. TBEP will continue to pursue these opportunities as a means of financing priority research, monitoring, and resource management needs.

**• RESTORE funds from Deepwater Horizon oil spill fines and penalties.**

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**Tampa Bay Environmental Restoration Fund.**

TBERF is a partnership of Tampa Bay Estuary Program, Restore America’s Estuaries, local governments and private industry. TBERF was created to raise funds for projects that help advance implementation of the CCMP. From 2013-2016, TBERF awarded more than $2.8 million in grants for projects throughout the bay area that contribute to CCMP implementation. These projects leveraged an additional $8 million in project implementation costs. TBEP staff are actively exploring opportunities to increase contributions to the Fund from public and private entities in the Tampa Bay region. TBERF administrative fees have generated between $30,000 and $40,000 per year since 2014.

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The following funding sources supplement CCMP implementation through local action plans of TBEP partners, grants, cooperative agreements and other mechanisms. While variable from year to year, they represent significant funding sources to support both short- and long-term resource needs as identified in the CCMP Actions for TBEP and its partners.

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## High Priority Research & Monitoring Topics

<table>
<thead>
<tr>
<th>FINAL RANK</th>
<th>TOPIC</th>
<th>CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Continue to assess the water quality, sediment quality and habitat of tidal tributaries in Tampa Bay. Build a database on information for smaller tributaries to support existing management strategies.</td>
<td>Existing Priority</td>
</tr>
<tr>
<td>2</td>
<td>Implement habitat mitigation &amp; restoration within the watershed that provides multiple benefits. Further assess the effectiveness and functionality of mitigation and restoration projects.</td>
<td>Existing/New Priority</td>
</tr>
<tr>
<td>3</td>
<td>Evaluate potential effects of climate change on Tampa Bay's ecology. Identify framework to assess CC impacts and integrate into new management strategies.</td>
<td>Existing Priority</td>
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<tr>
<td>4</td>
<td>Improve monitoring of pollutant loading (particularly nutrients) from the entire watershed (i.e. in both gaged and ungaged basins) to better understand loading contributions. Deploy additional continuous water quality and flow monitors in the watershed, considering new technologies.</td>
<td>Existing Priority</td>
</tr>
<tr>
<td>5</td>
<td>Better understand the status, trends and restoration progress of critical coastal habitats currently lacking complete information (e.g. oysters, hard/live bottom, tidal flats, artificial habitats, tidal creeks &amp; coastal uplands).</td>
<td>New Priority</td>
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<tr>
<td>6</td>
<td>Develop &amp; implement a long-term monitoring program to track coastal habitat quantity &amp; quality. Incorporate new technologies, as appropriate, to monitor coastal habitats. Frequent, on-the-ground assessments preferred.</td>
<td>Existing Priority</td>
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<tr>
<td>7</td>
<td>Determine existing and predicted impacts of watershed development on estuarine resources and processes (e.g. hydrological changes, hurricane vulnerability, progress in implementing OneBay initiative, evaluating Ecosystem Services, &amp; coastal habitat change).</td>
<td>Existing Priority</td>
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<tr>
<td>8</td>
<td>Better understand community awareness of the bay's health &amp; recreation, economic &amp; ecological value, to identify &amp; overcome barriers to involvement in bay restoration. Improve the effectiveness of outreach &amp; education products, programs &amp; restoration activities for the bay's inhabitants &amp; visitors.</td>
<td>New Priority</td>
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<tr>
<td>9</td>
<td>Better understand distribution and impacts of septic systems in the Tampa Bay watershed. Identify any nutrient load reduction benefits of septic-sewer conversions in the watershed.</td>
<td>New Priority</td>
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<tr>
<td>10</td>
<td>Better understand &amp; monitor emerging contaminants of concern in groundwater &amp; surface water. (e.g. PAHs from coal-tar based sealants &amp; mobile sources, PPCPs, endocrine disruptors, microplastics, etc.)</td>
<td>New Priority</td>
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<tr>
<td>11</td>
<td>Identify causes of seagrass recovery slowdown or seagrass loss in “problem areas” representing at least 10% of a bay segment.</td>
<td>Existing Priority</td>
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<td>RANK</td>
<td>TOPIC</td>
<td>CATEGORY</td>
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<tr>
<td>12</td>
<td>Better quantify fertilizer use within the watershed and reductions in watershed nitrogen loadings that may result from reduced fertilizer use.</td>
<td>New Priority</td>
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<tr>
<td>13</td>
<td>Better understand the current factors contributing to harmful algal blooms in the bay, and potential problem species in the future due to changing climate. Leverage existing model platforms. Research trophic links with other species, including drift algae, zooplankton, fish &amp; wildlife.</td>
<td>New Priority</td>
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<tr>
<td>14</td>
<td>Better understand the contribution of nutrients from reclaimed water to the bay.</td>
<td>New Priority</td>
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<tr>
<td>15</td>
<td>Better understand the causes of sanitary sewer overflows and other unanticipated releases that occur throughout the watershed. Better estimate the nitrogen loadings that result from these events.</td>
<td>New Priority</td>
</tr>
<tr>
<td>16</td>
<td>Better understand the distribution and effectiveness of agricultural BMPs in reducing nutrient loadings throughout the Tampa Bay watershed, including any new urban farming BMPs.</td>
<td>New Priority</td>
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</table>

**MODERATE PRIORITY RESEARCH & MONITORING TOPICS**

<table>
<thead>
<tr>
<th>RANK</th>
<th>TOPIC</th>
<th>CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Improve linkages between watershed &amp; hydrodynamic models to better predict water quality, hydrology, sediment transport &amp; circulation in the bay and resulting impacts to habitat &amp; biota. Refine for shallow areas.</td>
<td>Existing Priority</td>
</tr>
<tr>
<td>2</td>
<td>Facilitate the development of Total Nitrogen TMDLs and BMAPs for waterbodies within the watershed.</td>
<td>Existing Priority</td>
</tr>
<tr>
<td>3</td>
<td>Determine the assimilative capacity for nutrients in the Tampa Bay estuary.</td>
<td>Existing Priority</td>
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<tr>
<td>4</td>
<td>Evaluate and monitor living shoreline techniques that potentially improve habitat and ecosystem value of altered Tampa Bay shorelines.</td>
<td>New Priority</td>
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<tr>
<td>5</td>
<td>Better quantify ecosystem services of critical coastal habitats occurring within Tampa Bay, including carbon/nutrient cycling, ecosystem function assessments &amp; biota use.</td>
<td>New Priority</td>
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<tr>
<td>6</td>
<td>Re-evaluate the “Restoring the Balance” paradigm, considering habitat changes from population growth, climate change and sea level rise impacts.</td>
<td>New Priority</td>
</tr>
<tr>
<td>7</td>
<td>Quantify ungaged streamflow and groundwater flow to Tampa Bay, and develop estimates of surface and groundwater flux to Tampa Bay.</td>
<td>New Priority</td>
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<tr>
<td>8</td>
<td>Determine important resources affected by changes in FW inflow. Mine existing data sources to examine effects of FW inflow changes on fisheries &amp; other biological resources. Assess potential effects of MFLs on habitat &amp; biota.</td>
<td>New Priority</td>
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<tr>
<td>9</td>
<td>Better evaluate alternative sediment management/disposal techniques and restoration concepts to identify options for future disposal methods (e.g. dredge hole filling, marsh spraying, etc.).</td>
<td>New Priority</td>
</tr>
<tr>
<td>10</td>
<td>Evaluate new on-site disposal system technologies for reducing nutrient loads within the Tampa Bay watershed.</td>
<td>New Priority</td>
</tr>
<tr>
<td>11</td>
<td>Develop a best management practices (BMP) document for coastal habitat restoration in Tampa Bay that builds upon the lessons-learned &amp; emerging techniques utilized in coastal habitat restoration projects.</td>
<td>New Priority</td>
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<tr>
<td>12</td>
<td>Conduct early life history studies on important Gulf of Mexico commercial, recreational or priority fishery species (e.g. groupers, snappers, etc.) that utilize Tampa Bay as nursery habitat.</td>
<td>New Priority</td>
</tr>
<tr>
<td>13</td>
<td>Better quantify ungaged streamflow and groundwater flow to Tampa Bay, and develop estimates of surface and groundwater flux to Tampa Bay.</td>
<td>New Priority</td>
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<tr>
<td>14</td>
<td>Better understand how coastal development impacts wetland habitat function and quality.</td>
<td>New Priority</td>
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<td>No.</td>
<td>Priority</td>
<td>Description</td>
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<tr>
<td>15</td>
<td>New Priority</td>
<td>Better census environmentally sensitive habitats and wildlife for inclusion into baseline databases to improve modeling of spill trajectories for emergency response.</td>
</tr>
<tr>
<td>15</td>
<td>New Priority</td>
<td>Better understand the demographics, distribution &amp; magnitude of human recreational use within the bay &amp; watershed. Identify conflicts. If warranted, determine appropriate human access points with minimal impacts to the bay &amp; its watershed.</td>
</tr>
<tr>
<td>17</td>
<td>New Priority</td>
<td>Determine other biotic indicators (e.g. sentinel fish or benthic invertebrate communities) that could describe Tampa Bay ecologic/habitat health.</td>
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<tr>
<td>18</td>
<td>New Priority</td>
<td>Evaluate new/alternative technologies that decrease impacts to habitat and wildlife during dredging.</td>
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<tr>
<td>19</td>
<td>New Priority</td>
<td>Improve monitoring, detection &amp; tracking for high-priority existing or potential invasive species (e.g. lionfish, snakehead, pythons, tegu, etc.).</td>
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<tr>
<td>20</td>
<td>New Priority</td>
<td>Determine bay scallop population estimates for Tampa Bay that would lead to sustainable, annual populations occurring in Tampa Bay.</td>
</tr>
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COMMUNICATIONS PLAN

TBEP is developing a new 5-year Communications Plan for consideration and approval by the Policy Board in 2018. This task is being supported by a contractor working with a Communications Committee composed of CAC members, staff and Board members.

THIS PLAN WILL:

- Identify and rank appropriate public education and communications issues for TBEP to continue, expand or initiate.
- Evaluate existing TBEP education and engagement programs and products, and identify how existing education campaigns and programs can be enhanced or strengthened.
- Identify and rank potential new education/social marketing campaigns which support CCMP goals and priorities, to be considered for implementation within the next 5 years.
- Include goals and objectives, target audiences, activities and implementers, key deliverables, budget and timeframe.

TBEP’s existing Communications Strategy, as of 2017, is detailed in Action PE-2.
ACRONYMS FOR CCMP

- ABM: Agency on Bay Management
- ACP: Area Contingency Plan
- AIS: Automatic Identification System
- ASR: Aquifer Storage and Recovery
- ATON: Aids To Navigation
- AWT: Advanced Wastewater Treatment
- BASIS: Bay Area Science and Information Symposium
- BPA: Bisphenol A
- BMAP: Basin Management Action Plan
- BMP: Best Management Practice
- BOD: Biochemical Oxygen Demand
- BRACE: Bay Region Atmospheric Chemistry Experiment
- CAC: Community Advisory Committee (TBEP)
- CAFE: Corporate Average Fuel Economy
- CAFO: Concentrated Animal Feeding Operation
- CARES: County Alliance for Responsible Environmental Stewardship
- CCHA: Critical Coastal Habitat Assessment
- CCMP: Comprehensive Conservation and Management Plan
- CHNEP: Charlotte Harbor National Estuary Program
- CISMA: Cooperative Invasive Species Management Area
- COC: Contaminant of Concern
- CRE: Climate Ready Estuaries
- CSAP: Tampa Bay Climate Science Advisory Panel
- CVIS: Cooperative Vessel Tracking Service
- CWA: Clean Water Act
- CWA: Critical Wildlife Area (FWC)
- DMMA: Dredged Material Management Areas
- DMMP: Dredged Material Management Plan
- DMR: Discharge Monitoring Report
- EDC: Endocrine Disrupting Compound
- ELAPP: Environmental Lands Acquisition and Protection Program
- EPA: United States Environmental Protection Agency
- EPCHC: Environmental Protection Commission of Hillsborough County
- ERP: Environmental Resource Permit
- EzDMR: Electronic Discharge Monitoring Reporting system
- FAC: Florida Administrative Code
- FARMS: Facilitating Agricultural Resource Management System
- FDACS: Florida Department of Agriculture and Consumer Services
- FDEP: Florida Department of Environmental Protection
- FDOH: Florida Department of Health
- FDOT: Florida Department of Transportation
- FIM: Fisheries Independent Monitoring Program
- FIO: Florida Institute of Oceanography
- FNMP: Florida Master Naturalist Program
- FOG: Fats, Oils and Grease
- FPL: Florida Power and Light
- FWC: Florida Fish and Wildlife Conservation Commission
- FWRI: Fish and Wildlife Research Institute
- FY&N: Florida Yards and Neighborhoods
- GCOOS: Gulf of Mexico Coastal Ocean Observing System
- GIS: Geographic Information System
- GOMA: Gulf of Mexico Alliance
- GPRA: Government Performance and Results Act
- HAB: Harmful Algal Bloom
- HBMP: Hydro-Biological Monitoring Program
- IRL: Indian River Lagoon
- ISMP: Imperiled Species Management Plan
<table>
<thead>
<tr>
<th>ACRONYMS FOR CCMP</th>
<th>Meaning</th>
<th>ACRONYMS FOR CCMP</th>
<th>Meaning</th>
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<tbody>
<tr>
<td>KTTB</td>
<td>Keep Tampa Bay Beautiful</td>
<td>USCG</td>
<td>United States Coast Guard</td>
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<tr>
<td>LEPC</td>
<td>Local Emergency Planning Committee</td>
<td>USF</td>
<td>University of South Florida</td>
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<td>LID</td>
<td>Low Impact Development</td>
<td>USFWS</td>
<td>United States Fish and Wildlife Service</td>
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<td>MAC</td>
<td>Manatee Awareness Committee</td>
<td>USGS</td>
<td>United States Geologic Survey</td>
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<td>MFL</td>
<td>Minimum Flows and Levels</td>
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<td>MGD</td>
<td>Million Gallons Per Day</td>
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<td>MPO</td>
<td>Metropolitan Planning Organization</td>
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<td>NFWM</td>
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<td>Non-Governmental Organization</td>
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<td>National Marine Fisheries Service</td>
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<td>NSP</td>
<td>National Science Foundation</td>
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<td>NOA</td>
<td>National Oceanic and Atmospheric Administration</td>
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<td>NOX</td>
<td>Nitrogen Oxide</td>
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<td>National Pollutant Discharge Elimination System</td>
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<td>OA</td>
<td>Ocean Acification</td>
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<td>AOAWP</td>
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<td>PAH</td>
<td>Polycyclic Aromatic Hydrocarbon</td>
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<td>PBDE</td>
<td>Polybrominated Diphenyl Ether</td>
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<td>PCB</td>
<td>Polychlorinated Biphenols</td>
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<td>PORTS</td>
<td>Physical Oceanographic Real-Time System</td>
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<td>PPCP</td>
<td>Pharmaceuticals and Personal Care Products</td>
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<td>PRF</td>
<td>Pollution Recovery Fund</td>
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<td>PSA</td>
<td>Public Service Announcement</td>
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<td>PV</td>
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<td>RA</td>
<td>Reasonable Assurance document</td>
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<td>REDDy</td>
<td>Introduced Reptile Early Detection and Documentation</td>
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<td>RB</td>
<td>Rapid Infiltration Basin</td>
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<td>RSM</td>
<td>Regional Sediment Management</td>
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<td>SBEP</td>
<td>Sarasota Bay Estuary Program</td>
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<td>SHARP</td>
<td>South Hillsborough Aquifer Recharge Project</td>
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<td>SLR</td>
<td>Sea Level Rise</td>
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<td>SQAP</td>
<td>Sediment Quality Action Plan</td>
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<td>SSO</td>
<td>Sanitary Sewer Overflow</td>
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<td>SWFWMD</td>
<td>Southwest Florida Water Management District</td>
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<td>SWIM</td>
<td>Surface Water Improvement and Management Plan</td>
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<td>Technical Advisory Committee (TBEP)</td>
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<td>Tampa Augmentation Project</td>
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<td>Wastewater Treatment Plant</td>
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TAMPA BAY ESTUARY PROGRAM
AMENDED AND RESTATED INTERLOCAL AGREEMENT

THIS TAMPA BAY ESTUARY PROGRAM INTERLOCAL AGREEMENT (the “Agreement”) is executed and made effective by and among the following governmental entities: 1. CITY OF CLEARWATER, a Florida municipal corporation; 2. CITY OF ST. PETERSBURG, a Florida municipal corporation; 3. CITY OF TAMPA, a Florida municipal corporation; 4. FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION, a Florida state agency; 5. FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION’S FISH AND WILDLIFE RESEARCH INSTITUTE, an institute; 6. HILLSBOROUGH COUNTY, a Florida political subdivision; 7. THE ENVIRONMENTAL PROTECTION COMMISSION OF HILLSBOROUGH COUNTY, a political subdivision of the State of Florida; 8. MANATEE COUNTY, a Florida political subdivision; 9. PINellas COUNTY, a Florida political subdivision; 10. SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT, a public corporation of the State of Florida; 11. the TAMPA PORT AUTHORITY, a Florida port authority; 12. the TAMPA BAY REGIONAL PLANNING COUNCIL, a Florida regional planning council; and 13. TAMPA BAY WATER, a regional water supply authority, (collectively the “Parties” and each singularly a “Party”), and the following recitation of facts are provided in support of this Agreement:

(A) The Tampa Bay National Estuary Program (hereinafter, “Tampa Bay Estuary Program” or “Program”) was established in 1991 to assist the Tampa Bay area in developing a comprehensive plan to restore and protect Tampa Bay. The Tampa Bay Estuary Program was created by Interlocal Agreement dated February 27, 1998 (the “Prior Interlocal Agreement”) and is governed by a Policy Board and advised by a Management Board. The Tampa Bay Estuary Program is a part of a national network of twenty-eight (28) National Estuary Programs established under the Federal Clean Water Act and administered nationally by the United States Environmental Protection Agency.
(B) Local government and regulatory agency participants in the Tampa Bay Estuary Program consisting of the Parties described in the Preamble above, as well as the United States Environmental Protection Agency and the United States Army Corps of Engineers, have developed and unanimously adopted a Comprehensive Conservation & Management Plan for Tampa Bay, known as *Charting the Course*, dated December 1996, which was updated in May 2006, and amended in February 2013 (the “CCMP”), and are committed to its successful implementation. The CCMP seeks to ensure that Tampa Bay remains a vibrant part of the region's environmental and economic landscape by preserving and enhancing its roles as a recreational resource, international seaport and home for fish and wildlife.

(C) The CCMP presents goals for the improvement of Water & Sediment Quality, Bay Habitats, Fish & Wildlife, Spill Prevention and Response, Dredging and Dredged Material Management, Invasive Species, Public Education and Involvement, and Climate Change which will be reexamined at least once every five (5) years and updated as appropriate. To achieve the CCMP goals, this Agreement emphasizes regional cooperation and regulatory flexibility that allows the Parties to select cost-effective and environmentally beneficial bay improvement options for their communities, so long as the goals of the CCMP are met.

(D) The parties to the CCMP and the Interlocal Agreement dated February 27, 1998, established the Tampa Bay Estuary Program as the first National Estuary Program to adopt a binding agreement to ensure that the CCMP is implemented, and now seek to ensure that the CCMP continues to be properly and effectively implemented.

**NOW THEREFORE**, in consideration of the mutual promises contained in this Agreement, the receipt and adequacy acknowledged by them, the Parties agree as follows:

**ARTICLE ONE – INTRODUCTORY PROVISIONS**

1.1 **Recitals.** The statements contained in the recitation of facts set forth above (collectively
the "Recitation of Facts") are true and correct, and are hereby made a part of this Agreement by this reference.

1.2 **Exhibits.** The exhibits which are attached to this Agreement are by this reference made a part hereof.

1.3 **Abbreviations and Definitions.** The following abbreviations and definitions will be used for purposes of this Agreement:

(a) The abbreviations and definitions contained in the Preamble will be used for purposes of this Agreement.

(b) The abbreviations and definitions contained in the Recitals will be used for purposes of this Agreement.

(c) The term “Act” shall mean Section 163.01, Florida Statutes.

(d) The term “Action Plan(s)” shall mean the comprehensive action plans set forth in the CCMP, including initiatives and strategies to be undertaken to attain the CCMP Goals.

(e) The term “Agreement” shall mean this Amended and Restated Interlocal Agreement between the Parties as it is presently constituted or as it may be amended from time to time.

(f) The term “Army Corps” shall mean the United States Army Corps of Engineers, a federal agency.

(g) The term “CCMP” shall mean the Comprehensive Conservation and Management Plan, dated December 1996, unanimously approved by the Parties, as updated in May 2006 and amended in February 2013, and as it may be amended from time to time.
(h) The term “CCMP Goals” or “Goals” shall mean those goals and priorities of the CCMP set forth in Section 4.1 below, as amended from time to time.

(i) The term “Clearwater” shall mean the City of Clearwater, a Florida municipal corporation.

(j) The term “Cities” shall mean collectively Clearwater, St. Petersburg, and Tampa.

(k) The term “Contribution” includes funding of the Tampa Bay Estuary Program, the Tampa Bay Environmental Restoration Fund, and/or projects which support the goals of the CCMP and are included in the approved Work Plan.

(l) The term “Counties” shall mean collectively Hillsborough, Manatee and Pinellas.

(m) The term “DEP” shall mean the Florida Department of Environmental Protection, a Florida state agency.

(n) The term “Effective Date” shall mean the date that all Parties have duly executed this Agreement and filing has been completed under Section 11.14 below.

(o) The term “EPA” shall mean the United States Environmental Protection Agency, a federal agency.

(p) The term “EPC” shall mean the Environmental Protection Commission of Hillsborough County, a political subdivision of the State of Florida.

(q) The term “Full Budget” includes the Work Plan Budget and all other funding received by the Tampa Bay Estuary Program for projects, programs, operations and staffing.
(r) The term “Funding Entity” shall mean and include Local Governments and SWFWMD.

(s) The term “Hillsborough” shall mean Hillsborough County, a Florida political subdivision.

(t) The term “Institute” shall mean the Florida Fish and Wildlife Commission’s Fish and Wildlife Research Institute.

(u) The term “Local Governments” shall mean collectively the Cities and the Counties.

(v) The term “Management Board” shall mean a board of the Tampa Bay Estuary Program, as set forth and described in Article Five below.

(w) The term “Manatee” shall mean Manatee County, a Florida political subdivision.

(x) The term “Tampa Bay Nitrogen Management Consortium” or “Consortium” shall mean an ad hoc task force of representatives from the currently existing Management Board, other municipalities and counties located within the Tampa Bay watershed, private entities, electric utility industry, fertilizer industry, other industries with permitted nitrogen discharges, agriculture representatives, and regulatory agencies.

(y) The term "Pinellas" shall mean Pinellas County, a Florida political subdivision.

(z) The term "Policy Board" shall mean a board of the Tampa Bay Estuary Program, as set forth and described in Article Five below.

(aa) The term "Port Authority" shall mean the Tampa Port Authority, a Florida port authority.
(bb) The term "Regulatory Agencies" shall mean the governmental agencies with regulatory authority over certain of the other Parties, including DEP, EPC, Port Authority, and SWFWMD.

(cc) The term "St. Petersburg" shall mean the City of St. Petersburg, a Florida municipal corporation.

(dd) The term “SWFWMD” shall mean the Southwest Florida Water Management District, a public corporation of the State of Florida.

(ee) The term “Tampa” shall mean the City of Tampa, a Florida municipal corporation.

(ff) The term “Tampa Bay Water” shall mean a regional water supply authority formed pursuant to Sections 373.713, 373.715 and 163.01, Florida Statutes.

(gg) The term “TBRPC” shall mean the Tampa Bay Regional Planning Council, a Florida regional planning council.

(hh) The term “Work Plan” shall mean the annual document outlining the previous year's accomplishments and the upcoming year’s priorities, projects, funding partners and expenditures to meet the requirements of the EPA’s Cooperative Agreement with the Tampa Bay Estuary Program pursuant to CWA 320, and adopted by the Policy Board.

(ii) The term “Work Plan Budget” shall mean that portion of the Full Budget which includes the funding for projects identified in the Tampa Bay Estuary Program Work Plan.

ARTICLE TWO – AMENDED AND RESTATED INTERLOCAL AGREEMENT

2.1 Authority. This Agreement is an interlocal agreement, as contemplated by the Act, and pursuant to the authority of subsection (4) of the Act, all of the Parties qualify to be a part of this
Agreement under such Act.

2.2 **Immunity.** Pursuant to subsection (9) of the Act, all of the privileges and immunities from liability, exemptions from laws, ordinances and rules, and pensions and relief, disability, workers' compensation, and other benefits which apply to the activity of officers, agents or employees of any public agent or employees of any public agency when performing their respective functions within the territorial limits for their respective agencies shall apply to the same degree and extent to the performance of such functions and duties of such officers, agents, or employees extraterritorially under the provisions of this Agreement.

2.3 **Amendment and Restatement of Prior Interlocal Agreement.** This Agreement amends and restates the Prior Interlocal Agreement in its entirety such that the Prior Interlocal Agreement and all exhibits thereto are hereby superseded and subsumed into this Agreement, and all terms, obligations, powers and responsibilities regarding matters addressed herein and in the Prior Interlocal Agreement shall be governed solely by this Agreement. All acts and omissions of the Parties hereto, their officers, employees, agents and assigns, and all of the officers, employees, agents and assigns of the Tampa Bay Estuary Program established as a legal entity pursuant to the Prior Interlocal Agreement, taken or carried out pursuant to the Prior Interlocal Agreement, are hereby ratified and affirmed under this Agreement.

ARTICLE THREE – TERM

3.1 **Term.** The term of this Agreement is perpetual, commencing on the Effective Date (the “Term”). The first day of the Term (the "Effective Date") will be referred to below as the "Commencement Date." The last day of the Term will be referred to below as the "Termination Date."

3.2 **Sundown Review.** This Agreement shall be subject to a review by the Policy Board five
(5) years from the Effective Date of this Agreement and on the same day of each five (5) year period thereafter at which time the Policy Board shall evaluate the appropriateness and effectiveness of this Agreement and the Tampa Bay Estuary Program. The Policy Board shall vote by majority vote on whether to recommend to terminate this Agreement, amend this Agreement or to let the status quo prevail. Should no action by the Parties occur, this Agreement shall continue for another five year period.

**ARTICLE FOUR — CCMP**

4.1 **Adoption of CCMP Goals and Priorities.** The Parties hereby agree that the Goals for Tampa Bay described in the CCMP are approved and adopted by each of them. The Goals for Tampa Bay are to maintain important water quality and seagrass gains achieved over the last decade to allow the eventual recovery of seagrass to acreage observed in 1950. The Goals focus on issues that must be addressed to sustain a healthier bay that will support both recreation and commerce. These issues include seagrass and nitrogen load management, coastal habitats, toxic contaminants, atmospheric deposition, bacterial contamination, fish and wildlife, spill prevention and response, dredging and dredged material management, invasive species, public education and involvement, and climate change. The Goals shall be achieved in the manner described in Section 4.3 below. The Parties shall use their best efforts to achieve the Goals within the time periods prescribed, and shall work cooperatively to achieve all of the Goals applicable to them in a cost-effective manner. Additionally, the Parties agree to work together in good faith and through their best efforts to address other actions and recommendations in the CCMP.

4.2 **Modification.** The CCMP and its incorporated Goals for Tampa Bay shall not be amended, changed, extended, modified or supplemented without the unanimous written consent of all of the Parties, to be decided in their respective sole and absolute discretion. The Goals shall be reexamined by the Tampa Bay Estuary Program at least once every five (5) years in light of new knowledge or changed circumstances and updated accordingly. The Policy Board may elect by a majority vote to
reexamine the Goals more frequently if warranted by them. When it has been determined by the Policy Board unanimously that a Goal has been met, the Policy Board will thereafter support efforts by the Parties and the Consortium, as appropriate, that provide for the ongoing maintenance of the resource.

4.3 **Goals: Achievement.** The only CCMP Goal that is to be achieved individually by any of the Parties is the nitrogen loading reduction/management, to be accomplished by the Local Governments and other members of the Consortium, as described in the “Reasonable Assurance Addendum: Allocation and Assessment Report” dated September 11, 2009, as that Report may be amended from time to time, and implemented through actions identified in the Consortium’s Action Plan Database ("Action Plan Database"). The Tampa Bay Estuary Program shall facilitate and assist the Parties to collectively address the remaining CCMP Goals. If a cumulative Goal, other than the nitrogen management loading goal, is not met within its stated goal period, then the Tampa Bay Estuary Program will develop the additional projects necessary to address the shortfall, including the funding sources, which projects and funding are subject to the approval of the Policy Board.

4.4 **Nitrogen Management Consortium Responsibilities.** The Consortium participants have made and are expected to continue to make significant contributions toward achieving the CCMP goal of nitrogen loading management by meeting entity-specific nitrogen load allocations as identified in the “Reasonable Assurance Addendum: Allocation and Assessment Report” dated September 11, 2009, and approved by the Consortium participants.

4.5 **Existing Projects.** The Parties shall be able to take into account, in their nutrient management actions, projects that accomplish their designated responsibilities to the extent that such projects were completed and became operational on or after January 1, 1995.
ARTICLE FIVE – STRUCTURE OF THE TAMPA BAY ESTUARY PROGRAM

5.1 Tampa Bay Estuary Program. The Tampa Bay Estuary Program was created and continues under authority of Section 163.01(7), Florida Statutes. The Tampa Bay Estuary Program shall have those powers specifically described in or contemplated by this Agreement, which shall be exercised by, or in accordance with policies or procedures approved by, the Policy Board.

(a) The Tampa Bay Estuary Program shall:

(i) Have the powers and be in compliance with subsection (5) of the Act;

(ii) Determine, adopt and implement a personnel policy for the recruitment, retention, supervision, discipline and evaluation of Tampa Bay Estuary Program employees and be solely responsible for any claims by its employees;

(iii) Make purchases and enter into contracts in the manner determined- and, adopted by the Policy Board in the operating procedures for the Tampa Bay Estuary Program;

(iv) Determine the manner of acquisition, ownership, custody, operation, maintenance, lease or sale of real or personal property;

(v) Determine the manner of the acceptance of gifts, grants, assistance funds or bequests;

(vi) Determine the making of requests for federal, state, regional, local government or other aid or grants for the Tampa Bay Estuary Program, except as otherwise specifically described in this Agreement;

(vii) Determine Tampa Bay Estuary Program’s manner of responding for any liabilities, debts, mortgages or claims that may be incurred through performance under this Agreement,
provided that the Tampa Bay Estuary Program shall be solely liable and responsible for any such liabilities, debts, mortgages or claims incurred by or resulting from actions taken by the Tampa Bay Estuary Program;

(viii) Determine the manner in which strict accountability of all funds shall be provided and the manner in which reports, including an annual independent audit, of all receipts and disbursements shall be prepared and presented to the Tampa Bay Estuary Program and all Parties; and

(ix) Determine, adopt and implement all other necessary and proper matters not otherwise covered above.

(b) The Tampa Bay Estuary Program will not promulgate, issue or make rules or regulations, bonds, tax, charge rates, fees or rents, condemn or possess any of the other governmental powers possessed by the other Parties except as specifically allowed by this Agreement.

(c) In the event there is an undesignated fund balance held by the Tampa Bay Estuary Program, it shall be used in the manner determined by the Policy Board.

(d) The adjudication of disputes or agreements, the effects of failure of adjudicated Parties to pay their share of the cost or expenses and the rights of other Parties in such cases shall be governed by this Agreement and applicable law.

5.2 **Tampa Bay Estuary Program Functions and Responsibilities.** The Tampa Bay Estuary Program shall have the following functions and responsibilities, which are not inconsistent with the Act or any provision of applicable law, and which shall be carried out by, or in accordance with, policies or procedures approved by the Policy Board:

(a) To make and enter into contracts and assume such other functions as are necessary to carry out the provisions of any contracts entered into by the Tampa Bay Estuary Program;
(b) To employ agencies or employees and establish salaries and personnel and employee benefit programs for such full time and temporary employees as are necessary to carry out the functions of the Tampa Bay Estuary Program; provided that the Tampa Bay Estuary Program shall be solely responsible for any claims by its employees;

(c) To acquire, lease, construct, manage, maintain or operate buildings, works or improvements;

(d) To purchase, receive, or otherwise acquire, own, hold, sell, convey, lend, or otherwise dispose of, real, tangible or intangible personal property, or any legal or equitable interest in such property wherever located, and to the extent the Parties all have such power, to mortgage, pledge, or create a security interest in such property;

(e) To incur debts, liabilities, obligations, borrow money, issue its notes and other obligations, and to the extent the Parties all have such power, to secure any of its obligations by mortgage or pledge of any of its property, income and make contracts of guaranty and suretyship which do not constitute the debts, liabilities or obligations of any of the Parties;

(f) To adopt policies or procedures or rules pertaining to any of its operations and to conduct its business, locate offices, and exercise the powers granted by law;

(g) To acquire and to perform all the things necessary to carry out the purposes of this Agreement separately or in conjunction with any of the Parties;

(h) To conduct and pay for studies, plans and designs to effectuate the purpose of the Tampa Bay Estuary Program, which action may include, but is not limited to, plans for staffing, financing, research, advertising and marketing projects;

(i) To enter into interlocal agreements, or other contracts with public or private entities, if necessary, for the purposes described in this Agreement;

(j) To establish any future plan for participation of the Parties to effectuate the terms
and provisions of this Agreement, which shall include plans for any additional funding for the purpose of performance of this Agreement; provided that any change, modification or amendment to the method of funding set forth herein must be approved by the Funding Entities;

(k) To appear on its own behalf before boards, commissions, departments, or other agencies of municipal, county, state, or federal government; provided, however, members of the Management Board, Technical Advisory Committee and Community Advisory Committee shall not support or oppose specific projects or permits when acting as, on behalf of, or representing said Board or Committees; provided further that Tampa Bay Estuary Program employees can provide scientific and technical information and participate in technical discussions, but shall not oppose or support specific projects or permits;

(l) To request or accept any grant, payment, or gift, of funds or property made by the State of Florida, or by the United States or any department or agency thereof or by any individual, firm, corporation, municipality, county, or organization for any or all of the purposes of the Tampa Bay Estuary Program; and to expend such funds in accordance with the terms and conditions of any such grant, payment, or gift, in the pursuit of its administration or in support of the terms and provisions of this Agreement. The Tampa Bay Estuary Program shall separately account for the public funds and the private funds deposited into any authorized public depository;

(m) To recommend changes, amendments or modifications to this Agreement, which will become effective only upon approval by all Parties;

(n) To sue and be sued, complain, and defend in its entity name;

(o) To transact any lawful business that will aid governmental policy; and

(p) To make payments or donations or do any other act not inconsistent with law that furthers the affairs of the Tampa Bay Estuary Program.

5.3 Policy Board. The Policy Board of the Tampa Bay Estuary Program shall serve as the governing board of the Program and shall be made up of eight (8) voting directors appointed by and
representing the Cities, Counties, DEP and SWFWMD (collectively the "Policy Board Member(s)"), and one non-voting participant representing the EPA, and shall be known as the "Policy Board". The representative of each Policy Board Member and the EPA shall be appointed by such Policy Board Member or the EPA, respectively, from time to time. Each Policy Board Member and the EPA shall also appoint an alternate director for the Policy Board from time to time to serve when their director is not available. Each Policy Board Member and the EPA may change either their director or alternate director from time to time with prior written notice by a duly authorized representative of any change to the Policy Board before any meeting. The Policy Board shall have policy making powers for the Tampa Bay Estuary Program in addition to those powers explicitly set forth in this Agreement. Except as otherwise specifically set forth herein, a quorum for meetings and all votes shall be by a majority of the Policy Board directors in attendance, with the exception that the EPA representative will not vote nor be counted for purposes of a quorum. All directors of the Policy Board shall serve without compensation.

5.4 Management Board. The Management Board of the Tampa Bay Estuary Program shall consist of representatives of each of the Parties (each of which shall be voting members), one of each of the existing Co-Chairs of the TAC and CAC (both referred to in Section 5.6 below) and the Industry Co-Chair of the Consortium (each of which shall be voting members), and representatives of the Army Corps and EPA (who will be nonvoting members) (the "Management Board"). The actual representatives of each of the Parties and the Army Corps and EPA shall be appointed by such Management Board member from time to time. Each of the Parties and the Army Corps and EPA shall also appoint an alternate member to the Management Board from time to time, to serve when the actual representative is not available. Each of the Parties and EPA may change either their initial or alternate representatives from time to time with prior written notice by a duly authorized representative, to the Management Board before any meeting. The TAC and CAC shall not have alternate members, with only the alternating Co-Chairs being a member of the Management Board. The Management Board shall have
managerial powers for the Tampa Bay Estuary Program to the extent delegated by the Policy Board, in addition to those powers explicitly set forth in this Agreement. Except as otherwise specifically set forth herein, a quorum for meetings and all votes shall be by a majority of the board members, with the exception that the Army Corps and EPA representatives will not vote nor be counted for purposes of a quorum. New members may be added to the Management Board with Policy Board approval, and the Policy Board shall specify whether such new members shall be voting or nonvoting members. All directors of the Management Board shall serve without compensation.

5.5 **Officers.** The Policy Board shall elect (i) a chair or chairs of the Policy Board; and (ii) other Policy Board officers. The Management Board shall elect (i) a chair or chairs of the Management Board; and (ii) other Management Board officers.

5.6 **Committees.** The Policy Board or the Management Board at the direction of the Policy Board, shall continue such existing advisory committees as it deems necessary, including without limitation, the Technical Advisory Committee ("TAC") and the Community Advisory Committee ("CAC"). All members of committees shall serve without compensation.

5.7 **Limitations of Powers.** The Tampa Bay Estuary Program shall have no powers of taxation, regulation or eminent domain.

5.8 **Additional Board Members.** The Tampa Bay Estuary Program may allow other governmental entities, regulatory agencies, or other entities, to the extent allowed by law, to participate in the Program as members of the Policy Board, provided they are unanimously approved by the Policy Board in their respective sole and absolute discretion. Upon unanimous approval of the Policy Board, such Party must execute a Joinder Agreement by which it agrees to comply with all of the provisions of this Agreement and agree to contribute to funding of the Tampa Bay Estuary Program. The funding amounts in Exhibit A will be amended accordingly to add the funding obligation of the new Policy Board
Member, all as of the first day of the next fiscal year of the Tampa Bay Estuary Program. Once an entity is approved and has executed a Joinder Agreement, it will become a member of the Tampa Bay Estuary Program, of the Policy Board and of the Management Board with the same voting rights as the existing members of such entities or boards. The Policy Board may also allow other governmental entities or regulatory agencies to participate in the Program as members of the Management Board, provided that they must be unanimously approved by the Policy Board and the Management Board in their respective sole and absolute discretion and execute a Joinder Agreement. Once an entity has such approval and has executed a Joinder Agreement, it will become a member of the Management Board with the same voting rights as the existing members of such entities or board all as of the first day of the next fiscal year of the Tampa Bay Estuary Program.

5.9 Fiscal Year. The Tampa Bay Estuary Program shall observe a fiscal year beginning on October 1 and ending September 30 of each year, or such other fiscal year as may be required for special districts pursuant to Florida law.

5.10 Budgets.

(a) No later than the last day of the month of February each year, the Policy Board shall review the Tampa Bay Estuary Program tentative Work Plan Budget, and shall thereafter approve the Work Plan Budget no later than May. The approved Work Plan Budget shall be included in the Tampa Bay Estuary Program Full Budget.

(b) No later than the last day of the month of August and following preparation of a tentative Full Budget, the Policy Board shall publish a notice of its intention to adopt the Tampa Bay Estuary Program Full Budget. Following an appropriate public hearing, the Policy Board shall adopt the Tampa Bay Estuary Program Full Budget each year no later than the month of September covering its proposed operation and requirements for the fiscal year commencing on October 1 of that year.
(c) The Policy Board shall give consideration to objections filed against the budget and in its discretion, may amend, modify or change the tentative Full Budget. The Policy Board, by September 30th following appropriate notice and hearing, shall adopt a Full Budget for the Tampa Bay Estuary Program, which shall thereupon be the operating and fiscal budget for the Tampa Bay Estuary Program for the ensuing fiscal year.

(d) The Policy Board shall provide copies of the Work Plan and Full Budgets to the Parties, as well as the Army Corps and EPA, and such Work Plan and Full Budgets shall be accompanied by the estimated annual contribution of each of the Policy Board Members. The notice of public hearing to adopt the Tampa Bay Estuary Program Full Budget shall be published in a newspaper of general circulation in the Counties and the Cities and shall inform the public that: (i) the tentative Full Budget shall be posted on the Tampa Bay Estuary Program website at least two (2) days before the public hearing; (ii) the Full Budget shall be posted on the Tampa Bay Estuary Program website within thirty (30) days following adoption; and (iii) the public will be afforded an opportunity to appear before the Policy Board and express support or objection to the Full Budget. The notice shall be published once per week for two consecutive weeks in any newspaper of general circulation in each jurisdiction mentioned above, the last publication of which shall appear not less than one week prior to the date set by the Policy Board for the hearing on the Full Budget.

5.11 Bylaws. The Policy Board by unanimous vote shall create, adopt, amend and update Bylaws or appropriate rules of procedure for the Tampa Bay Estuary Program for its governance and which shall remain in effect until modified by the Policy Board.

5.12 Policies. The Tampa Bay Estuary Program shall adopt its operating rules and internal procedures as provided in Section 5.2(f) above.
ARTICLE SIX – RESPONSIBILITIES OF THE PARTIES

6.1 Responsibilities of all Parties. By entering into this Agreement, the Parties intend to recommend actions and adjust strategies as needed to keep Tampa Bay's recovery on track. To that end, each of the Parties hereby agrees to:

(a) Assist in implementing the CCMP nitrogen loading reduction/management Goal, to be accomplished by the Parties and other members of the Consortium, as described in the “Reasonable Assurance Addendum: Allocation and Assessment Report” dated September 11, 2009;

(b) Report in the Action Plan Data Base, which supports the CCMP and is maintained by the Tampa Bay Estuary Program, all available information about projects and actions that address nutrient reduction in Tampa Bay;

(c) Assist in supporting CCMP habitat goals for Tampa Bay by assisting the Tampa Bay Estuary Program in implementing and recording habitat protection and restoration activities; and

(d) Participate, as “responsible parties” identified in the CCMP, to implementation of Action Plans identified in the CCMP.

6.2 Additional Responsibilities of the Regulatory Agencies. The Regulatory Agencies agree that they will extend as much flexibility as is legally permissible under circumstances deemed appropriate by such agencies for projects that are part of an approved Action Plan set forth in the CCMP.

6.3 Regulatory Process Review. Subject to the above limitations, all Regulatory Agencies and all other Parties having regulatory functions agree to periodically review their regulatory processes and consider changes in statutes, ordinances, rules or policies that would assist in meeting the goals of the CCMP. Any such changes shall be made in keeping with the cooperative intent of this section and otherwise in this Agreement.
Florida Legislature under Chapter 95-488, Laws of Florida, as amended from time to time (the "Port Authority Enabling Act"). The Port Authority Enabling Act provides in part the Port Authority is responsible for regulating marine construction and management of sovereign submerged lands within the Hillsborough County Port District (the "Port Authority Regulatory Capacity"). Notwithstanding any provisions in this Agreement to the contrary, the Port Authority is entering into this Agreement only to the extent of its Port Authority Regulatory Capacity.

**ARTICLE SEVEN – BUDGETING AND FUNDING**

7.1 **Tampa Bay Estuary Program Budget.** The Policy Board is responsible for establishing the budget for the Tampa Bay Estuary Program and shall annually review and approve the budget. The budget will require approval by two-thirds (2/3) of all members of the Policy Board.

7.2 **Funding.** Subject to the provisions of Section 7.3 below, all non-federal Tampa Bay Estuary Program Work Plan budgeted costs shall be funded by the Funding Entities and allocated in accordance with Schedules 1 and 2 of Exhibit “A” hereto, as follows:

(a) To support additional projects and CCMP implementation, all Funding Entities are encouraged to contribute to the Tampa Bay Estuary Restoration Fund (“TBERF”) at the following levels based upon current (2014) Tampa Bay Estuary Program dues:

<table>
<thead>
<tr>
<th>Dues</th>
<th>TBERF Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level A: Less than $15,000 per year</td>
<td>At least $25,000</td>
</tr>
<tr>
<td>Level B: Between $15,000 and $40,000</td>
<td>At least $75,000</td>
</tr>
<tr>
<td>Level C: Greater than $40,000</td>
<td>At least $100,000</td>
</tr>
</tbody>
</table>
(b) Annual dues for Funding Entities will be determined by Schedule 1 of Exhibit “A” under the following conditions:

(i) If a Funding Entity contributes to the TBERF at the above levels in a particular year; or

(ii) In the case of SWFWMD, if SWFWMD provides funding to the Tampa Bay Estuary Program at the above levels through cooperative funding projects; or

(iii) If a Funding Entity contributes to the Tampa Bay Estuary Program at the above levels through projects which support the goals of the CCMP, are included in the approved Work Plan, and include a ten percent (10%) administrative fee for the Tampa Bay Estuary Program.

(c) Annual dues for Funding Entities will be determined by Schedule 2 of Exhibit “A” if section 7.2(b), above, does not apply.

(d) On or before the end of fiscal year 2020/2021, and every five years thereafter, the Policy Board shall initiate review and approval of draft revisions to Schedules 1 and 2, and thereafter shall submit said revisions to the Funding Entities for their review and approval, with the option to amend or modify. If no action is taken by the end of fiscal year 2020/2021, and every five years thereafter, the funding levels shown in each Schedule shall continue at the same level (the then current Year Five level) until amended or modified by the Policy Board and the Funding Entities;

(e) Management Board members that are not on the Policy Board are encouraged to contribute directly to the operations of Tampa Bay Estuary Program or to the TBERF; and

(f) The Funding Entities agree that if federal and other external funding increases beyond the levels on the Effective Date, and if the Tampa Bay Estuary Program’s undesignated fund
balance reaches a level that is sufficient to support a full fiscal year of program operations, then the Policy Board shall consider reducing their dues to the levels in place on the Effective Date.

7.3 **Annual Approval.** Each Policy Board director shall attempt to cause approval by its applicable legislative or governing body each fiscal year of the funding levels described in Schedules 1 or 2 of Exhibit “A” hereof, but which funding decision is in the sole discretion of such applicable body. Such funding approval is a condition precedent to the funding obligation by such Funding Entity each year under Section 7.2 and Schedules 1 and 2 of Exhibit “A” attached hereto.

7.4 **Non-Appropriation.**

(a) The obligations of the Funding Entities as to any funding required pursuant to this Agreement shall be limited to an obligation in any given year to budget, appropriate, and pay from legally available funds, after monies for essential services have been budgeted and appropriated, sufficient monies for the funding that is required during that year. Further, the Funding Entities shall not be prohibited from pledging any legally available non ad valorem revenues for any obligations prior to or after the execution of this Agreement and not including the commitments pursuant to this Agreement, which pledge shall be prior and superior to any commitments of the Funding Entities pursuant to this Agreement.

(b) Notwithstanding any other provisions of this Agreement, the obligations undertaken by the Funding Entities hereto shall not be construed to be or constitute general obligations’, debts or liabilities of any Funding Entity or the State of Florida or any political subdivision, municipal corporation or agency thereof within the meaning of the Constitution and laws of the State of Florida, but shall be payable solely in the manner and to the extent provided in or contemplated by this Agreement. The obligations of the Funding Entities hereunder are subject to annual appropriation of legally available non ad valorem funds by their respective governing boards, and shall not constitute or create a pledge, lending of credit or lien, either legal or equitable, of or on any of their ad valorem revenues or funds, or upon any
other revenues or funds of the Funding Entities, as may be construed under the laws or the Constitution of the State of Florida. Neither any Funding Entity nor any other person or entity shall ever have the right to compel any exercise of ad valorem taxing power by any other Funding Entity to make the payments herein provided, nor shall this Agreement constitute a charge, lien or encumbrance, either legal or equitable, upon any property or funds of any Funding Entity.

(c) Notwithstanding anything contained herein, each of the Funding Entities reserves the right, in its sole discretion, to pay the funding obligations contemplated by this Agreement from any Funds legally available for such purpose.

ARTICLE EIGHT – DEFAULT

In the event any Party is determined to be in willful and significant noncompliance with the CCMP Goals or with the terms of this Agreement, the Policy Board may, by a unanimous vote by all Parties except the Party charged with being in default, recommend the removal of such non-complying Party from this Agreement. Prior to any such vote by the Policy Board, the non-complying Party shall be given a notice of its non-compliance and an opportunity to remedy the problem within a reasonable period or to a public hearing before the Policy Board if there is a dispute whether a default exists. If a Party is found to be in noncompliance with permits by the applicable Regulatory Agency(ies), the permit granting agencies may take actions to enforce their permits against such non-complying Party under their own respective laws and regulations. If any Party is discharged under this Article Eight, (i) all monies previously paid hereunder shall be conclusively deemed earned and not subject to return to such Party, (ii) any future funding responsibility of such party shall terminate, and (iii) this Agreement shall continue as to the remaining Parties. Provided, however, any funds paid before termination but not expended shall only be used by the Tampa Bay Estuary Program in accordance with the approved budget for which such contribution was made.
ARTICLE NINE – NOTICE

Any and all notices required or permitted to be given hereunder shall be in writing, and shall be provided if either personally delivered to the Party at the addresses set forth in Exhibit "B," transmitted by electronic facsimile machine to the fax numbers listed, or sent by U.S. certified or registered mail, postage prepaid, return receipt requested, to such addresses, all such notices being effective upon delivery to and receipt by the Parties, unless the respective Party or Parties notify all other Parties in writing in accordance herewith of a change of address and/or representative at such address authorized to receive any and all such notices, in which case any and all such notices shall be delivered and/or mailed as aforesaid to said Party or Parties at such new address with respect to such Party.

ARTICLE TEN – WITHDRAWAL OF A PARTY

Notwithstanding anything contained in this Agreement to the contrary, any Party hereto shall have the right to withdraw as a Party to this Agreement by providing one hundred eighty (180) days prior written notice as set forth in Article Nine above. Such withdrawal of a Party shall occur only if the withdrawing Party provides one hundred eighty (180) days prior written notice to the other Parties. On the day following the end of such one hundred eighty (180) day period, the withdrawing Party shall no longer be considered a Party to this Agreement. Provided however, even though such withdrawing Party shall have withdrawn as a Party to this Agreement as set forth above in this Article, such withdrawing Party shall continue to be subject to all applicable laws and regulations, without the benefit of being a Party hereto to this Agreement. If a Party withdraws under this Article Ten, (i) all monies previously paid hereunder shall be conclusively deemed earned and not subject to return to such Party; (ii) the future funding responsibility of such Party shall continue for the longer of the period of such one hundred eighty (180) days or until the end of the current fiscal year, and (iii) this Agreement shall continue as to the remaining Parties.
ARTICLE ELEVEN – MISCELLANEOUS PROVISIONS

11.1 No Third Party Beneficiaries. This Agreement shall inure to the benefit of the Parties. This Agreement is for the exclusive benefit of the Parties, and shall not be deemed to be made for the benefit of any other persons not so specified.

11.2 Modification. This Agreement may be modified, altered or amended only by a written instrument recommended by the Policy Board and subsequently approved and executed by the Parties hereto.

11.3 Complete Agreement. This Agreement constitutes the full, complete and wholly independent agreement among the Parties with regard to the matters addressed herein. This Agreement also supersedes all prior agreements, understandings, representations, and statements among the Parties with respect to the matters addressed herein, either written or oral.

11.4 Severability Clause. If any clause, provision or section of this Agreement shall be held to be illegal or invalid by any court, the invalidity of such clause, provision or section shall not affect any of the remaining clauses, provisions or sections hereof, and this Agreement shall be construed and enforced as if such illegal or invalid clause, provision or section had not been contained herein.

11.5 Governing Law. Existing and future laws, rules and regulations of the United States and its agencies, the State of Florida and its agencies and the other Parties to this Agreement shall take precedence over the terms and provisions of this Agreement in case of conflict or inconsistencies between them. The laws of the United States or State of Florida as appropriate and applicable, shall govern the validity, performance and enforcement of this Agreement, regardless of the state in which this Agreement is being executed.
11.6 Public Purpose. This Agreement satisfies, fulfills and is pursuant to and for a public purpose and municipal purpose and is in the public interest, and is a proper exercise of each Party's power and authority under each Party's individual municipal or governmental authority.

11.7 Performance Standards. None of the provisions in this Agreement shall be deemed in any manner to amend, modify or otherwise change any of the provisions or regulations or ordinances of any municipality or governmental agency which is a Party to this Agreement to allow a performance standard less than is otherwise required under the terms of those provisions or regulations or ordinances.

11.8 Survival. All of the representations and warranties set forth in this Agreement shall survive the consummation of any and all of the transactions described in this Agreement and the termination of this Agreement, and shall not be deemed to be merged in this Agreement or any other instrument which may be executed and delivered pursuant to this Agreement.

11.9 Authority. None of the Parties has any authority to bind or make any oral or written representations on behalf of the other Parties, and nothing contained in this Agreement shall designate any one or more of the Parties as partners with or agents for any one or more of the other Parties.

11.10 Headings Not a Part Hereof. The headings preceding the several articles and sections hereof (and any table of contents hereto) are solely for convenience of reference, do not constitute a part of this Agreement, and shall not affect its meaning, construction or effect.

11.11 Counterparts. This Agreement may be executed in one or more counterparts, each of which may be executed by less than all of the parties but all of which shall be construed together as a single instrument. This Agreement shall become effective upon the exchange of original counterpart signature pages signed by all of the parties, but if such initial exchange occurs by facsimile, original signature pages will be exchanged within ten days of the date hereof.
11.12 Binding Effect. This Agreement shall bind the successors and assigns of the Parties.

11.13 Execution. This Agreement shall not be effective nor shall it have any force and effect whatsoever until all of the Parties have duly executed this Agreement and filed the Agreement pursuant to Section 11.14 below.

11.14 Filing. The Tampa Bay Estuary Program shall, pursuant to Section 163.01(11), Fla. Stat., file a copy of this Agreement and any amendments thereto with the Clerk of the Circuit Court of each County where the Parties are located.

11.15 Conditions Precedent. The Parties encourage the Army Corps to execute a Joinder to this Agreement and encourage the EPA to enter into a Memorandum of Understanding with the Tampa Bay Estuary Program concerning this Agreement, but said Joinder and Memorandum shall not be a precondition to the effectiveness of this Agreement.

IN WITNESS WHEREOF, the Parties hereto caused this Agreement to be executed, under seal, and it shall become effective upon completion of filing in accordance with Section 11.14, hereto.

[INTENTIONALLY LEFT BLANK]
TAMPA BAY ESTUARY PROGRAM
AMENDED AND RESTATED INTERLOCAL AGREEMENT

Countersigned:

By: George N. Cretekos
George N. Cretekos, Mayor

CITY OF CLEARWATER, a Florida municipal corporation

By: William B. Home II
William B. Home II, City Manager

Date: April 8, 2015

APPROVED AS TO FORM:

By: _______________________
Laura Mahony
Assistant City Attorney

Attest:

By: _______________________
Rosemarie Call, City Clerk

(SEAL)
CITY OF ST. PETERSBURG, a Florida municipal corporation

By: ____________________________

Print Name: Rick Kriseman

Title: Mayor

Date: 7-24-15

APPROVED AS TO FORM:

______________________________
City Attorney (Designee)

ATTEST:

______________________________
Chan Srinivasa

Seal of City of St. Petersburg, Florida
CITY OF TAMPA, a Florida municipal corporation

By:  Bob Buckhorn, Mayor

Date:  6/18/15

(SEAL)

APPROVED AS TO FORM:

Janice M McLean, Assistant City Attorney

Attest:

Shirley (Terry) Knowles
City Clerk or Deputy Clerk
FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION'S
FISH AND WILDLIFE RESEARCH INSTITUTE

By: [signature]

Print Name: Eric Sutton
Title: Executive Director
Date: 21 April 15

APPROVED AS TO FORM:

[Signature]
FWC Legal Counsel

(SEAL)
HILLSBOROUGH COUNTY, a political subdivision of the State of Florida

By: Sandra L. Murman
Print Name: Sandra L. Murman
Date: July 15, 2015

(SEAL)

BOARD OF COUNTY COMMISSIONERS
HILLSBOROUGH COUNTY FLORIDA
DOCUMENT NO. 15-0650
THE ENVIRONMENTAL PROTECTION COMMISSION
OF HILLSBOROUGH COUNTY, a political subdivision of
the State of Florida

By:

Print Name: Les Miller

Title: Chairman

Date: 7/1/15

APPROVED AS TO FORM:

EPC Attorney
Attest:

R.B. SHORE, Clerk of the Circuit Court

By: [Signature]

Deputy Clerk

MANATEE COUNTY, a political subdivision of the State of Florida

By its Board of County Commissioners

By: [Signature]

Chairperson

Print Name: [Signature]

Date: MAY 19, 2015

(SEAL)
PINELLAS COUNTY, a political subdivision of the State of Florida

By: ________________________________
   Mark S. Woodard

Title: County Administrator

Date: 4/30/15

(SEAL)

Witness: ____________________________
Alejo Anez

APPROVED AS TO FORM:
______________________________
Brendan Mackesey
Assistant County Attorney
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT, a public corporation of the State of Florida

By: [Signature]
Chair

Print Name: Michael A. Babb
Date: May 19, 2015

APPROVED AS TO FORM:

[Signature]
Amy Brennan
Assistant General Counsel

(SEAL)
TAMPA PORT AUTHORITY, a Florida port authority

By: Paul Anderson
Print Name: Paul Anderson
Title: President/CEO
Date: 6/3/15

APPROVED AS TO FORM:

(SEAL)

Assistant General Counsel
TAMPA BAY REGIONAL PLANNING COUNCIL, 
a Florida regional planning council

By: ________________

Manny Pumarega

Title: Executive Director

Date: 6/8/15

APPROVED AS TO FORM:

(SEAL)

General Counsel
**SCHEDULE 1**

**GOAL:** Maintain program operations with funding entities, adjusted annually by an increase of 2.5% beginning in FY 2016/2017.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<td>SWFWMD</td>
<td>$138,335</td>
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<td>$145,338</td>
<td>$148,972</td>
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<td>Total Local Dues</td>
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<td>$436,009</td>
<td>$446,910</td>
<td>$458,082</td>
<td>$469,534</td>
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**NOTE:** Projected funds needed to support program operations are shown below.

<table>
<thead>
<tr>
<th>Projected total funds needed for Program Ops</th>
<th>$720,000</th>
<th>$738,000</th>
<th>$756,450</th>
<th>$775,361</th>
<th>$794,745</th>
<th>$814,614</th>
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<tbody>
<tr>
<td>Funds (in addition to funding entities) needed for Program Ops</td>
<td>$305,000</td>
<td>$312,625</td>
<td>$320,441</td>
<td>$328,452</td>
<td>$336,663</td>
<td>$345,080</td>
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**SCHEDULE 2**

**GOAL:** Maintain program operations with funding entities, adjusted annually by an increase of 2.5% beginning in FY 2016/2017.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tr>
<td>SWFWMD</td>
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<td>$36,476</td>
<td>$39,573</td>
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<tr>
<td>Tampa</td>
<td>$39,402</td>
<td>$43,058</td>
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<td>$50,370</td>
<td>$54,026</td>
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<tr>
<td>Total Local Dues</td>
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<td>$492,004</td>
<td>$530,506</td>
<td>$569,008</td>
<td>$607,510</td>
</tr>
</tbody>
</table>

**NOTE:** Projected funds needed to support program operations are shown below.

| Projected total funds needed for Program Ops | $720,000 | $738,000 | $756,450 | $775,361 | $794,745 | $814,614 |
| Funds (in addition to funding entities) needed for Program Ops | $305,000 | $284,498 | $264,446 | $244,855 | $225,737 | $207,104 |
EXHIBIT “B”

If to Clearwater:  
City of Clearwater  
P. O. Box 4748  
Clearwater, FL 34618-4748  
Attn: City Attorney

If to St. Petersburg:  
City of St. Petersburg  
One Fourth Street North  
St. Petersburg, FL 33701  
Attn: City Attorney

If to Tampa:  
City of Tampa  
306 E. Jackson Street  
Tampa, FL 33602  
Attn: City Attorney

If to FDEP  
Florida Department of Environmental Protection  
Southwest District Office  
13051 N. Telecom Parkway  
Temple Terrace, FL 33637  
Attn: District Director

If to Fish & Wildlife Research Institute  
Florida Fish and Wildlife Conservation Commission’s  
Fish and Wildlife Research Institute  
100 8th Avenue SE  
St. Petersburg, FL 33701

If to Hillsborough County:  
Hillsborough County  
Public Works Department  
601 E. Kennedy Blvd.  
Tampa, FL 33602  
Attn: Director

If to EPC  
Environmental Protection Commission of Hillsborough County  
3629 Queen Palm Drive  
Tampa, FL 33619  
Attn: General Counsel

If to Manatee County  
Manatee County  
1112 Manatee Avenue West, Suite 920  
Bradenton, FL 34205  
Attn: County Administrator
WHO MAY APPLY
Local, state & federal governments; non-profit organizations; and educational institutions may apply.

LOCATION
Projects must benefit Tampa Bay or its contributing watershed.

REQUIRED MATCH
Minimum 1:1 match (cash or in-kind).

AWARD AMOUNT
$25,000 to $250,000.

PARTNERING FOR BAY RESTORATION
The Tampa Bay Environmental Restoration Fund is an innovative public-private partnership to secure financial support to achieve measurable conservation outcomes within the Tampa Bay watershed.

The fund supports water quality improvement, habitat restoration, fish and wildlife protection, environmental education and applied research and monitoring projects.

Grants are awarded annually.

www.estuaries.org/tampa-bay-environmental-restoration-fund
KEYSTONE SPONSORS

The Tampa Bay Environmental Restoration Fund is supported by many organizations. The Southwest Florida Water Management District is our keystone public partner. The Mosaic Company Foundation is our keystone private partner. Each project is required to provide a dollar-for-dollar match and encouraged to engage the community, further maximizing bay benefits. In its first four years, the fund has secured over three million dollars and leveraged an additional ten million dollars for bay restoration projects. You can be part of the Tampa Bay success story – contact the Tampa Bay Estuary Program or Restore America’s Estuaries to become a sponsor!

RETURN ON INVESTMENT:
For every $1 dollar raised, an additional $3 dollars goes toward protecting and restoring Tampa Bay.

INTERESTED IN STARTING A RESTORATION FUND FOR YOUR ESTUARY? RESTORE AMERICA’S ESTUARIES CAN HELP.

LEARN MORE
Maya Burke
Tampa Bay Estuary Program
mburke@tbep.org
727-893-2765

Elsa Carlisle-Schwartz
Restore America’s Estuaries
eschwartz@estuaries.org
360-926-8814

www.estuaries.org/tampa-bay-environmental-restoration-fund
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- Selection of Contractors  
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- TBEP Credit Card  

**CASH DISBURSEMENTS**  

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**PAYROLL**  

**INVESTMENT POLICY AND OVERSIGHT**  

**EXHIBITS**
INTRODUCTION

This Operating Procedures Manual provides a guide to the fiscal and procurement procedures of the Tampa Bay Estuary Program (TBEP). The objectives of the financial management and procurement system are to provide the Policy Board with reasonable assurance that assets are safeguarded against loss from unauthorized use or disposition, and that transactions are executed in accordance with generally accepted accounting principles and the Code of Federal Regulations (40 CFR 31).

The National Estuary Program (NEP) was established by the Water Quality Act of 1987. The Act authorizes the Administrator of the Environmental Protection Agency to aid coastal communities in developing Comprehensive Conservation and Management Plans (CCMPs) to clean up and restore estuaries of national significance that are threatened by pollution, development, or overuse.

Former EPA Administrator William K. Reilly, on April 20, 1990, added Tampa Bay to the National Estuary Program. A Management Conference Agreement was executed in March, 1991 binding the participants in the Tampa Bay NEP to adoption of a final CCMP and financing plan by May, 1995. The Conference Agreement represented the commitments of Management Conference participants for the work to be accomplished over the four-year term of the Program and provided an overview and schedule for work leading to the final CCMP.

In November, 1996 the NEP Policy Committee approved Charting the Course, the Comprehensive Conservation and Management Plan for Tampa Bay. The CCMP was approved by the Governor and EPA Administrator Browner in March 1997. A formal Interlocal Agreement was entered into in February, 1998 by the six local governments and seven non-federal agencies serving as the Program’s Management Committee. The agreement became effective March 26, 1998 and replaced the Management Conference Agreement. The core of the Agreement was a voluntary commitment by the signatories to achieve the goals adopted in the CCMP through detailed action plans prepared by each participant. EPA and the Corps of Engineers entered into ancillary agreements with the Program for comparable commitments.

In 2015, the TBEP Policy Board members executed an Amended and Restated Interlocal Agreement, recommitting the signatories to achieve the nitrogen management goal of the CCMP; defining the structure and functions of the TBEP; and encouraging funding entities to contribute dues according to identified levels as included in the Interlocal Agreement. Through execution of Joinder Agreements in 2016, Pasco County became a member of the TBEP Policy Board, and the Manatee Port Authority became a member of the Management Board.

Preparation of this Operating Procedures Manual is authorized under Section 5.2(f) of the 2015 Interlocal Agreement. TBEP is authorized to enter into an administrative support agreement with a third party to provide administrative services.
Management Structure

A nine-member Policy Board was established through the 2015 Interlocal Agreement to provide overall direction to the TBEP and make policy decisions on program budgets and expenditures. Serving on the Policy Board are representatives or their alternates appointed by and representing the cities of Tampa, St. Petersburg and Clearwater, the counties of Pinellas, Hillsborough, Manatee and Pasco, the Department of Environmental Protection, and the Southwest Florida Water Management District. The EPA participates on the Policy Board as a non-voting member.

In accordance with the Interlocal Agreement, the Policy Board has primary authority over the administration of the TBEP.

A twenty-member Management Board provides more direct oversight of the Program and makes recommendations to the Policy Board on programmatic priorities and matters of budget and spending. A Technical Advisory Committee of more than 100 members provides input as the scientific voice of the TBEP, and a Community Advisory Committee advises the TBEP staff on its public outreach strategy and specific projects to implement that strategy.

This Manual prescribes the expected flow of procurement and accounting documentation and establishes a uniform and systematic accumulation of information and statistical data necessary to fulfill the procurement, financial and accounting requirements of TBEP. An annual summary outlining the status of projects and accomplishments shall be prepared as part of the Annual Work Plan. Budget reports shall be provided to the Management and Policy Boards at the regular quarterly Management Board meetings and quarterly Policy Board meetings. Quarterly progress reports on individual projects are provided to the EPA Project Officer in Region IV. Region IV staff also review the annual progress and quarterly budget and accounting reports through their representation on the Management and Policy Boards.

ANNUAL BUDGET

Operations of the Tampa Bay Estuary Program are funded primarily through contributions from EPA, participating local governments and the Southwest Florida Water Management District. The Interlocal Agreement establishes the funding targets and requires that the Policy Board develop and approve an Annual Work Plan and budget, with due public notice.

The TBEP Executive Director has the authority to apply for external grants. The Executive Director has the authority to accept grant and cooperative agreement funds if there is no TBEP match required or if the TBEP match has been approved as a project in the Workplan. Notification of any awarded cooperative agreement of Federal assistance applications shall be presented to the Policy Board at its next quarterly meeting.
The TBEP Policy Board hereby delegates the authority to the TBEP Executive Director to transfer up to $25,000 between all project budgets in the approved Annual Work Plan. The Policy Board shall be advised of any budget amendments at the next quarterly meeting. Any budget changes to an approved project in excess of $25,000 shall require the approval of the Policy Board.

The Code of Federal Regulations (40 CFR 31.30) permits grantees and subgrantees to revise budgets within the approved direct cost category to meet unanticipated requirements and to make limited program changes to the approved project. Therefore, the Executive Director is authorized to approve transfers up to $25,000 per Annual Plan for revisions between line items within the approved operating budget to meet unanticipated requirements. The TBEP Policy Board shall be notified of budget transfers at its next quarterly meeting.

Additional work tasks under a budgeted amount of $25,000 which fall into projects previously approved in the Annual Work Plan may be contracted for in accordance with purchase order procedures as outlined in the Operating Procedures Manual without further approval of the Management and Policy Boards. Budget changes for projects shall require the written approval of EPA if any of the following occur:

- the revision would result in the need for additional funding
- cumulative transfers among direct cost categories or among separately budgeted programs, projects, functions, or activities which exceed or are expected to exceed 10 percent of the current total approved budget, whenever the EPA’s share exceeds $100,000.

The TBEP shall obtain prior written approval of the EPA whenever any of the following programmatic changes are anticipated:

- major revision of the scope of work or objectives of the Workplan
- need for extension of the period of availability of funds
- changes in key persons in cases where specified in an application of assistance award
- obtaining the services of a third party to perform activities which are central to the purposes of the award (not including procurement of equipment, supplies and general support services)

Requests to EPA for prior approval of any budget revision will be in the same budget form used by the grantee in its application and shall be accompanied by a narrative justification.
for the proposed revision. Requests for prior approval under applicable Federal cost principles (40 CFR 31) may be made by email. A request by a contractor or subgrantee for prior approval shall be addressed in writing via electronic mail to the TBEP. In turn, TBEP shall review and approve or disapprove the request in writing via electronic mail. TBEP shall not approve any budget or project revision which is inconsistent with the purpose of terms and conditions of the Federal grant to TBEP. If the requested revision would result in a change to the TBEP-approved project which requires EPA prior approval, the TBEP shall obtain EPA approval before approving the Contractor or Subgrantee’s request (40 CFR 31).

TBEP uses the following budget categories:

Salaries
This item represents the base salaries for all full-time and part-time employees, spot labor, temporary services and allocations of accrued holidays, vacations and sick leave.

Fringe Benefits
This item represents the cost of FICA benefits and workers compensation paid plus the net cost of Health and Life Insurance for all employees. This cost also includes the contributions made on behalf of the employees to the Florida Retirement System.

Membership and Dues
This item represents books, professional magazines, and annual dues of various professional organizations.

Travel/Conferences/Training
This item includes estimated amount needed to accommodate travel requirements associated with work of the TBEP, including mileage, per diem, air travel and other associated travel costs. Registration fee for conferences, seminars and workshops are also included in this category.

Legal Fees
This item represents the cost of retaining legal counsel and in-house legal services.

Capital and Small Equipment
This item represents purchases of equipment, furniture, etc. costing in excess of $500.00 with an expected useful life of at least one year.

Printing/Graphics
This item includes printing labor costs as well as costs for all paper, ink, bindings, covers, graphic tools and materials necessary to produce meeting notices, special reports and other printed or reproduced materials required by various contracts as well as TBEP publications.
Contract Services/Consultant
   This item represents the cost of retaining consultants and other
   professional services to assist the TBEP in areas where specialized
   assistance is required.

Office Rental
   This item represents the annual rent costs of the TBEP office facilities.

Equipment Lease/Maintenance
   This item represents the cost of leasing the copy machine, postage meter,
   and various equipment. It includes the maintenance agreement for the
   telephones and copy machine.

Auditing
   This item represents the audit fee to conduct the annual financial and
   single audit in conformance with state and federal requirements.

Other Operating Expenditures
   This item includes a variety of expenses necessary for program operations
   such as legal notices, staff training and development, recruitment costs,
   meeting expenses, recognition awards program, advertising, and rental
   space for records storage.

Administrative In-Kind
   The value of donated volunteer services used to meet cost-sharing or grant
   matching requirements.

Postage
   This item represents an estimate of money needed to support the postage
   demands of the TBEP mailing programs. It includes routine and mass
   mailing postage and courier services.

Communications/Phone
   This item represents an estimated annual cost for telephone and related
   services. The costs include local service, long distance carrier charges,
   Suncom upgrades and maintenance, cellular and internet accounts.

Insurance
   This item represents the insurance premiums for multi-peril, liability and
   umbrella policy coverage for TBEP and its employees, and any other
   necessary coverage.

Office Supplies
   This item represents an estimate of costs needed to provide for normal
day-to-day office supply cabinet turnover items, such as stationery, pencils
and pens, note pads, folders, and computer supplies, pre-printed forms,
and purchase of software.
Travel

The annual travel budget for TBEP professional staff, TBEP Board directors and advisory committee members shall include appropriate program related intra-and inter-state conferences, workshops and seminars. Travel requests must be verified for availability of funds by the TBEP Program Administrator, approved by the TBEP Executive Director and processed in accordance with Section 112.061, Florida Statutes, attached as Exhibit A. Complete instructions to employees on travel requests and reimbursement of expenses are provided in the Employee Handbook.

PROCUREMENT PROCEDURES

Federal funds, combined with non-federal matching funds from participating local governments and SWFWMD constitute the principal funding sources for the TBEP. The major budget objective of the TBEP is to utilize the available federal funding each year together with an amount of non-federal matching funds sufficient to implement the approved Annual Work Plan.

Costs for major projects included in each year’s Annual Work Plan are established through discussions with the Management and Policy Boards and with the input of the Technical and Community Advisory Committees where appropriate. The process is initiated by TBEP staff which recommends specific projects, associated work scopes, and estimated project costs as part of the coming year’s work plan. Selection of projects and associated work scopes is based on the work necessary during the coming year to meet the Program’s responsibilities under the Interlocal Agreement. The TAC and CAC Co-chairs, participating as voting members of the Management Board, provide input at the Management Board meeting on what adjustments, if any, are necessary to project work scopes and costs. Projects and estimated costs are then included in the work plan for review by the Management Board which may adjust project work scopes and funding. The Management Board’s recommendations are provided to the Policy Board for final review and approval and further adjustment as deemed appropriate by the Policy Board.

The process is designed to take advantage of the considerable knowledge and experience of professionals and policy makers serving on the various boards and advisory committees.

TBEP has been requested by EPA Region IV to specify in each Request for Proposal (RFP) the amount of federal funding supporting the particular project. To comply with the intent of that requirement, and still allow for some competitiveness in pricing of projects, a narrow range of the expected cost of the work is specified in the RFP.

Contracts are written on a cost-reimbursement basis with a not-to-exceed amount. This
provides a convenient basis for invoicing work accomplished by the contractor and tracking the level of effort being expended on a particular task. The not-to-exceed amount specified in a particular contract is the price offered in a contractor’s proposal and includes the contractor’s profit. Contract negotiations center on obtaining the best possible product(s) within the budget allocated for a particular project.

Approval of Purchases

In addition to initial approval in the Annual Work Plan, the following internal accounting controls are observed. All purchases must be approved by the TBEP Program Administrator. Additional approval is required as follows:

1. Purchases over $300.00 must be approved by the TBEP Executive Director. The Executive Director may authorize an Interim Executive Director to approve purchases on her/his behalf in their absence.

2. All capital equipment, regardless of price, must be approved by the TBEP Executive Director.

3. Service contracts under $25,000 shall be approved by the TBEP Executive Director.

4. Services over $25,000 shall be approved by the TBEP Policy Board, upon recommendation of the Management Board.

Selection of Contractors

In order to keep the TBEP staff a small yet effective working unit, specialized technical services and other specialized needs will be obtained through qualified consultants and agencies in the public and private sector. It is the intent of TBEP to select the best-qualified firms and agencies to provide the services necessary to meet TBEP’s responsibilities under the Interlocal Agreement. Positive efforts will be made by TBEP to comply with EPA guidelines by soliciting business or other organizations owned or certified as a Disadvantaged Business Enterprise (DBE). Whenever possible, TBEP will endeavor to the fullest extent practicable to negotiate a “FAIR Share” percentage of no less than 10 percent of the Federal funds for prime contracts, subcontracts, supplies, etc. to organizations owned or controlled by minorities. TBEP fully supports the utilization of minority business enterprises as defined in the Florida Small and Minority Business and Assistance Act.

All procurement procedures shall be conducted in accordance with the code of Federal Regulations (40CFR31.36) and as applicable Chapter 287, Florida Statutes and Chapter 60A-1, F.A.C. (Exhibit B) to the extent that the Florida Statutes are not in conflict with applicable Federal laws and standards.
The following purchasing categories have been created in Chapter 287.017, Florida Statutes.

(1) CATEGORY ONE: $20,000.
(2) CATEGORY TWO: $35,000. (Sealed bid threshold)
(3) CATEGORY THREE: $65,000.
(4) CATEGORY FOUR: $195,000.
(5) CATEGORY FIVE: $325,000.

Pursuant to Chapter 287(3)(e), Florida Statutes), the following contractual services can be excluded from the bidding process; services provided by governmental agencies (including state universities), single source, artistic services, auditing services, legal services, and educational events offered to the public. However, a detailed scope of work and any other appropriate documentation deemed necessary by EPA will be provided.

Section 287 F.S. allows the use of a purchase order in lieu of a written agreement. However, the purchase order must include an adequate description of the service, the contract period and the method of payment. Additionally, the purchase order or solicitation must include all applicable provisions of Section 287 F.S. and 40 CFR 31.36 along with “Attachment A – Purchase Order Terms and Conditions” ( Exhibit C) as required by 40 CFR 31.36.

Regardless of whether a purchase order or written agreement is used, the document must contain clear and specific language regarding services/deliverables that must be rendered and accepted prior to payments being made.

Except for those excluded purchases indentified in Section 287(3)(e), Florida Statutes, all contracts for the purchase of commodities or contractual services in excess of the threshold for Category Two ($35,000) shall be awarded by competitive sealed bidding unless determined in writing by the TBEP Policy Board that the competitive sealed bidding is not practicable, at which time procurement by competitive proposal will be conducted and a request for proposal (RFP) will be issued. Respondents to RFPs are required to submit price information with their proposal pursuant to instructions from EPA Region IV.

Following approval by the Policy Board of projects listed in the Annual Work Plan, the procedure for requests for proposals is as follows:

1. The Project Manager, in consultation with the TBEP Executive Director prepares appropriate RFP and invitation-to-bid documents, including scope of work, price range (in the case of RFPs), time frame, and the evaluation method. Written selection procedures for procurement shall include a clear and accurate description of product or services required, identification of all requirements which offerors must fulfill, and factors to be used in evaluating proposals. If it is anticipated that a contract may be
renewed, it shall be so stated in the invitation to bid or the RFP. The bid shall include the price for each year for which the contract may be renewed. Evaluation of bids and proposals shall include consideration of the total price for each year as quoted by the bidder.

2. Members of the Evaluation Committee will be selected by the Tampa Bay Estuary Program Executive Director. The Committee shall review each proposal and develop findings for delivery to the Executive Director. The Executive Director may attend the Evaluation Committee meeting to help organize, but will not engage in fact-finding of the Committee. The Executive Director shall present recommendations and suggested rankings to the Tampa Bay Estuary Program Management Board. The Management Board will consider the recommendations and rankings of the Executive Director in making its recommendation to the Policy Board, which shall take the final action. The TBEP reserves the right to request clarification of any applicant and refuse any or all proposals. All respondents will be notified of selection of the contractor under this RFP.

Representatives from the public sector may be appointed to the Evaluation Committee. No employee, officer or agent of the TBEP nor any member of the Evaluation Committee shall participate in the selection, award or administration of a contract if a conflict of interest exists. Persons whose primary employer is a for-profit consulting firm are not permitted to serve on evaluation committees. All Evaluation Committee members shall execute a Code of Standards of Conduct form (Exhibit D).

3. All purchases in excess of the threshold amount for Category Two shall be advertised on the TBEP website at a minimum not less than ten (10) calendar days prior to the bid opening for invitations to bid and no less than twenty-eight (28) calendar days prior to the proposal opening for Requests for Proposals. Notice of requests for proposals shall be emailed to the TBEP Technical email listserv at least 20 calendar days prior to the date for submittal of proposals. Notice of the invitation to bid shall be emailed to prospective bidders at least 10 calendar days prior to the date set for submittal of bids. These are only minimal requirements and do not limit frequency, lapse time, or other venues in which the advertisement may appear.

4. Respondent electronic or hard-copy bids/proposals shall be held unopened in the TBEP office and publicly opened at the time prescribed in the legal advertisement and bid documents. All respondents will be notified of the list of proposers following the bid/proposal opening.

5. TBEP reserves the right to reject any or all bids/proposals and such reservation shall be indicated in all advertising and invitations to bid/requests for proposals.

6. TBEP reserves the right to waive any minor irregularities in an otherwise valid
bid/proposal. Variations which are not minor cannot be waived.

7. TBEP shall provide notice of a decision concerning a bid solicitation or a contract award to all respondents by United States mail, hand delivery, electronic mail (email), or telephone facsimile.

8. Any person who is adversely affected by the decision shall file with the TBEP a notice of protest in writing 72 hours after receipt of the notice of the agency decision and shall file a formal written protest within 10 days after the date of filing of the notice of protest. Failure to file a notice of protest or failure to file a written protest shall constitute a waiver of proceedings. The formal written protest shall state with particularity the facts and law upon which the protest is based. Failure to file a protest within the time allowed for filing a bond shall constitute a waiver of proceedings under Chapter 120, Florida Statutes.

9. Upon receipt of the formal written protest which has been timely filed, TBEP shall stop the bid solicitation process or the contract award process until the subject of the protest is resolved by final agency action.

10. TBEP, on its own initiative or upon request of a protestor, shall provide an opportunity to resolve the protest by mutual agreement between the parties within 10 days of receipt of a formal written protest.

   a) If the subject of a protest is not resolved by mutual agreement within 10 days of receipt of the formal written protest, and there is no disputed issue of material fact, an informal proceeding shall be conducted pursuant to Chapter 120.57(2) Florida Statutes and applicable TBEP rules before a person designated by TBEP.

   b) If the subject of a protest is not resolved by mutual agreement within 10 days of receipt of the formal written protest, and if there is a disputed issue of material fact, a formal proceeding shall be conducted pursuant to Chapter 120.57(1), Florida Statutes and the model rules of procedure adopted by the Florida Administrative Commission.

11. Upon receipt of a formal written protest, the TBEP Executive Director shall refer to the Department of Administrative Hearings. DOAH shall assign an administrative law judge who shall conduct a hearing within 20 days of the receipt of the formal written protest by the Department and render a recommended order within 30 days after receipt of the hearing transcript by the hearing officer, whichever is later. The provisions of this paragraph may be waived upon stipulation by all parties.

12. Records of procurement history including rationale for the method of procurement,
selection of contract type, contractor selection or rejection, shall be maintained in the
administrative files along with a complete file stored at the TBEP Records Center for a
minimum of three years.

13. The list of selected firm(s) will be presented to the Management Board for review and
recommendation and to the Policy Board for approval.

14. The TBEP Executive Director and Project Manager will negotiate the agreement with the
selected firm or agency.

15. The TBEP Executive Director will draft the contract with selected firm(s) following the
form contractor agreement (Exhibit E) or Intergovernmental Agreement (Exhibit F) as
appropriate and submit the contract for legal review.

16. The TBEP Executive Director, in the quarterly Director’s report, shall notify the TBEP
Management and Policy Boards of the contract award.

17. A Project Manager is assigned by the TBEP Executive Director for each project. The
Project Manager shall ensure that contractual services are rendered in accordance with
the terms, conditions and specifications of the contract.

18. The TBEP Program Administrator is responsible for maintaining a contract file and
financial information on all contracts.

To ensure the preservation of integrity to the fullest extent possible in the selection,
award or administration of any contract supported by public funds, TBEP shall follow
procedures in accordance with the Code of Federal Regulations (40CFR31.36) and Chapter 287,
Florida Statutes to the extent that Florida Statutes are not in conflict with applicable Federal laws
and standards.

Four basic methods are used to acquire commodities and services for the TBEP:
a) contractual agreement, b) intergovernmental agreement, c) purchase order and d) credit card.

Contract Agreement

Contract agreements are normally generated as a result of professional service assistance
required by TBEP. Contingent upon the recommendation of the Management Board, the Policy
Board approves contractor short-lists and authorizes staff to negotiate with top-ranked firms.
The standard contract form is attached as Exhibit E. Contracts shall be approved as to form and
content by TBEP Executive Director, TBEP Project Manager and legal counsel (as required).
The Chairman of the TBEP Policy Board will execute the contract unless the Policy Board
authorizes the Executive Director to execute the contract. Contracts shall first be presented for
signature to the contractor.

Two original contracts shall be executed. One original is retained in the contract files and one original is mailed to the consultant.

All contract documents and data including draft, interim, and final reports developed, created or written by the Contractor shall be provided in electronic format to TBEP. Paper documents, if necessary, shall be produced on recycled paper pursuant to EPA Order 1000.25.

**Intergovernmental Agreements**

The procurement procedures set forth in 40 CFR 31.36 encourage grantees and subgrantees to enter into state and local intergovernmental agreements for the procurement or use of common goods and services to foster greater economy and efficiency. In conjunction with the Florida Statutes Section 163.01 known as the Florida Interlocal Cooperation Act of 1969, public entities may interact with each other on a basis of mutual advantage by entering into an intergovernmental agreement. Requirements and procedures for processing intergovernmental agreements are the same as outlined for contracts. A typical intergovernmental agreement model is attached as Exhibit F.

**Purchase Orders**

Purchase order systems are established for dual purposes; one for controlling costs through purchases, and the second for internal control within the administering agency. Both purposes are of equal importance, and the purchase order system established by TBEP complies with regulations and guidelines regarding internal control and cost control. Purchase orders can be used to procure materials or services.

The TBEP Program Administrator is responsible for the control of purchase orders (Exhibit G). A purchasing activity is initiated through the TBEP Program Administrator who prepares the purchase order. An electronic log for purchase orders including date of initiation, vendor, item (service) ordered, and amount is maintained by the TBEP Program Administrator.

Purchase orders for materials should specify type of item, size, color, and other appropriate descriptions to ensure satisfactory order. Purchase orders for services should specify tasks, deliverables, and a timeline. Purchase orders should also include the vendor’s inventory item number and price (including applicable discounts), along with the project number to be charged. Items must be verified for availability of funds through the TBEP Program Administrator.

After approval by the TBEP Executive Director, the purchase order is returned to the TBEP Program Administrator for recording and release to the vendor. The original copy is sent
to the vendor via electronic mail, one copy will be kept on file with the TBEP Program Administrator.

In accordance with Chapter 403.7065 of Florida Statute it shall be the policy of TBEP to procure products or materials with recycled content when those products or materials are available at reasonable prices. A decision not to procure such items must be based on a determination that such procurement:

1) Is not available within a reasonable period of time; or

2) Fails to meet the performance standards set forth in the applicable specifications or fails to meet the reasonable performance standards of the agency.

"Recycled content" means materials that have been recycled that are contained in the products or materials to be procured, including, but not limited to, paper, aluminum, glass and composted material. The term does not include internally generated scrap that is commonly used in industrial or manufacturing processes or waste or scrap from another manufacturer who manufactures the same or a closely related product.

**TBEP Credit Card**

TBEP Credit cards shall be used, when practical, to purchase goods and services. A corporate credit card account will be established and used, when appropriate, for purchases. Purchases larger than $100 must be pre-approved by the Executive Director and Program Administrator. All receipts must be submitted to the Program Administrator. The TBEP Program Administrator will receive statements and forward them for processing on a monthly basis.

**CASH DISBURSEMENTS**

The TBEP Program Administrator shall approve routine bills and purchases such as utility and telephone bills. The TBEP Executive Director shall approve all invoices for legal services. After approval, invoices are sent to TBRPC Accounting for processing.

The TBEP Program Administrator receives all unopened bank statements for inspection of all deposits and checks disbursed during the period. The statements are received by TBRPC Accounting for reconciliation. All bank reconciliations require the approval of the TBRPC Accounting Manager.

All accounts payable require approval by the Program Administrator and the Executive Director and are forwarded to Accounting to be processed on Tuesday of each week. Staff travel reimbursements, including seminar or conference attendance must be approved by the Executive
Director. The Program Administrator will keep records of approved travel requests. The TBEP Chair shall approve travel reimbursements accrued by the Executive Director.

Invoices shall be addressed to TBEP. The TBEP Executive Director shall approve all TBEP invoices in excess of $300. The TBEP Program Administrator shall approve invoices less than $300. The TBEP Executive Director may delegate authority for approving check requests and invoices to the Program Administrator, in the event that the Executive Director is not available.

CASH RECEIPTS

The objective of the Cash Procedure is to insure that all cash and checks are accurately received, recorded, and promptly deposited. The TBEP Program Administrator is responsible for all cash and checks received via mail. The Program Administrator will endorse stamp all checks on the back “for deposit only Tampa Bay Estuary Program”, deposit into the TBEP bank account, and forward documentation of deposit to TBRPC Accounting.

PAYROLL

When a person is hired, the TBEP Program Administrator immediately prepares a personnel folder. This folder should contain the following documents:

- Completed Application
- Resume
- Employment Letter
- Copy of Social Security and Driver’s License
- W-4
- Employee Handbook Form
- Key Entrance Form
- Florida Retirement Membership Form
- Immigration Form
- COBRA Letter
- Drug Free Workplace Statement
- Professional Background

All personnel records are kept locked in the administrative area. The TBEP Executive Director and TBEP Program Administrator are authorized to have access to the TBEP’s personnel files. If anyone has to inspect a file, one of these individuals must be present at all times.

The TBEP Executive Director authorizes the hiring of an employee by signing an
Employment Letter and Pay Change Authorization Form (Exhibit H). This form is routed to TBRPC Accounting to initiate a payroll master file for the new employee. Any changes in the master file must be initiated by the properly executed form such as the Pay Change Authorization Form, W-5 Form, Insurance Application or approved authorization for miscellaneous payroll deductions.

All labor charges to projects (including sick and holiday) and non-chargeable time for vacation are reported on an electronic Bi-Weekly Time Sheet Form (Exhibit I).

Each Time Sheet Form should include the correct numbers of hours reported for the time period, period ending date and signature of employee and approval of supervisor. All time must be reported to the nearest quarter of an hour.

Full-time and part-time employees accumulate sick and vacation leave as addressed in the TBEP Employee Handbook. The employee must request sick or annual leave from the Executive Director for approval via email, with a copy to the Program Administrator. The Program Administrator will keep files of leave requests and approvals.

The approved time sheets shall be submitted to TBRPC Accounting where they will be utilized both to produce time accounting reports and assist in the preparation of the payroll reports. Payroll is direct deposited into the employee’s bank account by the TBRPC.

An employee terminating employment in accordance with the established TBEP Employee Handbook is entitled to a final check that includes pay for accumulated vacation and sick leave if applicable. Before the final check (s) is released, the individual must complete the Employee Check-out Form (Exhibit J).

**TBEP INVESTMENT POLICY AND OVERSIGHT**

1). Authority

The Florida law governing TBEP’s surplus funds is Chapter 218.415 Florida Statutes - “Local Government Investment Policies.”

Paragraph 17 addresses local municipal governments with no formal written investment policy and states, “Those units of local government electing not to adopt a written investment policy in accordance with investment policies developed as provided in subsections (1)-(15) may invest or reinvest any surplus public funds in their control or possession in:

(a) The Local Government Surplus Funds Trust Fund, or any intergovernmental investment pool authorized pursuant to the Florida Interlocal Cooperation Act of 1969, as provided in s. 163.01.
(b) Securities and Exchange Commission registered money market funds with the highest credit quality rating from a nationally recognized rating agency.

(c) Interest-bearing time deposits or savings accounts in qualified public depositories (QPD), as defined in s. 280.02.

2). Internal Controls of Cash Management

Policy Board Chair - Authorized signer on account. Full account access
Executive Director - Authorized signer on account. Full account access
Program Administrator - Authorized signer, Deposits only. Limited online reconciliation.
External Accounting Manager (RPC) - Online Treasury Manager. Oversight of all banking transactions.
External Accountant (RPC) - Online Treasury Manager. Conducts all online banking transactions.

External accountants provide monthly banking reconciliation on all accounts, scrutinize for accuracy.

3). Annual Audit over Internal Controls

In accordance with Government Auditing Standards, an annual audit is conducted, and in part, considers the Estuary Program’s internal control over financial reporting and tests its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. Various tests are performed to provide reasonable assurance about whether the Estuary Program’s financial statements are free from material misstatement or noncompliance with which could have a direct and material effect on the determination of financial statement.
Exhibits

Section 112.061 Florida Statutes A.

40 CFR 31.36, Chapter 287 Florida Statutes, B.
Chapter 60A-1 F.A.C.

Purchase Order “Attachment A – Terms and Conditions” C.

Code of Standards of Conduct D.

Contractor Agreement E.

Intergovernmental Agreement F.

Blank Purchase Order G.

Employment Letter/Pay Change H.

Timesheet I.

Employment Check-Out Form J.
Ms. Holly S. Greening  
Executive Director  
Tampa Bay Estuary Program  
263 – 13th Ave., South; Suite 350  
St. Petersburg, FL 33701

Re: Administrative and Financial Review

Dear Ms. Greening:

The U.S. Environmental Protection Agency conducted a desk review on October 27, 2016 of two EPA Assistance Agreements CD000D39615-0 and CE00D31115-0 issued to the Tampa Bay Estuary Program.

The objectives of the desk review were to assess the effectiveness of Tampa Bay’s internal controls and to determine if the grantee’s administrative and financial management systems meet the requirements outlined in the Code of Federal Regulations (CFR) 2 CFR 200 and 1500, “Uniformed Administrative Requirements, Cost Principles and Audit Requirement for Federal Awards” and relevant Terms and Conditions of the EPA assistance agreement.

The review did not disclose any findings which need improvement for compliance with EPA grant requirements.

We appreciate the assistance received from you and your staff for this desk review.

Sincerely,

[Signature]

Keva R. Lloyd, Chief  
Grants and Audit Management Section

Enclosure

cc: Tina Lamar, Project Officer  
Geryl Ricks, Project Officer
Participation on Advisory Committees, Review Panels, Planning Committees
July 1, 2012 - June 30, 2017

Holly Greening, Executive Director (2012-2017)

Tampa Bay
- Member, SWFWMD Natural Resources Advisory Committee
- Member at large, Hillsborough County Agricultural Economic Development Council
- Member, Tampa Bay Regional Planning Council’s Agency on Bay Management
- Co-editor, *Integrating Science and Management in Tampa Bay, Florida* (USGS Circular 1348)
- Member, St. Petersburg Pier Scientific Review Panel
- Member, TBRPC Future of the Region Review Panel
- Member, Florida Estuaries Alliance
- Member, Pinellas County RESTORE Working Group
- Member, Southwest Florida Ecosystem Restoration Plan Work Group
- Ex-Officio, IRLEP Program Evaluation Team; Long Island Sound Study

National
- Chair of the 2012 Coastal and Estuarine Research Federation Conference
- Member, Florida Oceans and Coastal Council
- Associate Editor for the scientific journal *Estuaries and Coasts*
- Chair, Association of National Estuary Programs
- Member, National Academy of Sciences Committee evaluating Chesapeake Bay’s nutrient management strategy
- Member, Restore America’s Estuaries 2012 Conference Steering Committee
- Member, National Blue Carbon Working Group
- Member, NOAA NERRS Science Advisory Board
- Member, Gulf of Mexico Research Institute Review Team
- Member, NOAA Science Collaborative Project Review Team

Ed Sherwood, Senior Scientist (2012-2017)

Tampa Bay
- Board of Director Member, Hillsborough River Watershed Alliance
- Member, McKay Bay Working Group
- Alternate member, SWFWMD Environmental Advisory Committee
- Alternate member, Hillsborough Co. Agriculture & Economic Development Committee
- Alternate member, Pinellas County Environmental Science Forum
- Alternate member, Tampa Bay Climate Science Advisory Panel
- Co-chair, BASIS 6 Steering Committee
· Member, BMAP Hillsborough & Alafia Working Groups
· Member, Hillsborough County Environmental Lands Strategic Planning TAC
· Member, Southwest Florida Bay Scallop Restoration Working Group
· Member, Southwest Florida Regional Ambient Monitoring Program
· Member, Southwest Florida Tidal Tributaries Working Group
· Lead, Tampa Bay Interagency Seagrass Transect Monitoring Program
· Facilitator, Tampa Bay Nitrogen Management Consortium
· Facilitator, Tampa Bay Estuary Program Technical Advisory Committee

National
· Member, MS-AL Sea Grant Review Panel
· NOAA RESTORE Science RFP Review Panel

Lindsay Cross, Science and Policy Coordinator (2012-2016)

Tampa Bay
· Judge, Pinellas County Science Fair
· Co-chair, Pinellas County Environmental Science Forum
· President, Friends of Weedon Island
· Member, Pinellas County Post-Disaster Recovery Plan group
· Member, TBARTA Land Use Working Group
· Member, Tampa Bay Regional Planning Advisory Committee
· Environmental Education and Outreach Officer, TRUE Dive Team, Tampa Chapter
· Member, Tampa Migratory Bird Protection Committee
· Member, ONE BAY, Livable/Resilient Communities Working Groups
· Member, Tampa Bay Climate Science Advisory Panel
· Member, St. Petersburg Ocean Team
· Member, Pinellas Extension and Pinellas Sea Grant Advisory teams
· Member, Tampa BASIS6 Steering Committee
· Member, Leadership St. Pete
· Facilitator, Habitat Restoration Partnership
· Facilitator, Dredging Advisory Committee

National
· Member, External Scientific Advisory Panel, Reinventing Aging Infrastructure for Nutrient Management
Gary Raulerson, Program Ecologist (2016-2017)

**Tampa Bay**
- Member, Pinellas Extension and Pinellas Sea Grant Advisory teams
- Member, Tampa Migratory Bird Protection Committee
- Member, Peninsular Florida Landscape Conservation Cooperative
- Facilitator, Southwest Florida Seagrass Working Group
- Facilitator, Dredging Advisory Group
- Member, Tampa Bay Interagency Seagrass Transect Monitoring Program

Maya Burke, Science Policy Coordinator (2016-2017)

**Tampa Bay**
- Member, Tampa Bay Climate Science Advisory Panel
- Member, ONE BAY Resilient Communities Working Group
- Member, Suncoast Sea Level Rise Cooperative
- Member, Tampa Bay Harbor Safety & Security Committee
- Member, Shell Key Advisory Committee
- Co-Chair, BASIS6 Steering Committee
- President, Friends of Boyd Hill Nature Preserve

**National**
- Member, Gulf of Mexico Alliance Climate Community of Practice

Nanette O'Hara, Public Outreach Coordinator (2012-2017)

**Tampa Bay**
- Coordinator, Manatee Awareness Coalition
- Coordinator, Fertilizer Education Advisory Committee
- Member, Florida Aquarium Education Committee
- Member, Stormwater Education and Training Committee
- Member, *Bay Soundings* Editorial Advisory Committee
- Member, Hillsborough Florida Yards & Neighborhoods Advisory Committee
- Member, Suncoast Cooperative Invasive Species Management Area

Misty Cladas, Community Project Manager (2012-2017)

**Tampa Bay**
- Facilitator, Tampa Bay Estuary Program Community Advisory Committee
- Member, Let's Move Outside! Tampa

**National**
- Member, Trash Free Waters Working Group
Ron Hosler, Program Administrator (2012-2017)
Colleen Gray, Outreach Specialist (2012-2014)
None.
The Tampa Bay Estuary Program (TBEP) and the Tampa Bay Nitrogen Management Consortium (NMC) submitted the “Tampa Bay Watershed Management Summary” to the Florida Department of Environmental Protection (FDEP) on July 29, 2002. The purpose of that document (called the “2002 Tampa Bay Reasonable Assurance Document”) was to summarize the nitrogen management plan developed by the TBEP for Tampa Bay and to outline the underlying scientific basis for the plan. The document was formatted to facilitate its use in demonstrating reasonable assurance that designated uses of waterbody segments within the Tampa Bay basin, which were designated as potentially impaired for nutrients pursuant to Chapter 62-303, F.A.C., will be maintained or restored. The document also provided a basis for designation of alternative site-specific thresholds that more accurately reflect conditions beyond which an imbalance of flora and fauna may occur.

In November 2002, the FDEP Bureau of Watershed Management concluded that “the nitrogen management plan developed by TBEP for Tampa Bay provides reasonable assurance that impairment of designated uses related to nutrients in Tampa Bay will be adequately addressed.”

Subsequent to the 2002 effort, both a 2007 Reasonable Assurance Update and 2009 Reasonable Assurance Addendum were prepared for FDEP to ensure that the original 2002 determination would be extended until 2012. The 2007 Tampa Bay Update to Reasonable Assurance Documentation and 2009 Addendum were intended to: 1) provide an update on implementation of the Tampa Bay Nitrogen Management Strategy to FDEP for the 2003-2007 period; 2) provide adequate documentation to allow FDEP a finding of Reasonable Progress pursuant to Florida Administrative Code 62-303.600 for the 2003-2007 period; and, 3) provide TN loading allocations to categories of nitrogen sources by major bay segment, and facility-specific and MS4 specific allocations within each major bay segment, to support any FDEP water quality based effluent limitation, FDEP Reasonable Assurance determination, and to comply with the federally-recognized TMDL for Tampa Bay. Lastly, a 2012 Reasonable Assurance Update was submitted to the FDEP to extend the Reasonable Assurance determination through 2017.

The format of this 2017 Reasonable Assurance (RA) Update follows that provided in the draft “Guidance for Development of Documentation to Provide Reasonable Assurance that Proposed Pollution Control Mechanisms will Result in the Restoration of Designated Uses in Impaired Waters” provided by FDEP in February 2002. For each element, updated 2017 Reasonable Assurance documentation is integrated with any relevant documentation detailed in the 2002, 2007, 2009 and 2012 RA submittals.
1. Description of the Waterbody

2017 RA Update: The Tampa Bay estuary is located on the eastern shore of the Gulf of Mexico in Florida (Figure 1). At 882 km$^2$, it is Florida’s largest open water estuary. Greater than 3 million people live in the 5870 km$^2$ watershed. Land use in the watershed is mixed, with about 32% of the watershed undeveloped, 20% agricultural, 43% urban and suburban residential, and the remaining 5% mining. Major habitats in the Tampa Bay estuary include mangroves, salt marshes, salt barrens and submerged aquatic vegetation.

Between 1950 and 1988, an estimated 42% of the seagrass acreage in Tampa Bay was lost primarily through excess nitrogen loading and related increases in phytoplankton concentrations, causing light limitation for seagrass survival and growth. In 1980, all municipal wastewater treatment plants were required to provide 100% reuse or Advanced Wastewater Treatment (AWT) for discharges directly to the bay and its tributaries. In addition to the significant reductions in nitrogen loadings from municipal wastewater treatment plants, stormwater regulations enacted in the 1980s also resulted in reduced nitrogen loads to the bay. Estimates for average annual total nitrogen loadings to Tampa Bay for 1976 are more than 2.6 times greater than current estimates (2010-2016 annual average).

A key focus of the TBEP has been to establish nitrogen loading targets for Tampa Bay to encourage seagrass recovery. In 1996, local government and agency partners in the TBEP approved a long-term goal to restore 95% of the seagrass coverage observed in 1950 (38,000 acres). Also in 1996, the Tampa Bay Nitrogen Management Consortium (NMC) was formed. The NMC includes local governments and agencies participating in the TBEP, as well as phosphate companies, port industries, electric utilities and agricultural interests in the Tampa Bay watershed. These entities have pledged to work cooperatively in a voluntary, ad-hoc framework to assist with the maintenance of nitrogen loads to support seagrass restoration in Tampa Bay.

Recent data and observations from Tampa Bay indicate that continuing efforts to reduce nitrogen loading by the NMC partners are resulting in more than sufficient water quality for the expansion of seagrasses. Time series plots show that, with the exception of the Old Tampa Bay segment in 2015, FDEP-adopted chlorophyll-a thresholds have been met in all four major bay segments over the 2012-2016 RA period (Figure 2). As part of the compliance assessment protocol established in the 2009...
Reasonable Assurance Addendum, a response to these exceedances is not necessary unless the exceedances occurred in two concurrent years. Nevertheless, the TBEP and Consortium participants have undertaken actions to address the exceedances observed in the Old Tampa Bay segment as described in Section 5.

Furthermore, seagrass acreage in Tampa Bay continues to increase. Between 2012 and 2016, seagrass coverage increased by 7,013 acres. As of 2016, Tampa Bay seagrass acreage (41,655 acres) now exceeds both the recovery goal (38,000 acres) and the historic, 1950 benchmark period estimate (40,420 acres) (Figure 3).

Figure 2: Annual average chlorophyll-a concentration in each of the four major bay segments, 1974-2016. The solid lines represent chlorophyll-a thresholds FDEP recognizes as indicators for impairment in each of the major bay segments and are the designated alternative site-specific thresholds adopted by FDEP in 2002. Grey shaded area indicates the 2012-2016 Reasonable Assurance Period. Data source: Environmental Protection Commission of Hillsborough County (EPCHC).

Figure 3: Historic seagrass acreage estimates. Data source: TBEP & SWFWMD.
1.a. Name
2017 RA Update: No change. This document addresses the four main bay segments of Tampa Bay: Old Tampa Bay, Hillsborough Bay, Middle Tampa Bay and Lower Tampa Bay. As of the 2009 RA Addendum, an additional segment was included: “Remainder of Lower Tampa Bay.” This segment includes Terra Ceia Bay and portions of the Manatee River and Boca Ciega Bay. A cross-reference between these TBEP-identified management segments and FDEP WBID boundaries was previously provided in the 2009 RA Addendum (Appendix E-2 through E-10). Figure 4 depicts the overlap of the bay segment and FDEP WBIDs as of the 2009 RA Addendum submittal. It should be noted that the Old Tampa Bay, Hillsborough Bay, Middle Tampa Bay and Lower Tampa Bay segments are identical to FDEP’s established estuary nutrient regions.

1.b. Location
2017 RA Update: No change. Please refer to Figure 1 and Figure 4.

1.c. Watershed/8-digit cataloging unit code:
2017 RA Update: No change. 03100206 Tampa Bay and coastal areas

1.d. Type (lake, stream or estuary) of water:
2017 RA Update: No change. Estuary.

1.f. Water use classification:
2017 RA Update: Class II and III waters. Class II waters were realigned in 2015. See rule 62-302.400, F.A.C.

1.g. Designated use of waterbody:
2017 RA Update: No change. As per FDEP’s latest 2016 305(b) Integrated Water Quality Assessment Report for Florida, all WBIDs in Tampa Bay proper are identified as either EPA Integrated Assessment...
Category 2 (attaining some designated uses) or 4b (impaired for one or more designated uses, but no TMDL is required because an existing or proposed pollutant control mechanism provides reasonable assurance that the water will attain standards in the future) for nutrient-related impairments (Figure 5). Note that this document does not address impairments related to Class II shellfish harvesting areas in Tampa Bay.

Figure 5: FDEP results of Florida’s surface water quality assessment with focus on the Tampa Bay region: EPA assessment categories for nutrients. Source: FDEP.

1.h. Area of the waterbody:
2017 RA Update: No change. The total surface area of the four major bay segments in Tampa Bay is 882 km$^2$ (approximately 341 square miles).

1.i. Pollutant(s) of Concern:
2017 RA Update: No change. The pollutant of concern has been identified as Total Nitrogen (TN), which has been determined to be the limiting nutrient in Tampa Bay$^6$. Elevated nitrogen loading has been

demonstrated to lead to excess algal growth (as indicated by chlorophyll-a concentrations), which in turn leads to reduced light penetration and loss of seagrass in the bay.

1.j. Suspected or documented sources of pollutant of concern:
2017 RA Update: The TBEP has developed loading reports for Tampa Bay since 1985. The most recent estimates of TN loading to Tampa Bay are for the 2012-2016 time period. Overall, total loadings to the bay have declined from previous annual average estimates. Table 1 shows the mix of major contributing sources of TN load to Tampa Bay over the 5-yr RA assessment periods. In addition, the per capita TN loading to the bay has decreased over time (Figure 6), and the amount of TN delivered per unit water has also decreased over time in each of the major bay segments (Figure 7). To date, hydrologically-normalized total loads to Tampa Bay are at the lowest levels since they have been estimated (1985) despite an ever increasing population in the Tampa Bay metropolitan area (Figure 8).

Table 1: Summary of major TN loading sources (mean percentage contribution) estimated for the 5-year Tampa Bay RA periods.

<table>
<thead>
<tr>
<th>Source</th>
<th>2002 RA Update 1997-2001 (Mean %)</th>
<th>2007 RA Update 2002-2006 (Mean %)</th>
<th>2012 RA Update 2007-2011 (Mean %)</th>
<th>2017 RA Update 2012-2016 (Mean %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater</td>
<td>59.3</td>
<td>58.8</td>
<td>51.3</td>
<td>65.7</td>
</tr>
<tr>
<td>Direct Atmospheric Deposition</td>
<td>22.7</td>
<td>18.2</td>
<td>25.2</td>
<td>17.1</td>
</tr>
<tr>
<td>Domestic Wastewater</td>
<td>9.6</td>
<td>9.2</td>
<td>14.7</td>
<td>11.1</td>
</tr>
<tr>
<td>Industrial Wastewater</td>
<td>3.9</td>
<td>10.9</td>
<td>6.8</td>
<td>4.9</td>
</tr>
<tr>
<td>Industrial Fertilizer Losses</td>
<td>0.7</td>
<td>0.5</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Groundwater and Springs</td>
<td>3.8</td>
<td>2.4</td>
<td>1.5</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Figure 6: Trend in historic per capita estimate of total nitrogen load (lbs. per person per year) entering Tampa Bay. (Data Sources: TBEP, US Census Bureau).
Figure 7: Nitrogen delivery ratio [i.e. total nitrogen load (tons/yr) per unit water (million m$^3$) delivered] to each of the major bay segments. The 1992-1994 ratio targets (black horizontal line) are highlighted for each bay segment and represent the arithmetic mean of those years. The 1992-1994 arithmetic mean ratio targets have been adopted by FDEP and accepted by EPA as the numeric nutrient criteria for the Old Tampa Bay, Hillsborough Bay, Middle Tampa Bay and Lower Tampa Bay segments. These bay segments have been established as FDEP Estuary Nutrient Regions.
2. Description of Water Quality or Aquatic Ecological Goals

2.a. Water quality-based targets or aquatic ecological goals

2017 RA Update: No change. Maintaining seagrass acreages at near 1950’s levels is still the primary restoration goal for Tampa Bay. Maintaining adequate water quality at adopted FDEP threshold levels for chlorophyll-a in each of the major bay segments on an annual average basis is the primary metric for assessing progress in maintaining the seagrass restoration goal. In addition, with adoption of the 2009 Reasonable Assurance Addendum, a secondary goal to maintain hydrologically-normalized total nitrogen loads to each of the major bay segments was established. As a result, a compliance assessment framework was established for future reasonable assurance determinations in the 2009 RA Addendum.
The Tampa Bay NMC further refined the allocation compliance assessment methodology during the 2012-2016 RA period with FDEP concurrence.

2.b. Averaging Period:

2017 RA Update: No change. The TBEP uses annual average bay segment chlorophyll-a levels for tracking attainment of water quality targets and thresholds. An annual assessment of TN loads is predicated on the water quality assessment as outlined in the compliance assessment framework detailed above. Details on how the annual bay segment assessments are developed can be found here: [http://shiny.tbeptech.org/tbepwqassess/](http://shiny.tbeptech.org/tbepwqassess/). All source code for the analysis is located here: [https://github.com/esherwoo77/pull_epc_data](https://github.com/esherwoo77/pull_epc_data).

2.c. How will goals result in restoration of impaired designated uses:

2017 RA Update: No change. Maintaining chlorophyll-a concentrations at target levels is expected to result in the maintenance of water clarity levels adequate to support seagrass at depths observed in 1950, thereby ensuring that nutrient levels do not result in an imbalance in the flora or fauna of Tampa Bay.

2.d. Determining whether additional corrective actions are needed.

2017 RA Update: No changes to the TBEP’s annual management Decision Matrix process, the Tampa Bay NMC nutrient management strategy or allocation compliance assessment framework. Annual allocation compliance assessment protocols were established in the 2009 RA Addendum to determine whether any additional corrective actions would be necessary in relation to bay segment specific nitrogen loadings. Results of the bay segment-specific compliance assessment over the 2012-2016 RA Period are described in Figure 9 and Table 2 - Table 6.

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7 [https://www.tbeptech.org/attachments/article/50/FINAL_NMC_APPROVED_2009_RA_Addendum_Addressing_FDEP_Comments_01222010.pdf#page=63](https://www.tbeptech.org/attachments/article/50/FINAL_NMC_APPROVED_2009_RA_Addendum_Addressing_FDEP_Comments_01222010.pdf#page=63)
8 [https://www.tbeptech.org/NitrogenMgmtConsort/Key_Actions/Final_NMC_Decision_Memo_2016-01_Recommended_Compliance_Assessment_Approach.pdf](https://www.tbeptech.org/NitrogenMgmtConsort/Key_Actions/Final_NMC_Decision_Memo_2016-01_Recommended_Compliance_Assessment_Approach.pdf)
9 [https://www.tbeptech.org/NitrogenMgmtConsort/Key_Actions/FINAL_NMC_Decision_Memo_2016-02_Unanticipated_Discharges.pdf](https://www.tbeptech.org/NitrogenMgmtConsort/Key_Actions/FINAL_NMC_Decision_Memo_2016-02_Unanticipated_Discharges.pdf)
10 [https://www.tbeptech.org/NitrogenMgmtConsort/Key_Actions/FDEP_Reponse_TBNMC_2016-01+02_020817.pdf](https://www.tbeptech.org/NitrogenMgmtConsort/Key_Actions/FDEP_Reponse_TBNMC_2016-01+02_020817.pdf)

NMC Approved: September 29, 2017
2017 Tampa Bay RA Update
-10-
### Figure 9: Attainment of adopted chlorophyll-a thresholds (1974-2016) in the four major bay segments. Green (yes) indicates that average annual chlorophyll-a thresholds were met; red (no) indicates that threshold levels were not met. Data source: EPCHC.

<table>
<thead>
<tr>
<th>Year</th>
<th>Old Tampa Bay</th>
<th>Hillsborough Bay</th>
<th>Middle Tampa Bay</th>
<th>Lower Tampa Bay</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>No</td>
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<td>1975</td>
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<td>2016</td>
<td>Yes</td>
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</tbody>
</table>
Table 2: Demonstration of reasonable assurance assessment steps for Old Tampa Bay. Green and yellow squares indicate outcomes of decision points outlined in the NMC’s reasonable assurance assessment framework.

<table>
<thead>
<tr>
<th>Bay Segment Reasonable Assurance Assessment Steps</th>
<th>DATA USED TO ASSESS ANNUAL REASONABLE ASSURANCE</th>
<th>OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMC Action 1: Determine if observed chlorophyll-a exceeds FDEP threshold of 9.3 µg/L</td>
<td>Year 1 (2012) 7.8 µg/L (No) Year 2 (2013) 8.7 µg/L (No) Year 3 (2014) 7.9 µg/L (No) Year 4 (2015) 10.7 µg/L (Yes) Year 5 (2016) 9.0 µg/L (No)</td>
<td>One year (2015) above threshold, not necessary for NMC Actions 2-5, as 2016 results returned to below threshold.</td>
</tr>
<tr>
<td>NMC Action 2: Determine if any observed chlorophyll-a exceedances occurred for 2 consecutive years</td>
<td>No No No No No</td>
<td>Concurrent years with threshold exceedances did not occur, not necessary for NMC Actions 3-5</td>
</tr>
<tr>
<td>NMC Action 3: Determine if observed hydrologically-normalized total load exceeds federally-recognized TMDL of 486 tons/year</td>
<td>N/A N/A N/A N/A N/A</td>
<td>Not necessary due to observed water quality and seagrass conditions in the bay segment.</td>
</tr>
<tr>
<td>NMC Actions 4-5: Determine if any entity/source/facility specific exceedances of 5-yr average allocation occurred during implementation period</td>
<td></td>
<td>Not necessary when chlorophyll-a thresholds met.</td>
</tr>
</tbody>
</table>

Table 3: Demonstration of reasonable assurance assessment steps for Hillsborough Bay. Green and yellow squares indicate outcomes of decision points outlined in the NMC’s reasonable assurance assessment framework.

<table>
<thead>
<tr>
<th>Bay Segment Reasonable Assurance Assessment Steps</th>
<th>DATA USED TO ASSESS ANNUAL REASONABLE ASSURANCE</th>
<th>OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMC Action 1: Determine if observed chlorophyll-a exceeds FDEP threshold of 15.0 µg/L</td>
<td>Year 1 (2012) 12.6 µg/L (No) Year 2 (2013) 12.9 µg/L (No) Year 3 (2014) 13.1 µg/L (No) Year 4 (2015) 9.0 µg/L (No) Year 5 (2016) 11.4 µg/L (No)</td>
<td>All years below threshold, not necessary for NMC Actions 2-5</td>
</tr>
<tr>
<td>NMC Action 2: Determine if any observed chlorophyll-a exceedances occurred for 2 consecutive years</td>
<td>No No No No No</td>
<td>All years met threshold, not necessary for NMC Actions 3-5</td>
</tr>
<tr>
<td>NMC Action 3: Determine if observed hydrologically-normalized total load exceeds federally-recognized TMDL of 1451 tons/year</td>
<td>N/A N/A N/A N/A N/A</td>
<td>Not necessary due to observed water quality and seagrass conditions in the bay segment.</td>
</tr>
<tr>
<td>NMC Actions 4-5: Determine if any entity/source/facility specific exceedances of 5-yr average allocation occurred during implementation period</td>
<td></td>
<td>Not necessary when chlorophyll-a thresholds met.</td>
</tr>
</tbody>
</table>

Table 4: Demonstration of reasonable assurance assessment steps for Middle Tampa Bay. Green and yellow squares indicate outcomes of decision points outlined in the NMC’s reasonable assurance assessment framework.

<table>
<thead>
<tr>
<th>Bay Segment Reasonable Assurance Assessment Steps</th>
<th>DATA USED TO ASSESS ANNUAL REASONABLE ASSURANCE</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMC Action 1: Determine if observed chlorophyll-a exceeds FDEP threshold of 8.5 µg/L</td>
<td>Year 1 (2012) 7.8 µg/L (No) Year 2 (2013) 6.8 µg/L (No) Year 3 (2014) 6.8 µg/L (No) Year 4 (2015) 8.1 µg/L (No) Year 5 (2016) 5.7 µg/L (No)</td>
<td>All years below threshold, not necessary for NMC Actions 2-5</td>
</tr>
<tr>
<td>NMC Action 2: Determine if any observed chlorophyll-a exceedances occurred for 2 consecutive years</td>
<td>No No No No No</td>
<td>All years met threshold, not necessary for NMC Actions 3-5</td>
</tr>
<tr>
<td>NMC Action 3: Determine if observed hydrologically-normalized total load exceeds federally-recognized TMDL of 799 tons/year</td>
<td>N/A N/A N/A N/A N/A</td>
<td>Not necessary due to observed water quality and seagrass conditions in the bay segment.</td>
</tr>
<tr>
<td>NMC Actions 4-5: Determine if any entity/source/facility specific exceedances of 5-yr average allocation occurred during implementation period</td>
<td></td>
<td>Not necessary when chlorophyll-a threshold and TMDL target met</td>
</tr>
</tbody>
</table>

NMC Approved: September 29, 2017
2017 Tampa Bay RA Update
Table 5: Demonstration of reasonable assurance assessment steps for Lower Tampa Bay. Green and yellow squares indicate outcomes of decision points outlined in the NMC’s reasonable assurance assessment framework.

<table>
<thead>
<tr>
<th>Bay Segment Reasonable Assurance Assessment Steps</th>
<th>DATA USED TO ASSESS ANNUAL REASONABLE ASSURANCE</th>
<th>OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMC Action 1: Determine if observed chlorophyll-a exceeds FDEP threshold of 5.1 µg/L</td>
<td>4.4 µg/L (No)</td>
<td>3.9 µg/L (No)</td>
</tr>
<tr>
<td>NMC Action 2: Determine if any observed chlorophyll-a exceedances occurred for 2 consecutive years</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>NMC Action 3: Determine if observed hydrologically-normalized total load exceeds federally-recognized TMDL of 349 tons/year</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>NMC Actions 4-5: Determine if any entity/source/facility specific exceedances of 5-yr average allocation occurred during implementation period</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6: Demonstration of reasonable assurance assessment steps for Remainder of Lower Tampa Bay. Green and yellow squares indicate outcomes of decision points outlined in the NMC’s reasonable assurance assessment framework.

<table>
<thead>
<tr>
<th>Bay Segment Reasonable Assurance Assessment Steps</th>
<th>DATA USED TO ASSESS ANNUAL REASONABLE ASSURANCE</th>
<th>OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMC Action 1: Determine if observed chlorophyll-a exceeds FDEP threshold of 5.1 µg/L for Lower Tampa Bay proper</td>
<td>4.4 µg/L (No)</td>
<td>3.9 µg/L (No)</td>
</tr>
<tr>
<td>NMC Action 2: Determine if any observed chlorophyll-a exceedances occurred for 2 consecutive years</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>NMC Action 3: Determine if observed hydrologically-normalized total load exceeds RA target load of 629 tons/year</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>NMC Actions 4-5: Determine if any entity/source/facility specific exceedances of 5-yr average allocation occurred during implementation period</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. A Description of the Proposed Management Actions to be Undertaken

3.a. Participating Entities

2017 RA Update:
Members of the Tampa Bay Estuary Program Policy Board include the following:

- City of Tampa
- City of Clearwater
- City of St. Petersburg
- Manatee County
- Hillsborough County
- Pinellas County
- Pasco County (joined in 2016)
- Florida Dept. of Environmental Protection
- Southwest Florida Water Management District
- U.S. Environmental Protection Agency (EPA serves as a non-voting advisory agency to the Tampa Bay Estuary Program)

The Tampa Bay Nitrogen Management Consortium includes participants from the following public and private entities:

2017 NMC Public Partners

- Tampa Bay Estuary Program
- U.S. Environmental Protection Agency
- Florida Department of Environmental Protection
- Florida Department of Agriculture & Consumer Services
- Florida Department of Transportation
- Southwest Florida Water Management District
- MacDill Air Force Base
- Tampa Bay Regional Planning Council
- Tampa Bay Water
- Tampa Port Authority
- Environmental Protection Commission of Hillsborough County
- Hillsborough County
- Manatee County
- Pasco County
- Pinellas County
- Polk County
- Sarasota County
- City of Bradenton
- City of Clearwater
- City of Gulfport
- City of Lakeland
- City of Largo
- City of Mulberry
- City of Oldsmar
- City of Palmetto
- City of Plant City
- City of Safety Harbor
- City of St. Petersburg
- City of Tampa

2017 NMC Private Partners

- Busch Entertainment
- Lowry Park Zoo
- Mosaic Company
- Tampa Port Services, LLC
- Kinder Morgan Bulk Terminals, Inc.
- HRK Holdings, Inc.
- Tampa Electric Company
- Duke Energy Corporation
- CSX Transportation
- Tropicana Products, Inc.
- Kerry I&F Contracting
- Trademark Nitrogen
- Yara North America
- Alafia Preserve, LLC
- Eagle Ridge, LLC
- LDC Donaldson Knoll Investments, LLC
3.b. Existing and proposed management activities

2017 RA Update: During the 2012-2016 RA implementation period, partners entered information on completed and planned TN load reduction projects into the on-line, Tampa Bay Action Plan Database (http://apdb.tbeptech.org). Consortium participants and regulators have direct access to input and view projects contained in the database. Various reporting tools are available online, and a GIS mapping interface for projects that contain location information is available (Figure 10). Over the 2012-2016 RA implementation period, 51 projects were implemented in the Tampa Bay watershed by Consortium participants. Cumulatively, for those projects that have load reduction estimates associated with them, a TN load reduction of 147.3 tons/year was estimated over the 2012-2016 period (Table 7). This amount would be even larger if estimates were developed for all projects.

In addition, Consortium participants continue to look towards the future and have plans to implement or continue to implement a number of projects post-2016. Table 8 lists projects that are being continued by Consortium participants and include education components. Table 9 lists projects that are planned to be initiated/completed in specific years or are in progress of being completed during the 2017-2021 RA Implementation period. Combining information from both tables’ projects where load reductions can be estimated, ~482.8 tons/year of TN is estimated to be precluded from entering the bay in the future.
Figure 10: Screenshot of the online Tampa Bay Action Plan Database (http://apdb.tbeptech.org) showing the approximate spatial locations of projects implemented in the watershed from 1990 to date.
Table 7: Listing of completed load reduction projects included in the Tampa Bay Action Plan Database during the 2012-2016 RA Implementation Period (as of 10/18/2017).

<table>
<thead>
<tr>
<th>Project ID</th>
<th>Project Name</th>
<th>Bay Segment</th>
<th>Lead Entity</th>
<th>Completion Dates</th>
<th>TP (lbs/yr)</th>
<th>TN (lbs/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1403</td>
<td>Street Sweeping – Long Branch &amp; Allens Creek</td>
<td>Old Tampa Bay</td>
<td>City of Largo</td>
<td>2016</td>
<td>309.4</td>
<td>482.6</td>
</tr>
<tr>
<td>1404</td>
<td>Filter Baskets- Allens Creek Watershed</td>
<td>Old Tampa Bay</td>
<td>City of Largo</td>
<td>2013</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>1405</td>
<td>Nitrogen Reduction Evaluation</td>
<td>Old Tampa Bay</td>
<td>City of Largo</td>
<td>2016</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>1371</td>
<td>Street Sweeping</td>
<td>Old Tampa Bay</td>
<td>City of Safety Harbor</td>
<td>2012-2016</td>
<td>15.2</td>
<td>180.6</td>
</tr>
<tr>
<td>1309</td>
<td>Street Sweeping - Old Tampa Bay</td>
<td>Old Tampa Bay</td>
<td>City of St. Petersburg</td>
<td>2012-2016</td>
<td>TBD</td>
<td>136</td>
</tr>
<tr>
<td>1410</td>
<td>MLKing Ph 2 at 83 Ave N</td>
<td>Old Tampa Bay</td>
<td>City of St. Petersburg</td>
<td>2015</td>
<td>15.5</td>
<td>130.7</td>
</tr>
<tr>
<td>1304</td>
<td>Annual Street Sweeping Maintenance BMP</td>
<td>Old Tampa Bay</td>
<td>City of Tampa</td>
<td>2012-2016</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>1054</td>
<td>North Dale Mabry Highway Stormwater Retrofit &amp; Wetland Restoration</td>
<td>Old Tampa Bay</td>
<td>FDOT</td>
<td>2012</td>
<td>TBD</td>
<td>900</td>
</tr>
<tr>
<td>55</td>
<td>Lower Sweetwater Creek Stormwater Retrosits</td>
<td>Old Tampa Bay</td>
<td>Hillsborough County</td>
<td>2012</td>
<td>4.2</td>
<td>17.3</td>
</tr>
<tr>
<td>1313</td>
<td>Street Sweeping - Hillsborough County Total</td>
<td>OTB + HB</td>
<td>Hillsborough County</td>
<td>2012-2016</td>
<td>TBD</td>
<td>1958</td>
</tr>
<tr>
<td>135</td>
<td>Lake Tarpon Stormwater Treatment (Areas 44/47)</td>
<td>Old Tampa Bay</td>
<td>Pinellas County</td>
<td>2014</td>
<td>202.7</td>
<td>559.2</td>
</tr>
<tr>
<td>1365</td>
<td>Bridgeway Acres Pond A Dredging</td>
<td>Old Tampa Bay</td>
<td>Pinellas County</td>
<td>2012</td>
<td>TBD</td>
<td>5212.8</td>
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<tr>
<td>1372</td>
<td>Street Sweeping</td>
<td>Old Tampa Bay</td>
<td>Pinellas County</td>
<td>2012</td>
<td>271</td>
<td>422</td>
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<tr>
<td>1376</td>
<td>Stormwater Catch Basin Cleanouts</td>
<td>Old Tampa Bay</td>
<td>Pinellas County</td>
<td>2012</td>
<td>719</td>
<td>1170</td>
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<tr>
<td>925</td>
<td>Lake Tarpon Water Quality Area 6 Alum Treatment</td>
<td>Old Tampa Bay</td>
<td>Pinellas Co. &amp; FDOT</td>
<td>2012</td>
<td>1313</td>
<td>5055.6</td>
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<tr>
<td>1236</td>
<td>Pond project</td>
<td>Old Tampa Bay</td>
<td>Duke Energy, Inc.</td>
<td>2013</td>
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<td><strong>Old Tampa Bay Subtotal</strong></td>
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<td>26824.8</td>
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<td>1065</td>
<td>City of Plant City proposed reuse by reclaimed water irrigation at Walden Lake Golf course</td>
<td>Hillsborough Bay</td>
<td>City of Plant City</td>
<td>2012</td>
<td>205.2</td>
<td>1600.2</td>
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<tr>
<td>1314</td>
<td>Street Sweeping - City of Plant City</td>
<td>Hillsborough Bay</td>
<td>City of Plant City</td>
<td>2012-2016</td>
<td>TBD</td>
<td>434.6</td>
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<tr>
<td>1223</td>
<td>North Tampa Closed Basins - Phase I</td>
<td>Hillsborough Bay</td>
<td>City of Tampa</td>
<td>2012</td>
<td>3</td>
<td>10</td>
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<td>1409</td>
<td>Street Sweeping Program</td>
<td>Hillsborough Bay</td>
<td>City of Tampa</td>
<td>2016</td>
<td>4363</td>
<td>6804</td>
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<td>1182, 1184</td>
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<td>1187</td>
<td>Agricultural BMPs</td>
<td>Hillsborough Bay</td>
<td>FDEP/FDACS</td>
<td>2012</td>
<td>TBD</td>
<td>TBD</td>
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<td>1317</td>
<td>Street Sweeping in Alafia River Basin</td>
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<td>FDOT</td>
<td>2013</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>1366</td>
<td>SHARP</td>
<td>Hillsborough Bay</td>
<td>Hillsborough County</td>
<td>2016</td>
<td>2355.5</td>
<td>17096.4</td>
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<td>1327</td>
<td>Itchepickasssasa Creek Wetland Treatment Project</td>
<td>Hillsborough Bay</td>
<td>Polk County</td>
<td>2013</td>
<td>6528</td>
<td>3760</td>
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<tr>
<td>1083</td>
<td>Robles Park Water Quality and Natural Systems Improvement</td>
<td>Hillsborough Bay</td>
<td>SWFWMD</td>
<td>2016</td>
<td>84</td>
<td>143</td>
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<td>1067</td>
<td>Tampa Bay Regional Surface Water Treatment Plant Expansion (Alafia River)</td>
<td>Hillsborough Bay</td>
<td>Tampa Bay Water</td>
<td>2016</td>
<td>0</td>
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<tr>
<td>1078</td>
<td>Tampa Bay Regional Surface Water Treatment Plant Expansion (TBC/Hillsborough River)</td>
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<td>Tampa Bay Water</td>
<td>2016</td>
<td>0</td>
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<td><strong>Hillsborough Bay Subtotal</strong></td>
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<td>199166.2</td>
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<td>SWIM Phase 3 Ecosystem Restoration</td>
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<td>MacDill AFB</td>
<td>2013</td>
<td>192.9</td>
<td>965.9</td>
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<td>1374</td>
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<td>Middle Tampa Bay</td>
<td>Pinellas County</td>
<td>2012-2016</td>
<td>17</td>
<td>27</td>
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<td>1377</td>
<td>Stormwater Catch Basin Cleanouts</td>
<td>Middle Tampa Bay</td>
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<td>2012-2016</td>
<td>45</td>
<td>74</td>
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<td>1414</td>
<td>Tinney Creek at 94th Ave N</td>
<td>Middle Tampa Bay</td>
<td>City of St. Petersburg</td>
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<td>Project ID</td>
<td>Project Name</td>
<td>Bay Segment</td>
<td>Lead Entity</td>
<td>Completion Date</td>
<td>TP (lbs/yr)</td>
<td>TN (lbs/yr)</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------------------------------------</td>
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<td>--------------------------</td>
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<td>1307</td>
<td>Street Sweeping - Boca Ciega Bay</td>
<td>Boca Ciega Bay</td>
<td>City of St. Petersburg</td>
<td>2012</td>
<td>TBD</td>
<td>345</td>
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<tr>
<td>1412</td>
<td>Golf Creek at 13th Ave N</td>
<td>Boca Ciega Bay</td>
<td>City of St. Petersburg</td>
<td>2013</td>
<td>14.8</td>
<td>109.3</td>
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<td>1423</td>
<td>Jungle Lake Outfall at 27th Ave N</td>
<td>Boca Ciega Bay</td>
<td>City of St. Petersburg</td>
<td>2012</td>
<td>4.4</td>
<td>32.4</td>
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<tr>
<td>1424</td>
<td>Jungle Lake NE at Walter Fuller Park</td>
<td>Boca Ciega Bay</td>
<td>City of St. Petersburg</td>
<td>2013</td>
<td>3.6</td>
<td>26.6</td>
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<tr>
<td>923</td>
<td>Seminole Bypass Canal Regional Stormwater Treatment Facility</td>
<td>Boca Ciega Bay</td>
<td>Pinellas County</td>
<td>2012</td>
<td>TBD</td>
<td>18339</td>
</tr>
<tr>
<td>924</td>
<td>Alum Treatment of Five Priority Subbasins Discharging to Lake Seminole</td>
<td>Boca Ciega Bay</td>
<td>Pinellas County</td>
<td>2012</td>
<td>4222</td>
<td>43812</td>
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<tr>
<td>1265</td>
<td>Lealman Area Drainage Improvements</td>
<td>Boca Ciega Bay</td>
<td>Pinellas County</td>
<td>2012</td>
<td>77</td>
<td>341</td>
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<tr>
<td>1266</td>
<td>Bear Creek Channel Improvements Phase II</td>
<td>Boca Ciega Bay</td>
<td>Pinellas County</td>
<td>2012</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>1267</td>
<td>Bear Creek Channel Improvements Phase III</td>
<td>Boca Ciega Bay</td>
<td>Pinellas County</td>
<td>2012</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>1271</td>
<td>Silver Lake Sediment Inactivation</td>
<td>Boca Ciega Bay</td>
<td>PC &amp; FDOT</td>
<td>2014</td>
<td>TBD</td>
<td>TBD</td>
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<td>1375</td>
<td>Street Sweeping</td>
<td>Boca Ciega Bay</td>
<td>Pinellas County</td>
<td>2012-2016</td>
<td>333</td>
<td>519</td>
</tr>
<tr>
<td>1378</td>
<td>Stormwater Catch Basin Cleanouts</td>
<td>Boca Ciega Bay</td>
<td>Pinellas County</td>
<td>2012</td>
<td>884</td>
<td>1439</td>
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<td>507</td>
<td>Clam Bayou Stormwater Treatment and Habitat Restoration (phase 3)</td>
<td>Boca Ciega Bay</td>
<td>SWFWMD</td>
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<td>93.7</td>
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<td>1007</td>
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<td>SWFWMD</td>
<td>2012</td>
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<td>952</td>
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<td>Boca Ciega Bay</td>
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<td>15.1</td>
<td>272</td>
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<td>714, 957</td>
<td>Wares Creek Flood Reduction &amp; Dredging</td>
<td>Manatee River</td>
<td>Manatee County</td>
<td>2015</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>1165</td>
<td>BRASWA</td>
<td>Manatee River</td>
<td>Manatee County</td>
<td>2012</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>1260</td>
<td>Duette Preserve Wetlands Restoration</td>
<td>Manatee River</td>
<td>Manatee County</td>
<td>2015</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1261</td>
<td>Bennett Park</td>
<td>Manatee River</td>
<td>Manatee County</td>
<td>2012</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>1354</td>
<td>Manatee County SEWRF Upgrades</td>
<td>Manatee River</td>
<td>Manatee County</td>
<td>2016</td>
<td>0</td>
<td>0</td>
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<tr>
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<td></td>
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<td>5689.3</td>
<td>67559.3</td>
</tr>
</tbody>
</table>

Remainder of LTB Subtotal

Tampa Bay Totals (lbs/yr) 22443.8 294698

Tampa Bay Totals (tons/yr) 11.2 147.3
Table 8: Listing of ongoing and/or education projects submitted by Consortium participants into the online Tampa Bay Action Plan Database (http://apdb.tbeptech.org) that are anticipated to be continued during the 2017-2021 RA Implementation period.

<table>
<thead>
<tr>
<th>Bay Segment</th>
<th>Lead Entity</th>
<th>Action Plan ID</th>
<th>Project Name/Description</th>
<th>Completion Year/Implementation Period</th>
<th>Education Credits?</th>
<th>Anticipated N Load Offset (lbs./yr)</th>
<th>Estimated Future Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Segments</td>
<td>SWFWMD</td>
<td>580</td>
<td>Water Resources Education Programs for Public Schools</td>
<td>Ongoing</td>
<td>Yes</td>
<td></td>
<td>$750,000</td>
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<tr>
<td>All Segments</td>
<td>SWFWMD</td>
<td>580</td>
<td>Water Resources Education Programs for Public Schools</td>
<td>Ongoing</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Segments</td>
<td>SWFWMD</td>
<td>589</td>
<td>Water Conservation - Toilet Rebates</td>
<td>Ongoing</td>
<td></td>
<td></td>
<td>$2,600,000</td>
</tr>
<tr>
<td>All Segments</td>
<td>SWFWMD</td>
<td>594</td>
<td>Virtual Watershed Excursion</td>
<td>Ongoing</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Segments</td>
<td>SWFWMD</td>
<td>697</td>
<td>&quot;Water Conservation: Reflect, Connect, Celebrate&quot;</td>
<td>Ongoing</td>
<td>Yes</td>
<td></td>
<td></td>
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\(^{11}\) Updated information on FDACs BMP enrollment through 2016 can be found in [TBEP’s 2017 CCMP Update, Action SW-8](#).
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<th>Bay Segment</th>
<th>Lead Entity</th>
<th>Action Plan ID</th>
<th>Project Name/Description</th>
<th>Completion Year/Implementation Period</th>
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**Tampa Bay Totals**: 102293 $47,912,254
Table 9: Listing of future planned projects submitted by Consortium participants into the online Tampa Bay Action Plan Database (http://apdb.tbeptech.org).

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<th>Bay Segment</th>
<th>Lead Entity</th>
<th>Action Plan ID</th>
<th>Project Name/Description</th>
<th>Completion Year/Implementation Period</th>
<th>Education Credits?</th>
<th>Anticipated N Load Offset (lbs./yr)</th>
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<td>City of St. Petersburg</td>
<td>1422</td>
<td>Crescent Lake at 14th Ave N</td>
<td>2017</td>
<td></td>
<td>41.9</td>
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<tr>
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<td>Manatee County SWWRF Upgrade</td>
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<tr>
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<td>Deep Well Injection at SWWRF</td>
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<tr>
<td>Remainder LTB</td>
<td>Pinellas County</td>
<td>1382</td>
<td>Lake Seminole Alum Treatment Subbasin 2</td>
<td>2017</td>
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<tr>
<td>Lower Tampa Bay</td>
<td>Manatee County</td>
<td>1353</td>
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<tr>
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<td>1419</td>
<td>34th Ave NE at Poplar St</td>
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<tr>
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<td>Mulberry, Closure of Mulberry Phosphogypsum Stack</td>
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<td>Old Tampa Bay</td>
<td>City of Largo</td>
<td>1408</td>
<td>Planned WWRF Improvements</td>
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<td>Roosevelt Stormwater Ponds</td>
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<td>1166</td>
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<td>Alafia River Water Quality Protection Plan (WQPP)</td>
<td>2021</td>
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<td>1339</td>
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<td>Long Branch Stormwater Improvements, W22-04, -05, -08</td>
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<td>1400</td>
<td>Alligator Creek Stormwater Improvements, W14-01</td>
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<td>Roosevelt Stormwater Ponds, W23-01,-10,-03</td>
<td>2030</td>
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<td>South Tampa Area Reclaim Project (STAR)</td>
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<tr>
<td>Hillsborough Bay</td>
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<td>1218</td>
<td>Sediment Trap NSBB: Brorien St</td>
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</tr>
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<td>Hillsborough Bay</td>
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<td>Bay Segment</td>
<td>Lead Entity</td>
<td>Action Plan ID</td>
<td>Project Name/Description</td>
<td>Completion Year/Implementation Period</td>
<td>Education Credits?</td>
<td>Anticipated N Load Offset (lbs./yr)</td>
<td>Estimated Future Costs</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------------</td>
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<td>-----------------------------------------------------------------------------------------</td>
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<tr>
<td>Hillsborough Bay</td>
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<td>1255</td>
<td>Bayshore Blvd. Reclaimed Water Expansion</td>
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<td>$550,000</td>
</tr>
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<td>571, 830</td>
<td>North Tampa Pipeline</td>
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<td>$200,000</td>
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<td>City of Tampa, SWFWMD, FDOT</td>
<td>1294, 1224, 1056</td>
<td>River Tower Park Shoreline Restoration and Stormwater Improvements</td>
<td>Future</td>
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<td>Hillsborough Bay</td>
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<td>Hillsborough County Reclaimed Aquifer Storage and Recovery (ASR)</td>
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<tr>
<td>Hillsborough Bay</td>
<td>Mosaic</td>
<td>1233</td>
<td>Green Bay Discharge Diversion to Progress Energy</td>
<td>Future</td>
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<td>12233.4</td>
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<td>Hillsborough Bay</td>
<td>Pasco County</td>
<td>1179</td>
<td>Reclaimed Water Reservoir Floating Wetland Island</td>
<td>Future</td>
<td></td>
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<td>Middle Tampa Bay</td>
<td>SWFWMD</td>
<td>478</td>
<td>Sawgrass Lake Park Habitat Enhancement Project</td>
<td>Future</td>
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<td>$4,089,261</td>
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<td>Old Tampa Bay</td>
<td>SWFWMD</td>
<td>1226</td>
<td>South Bayshore Blvd.</td>
<td>Future</td>
<td></td>
<td></td>
<td>$3,017,298</td>
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<tr>
<td>Remainder LTB</td>
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<td>714</td>
<td>Ware’s Creek Flood Reduction</td>
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<td>Duette Preserve Wetlands Restoration</td>
<td>Future</td>
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<td></td>
<td>$200,000</td>
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<td>Remainder LTB</td>
<td>Manatee County</td>
<td>1261</td>
<td>Bennett Park</td>
<td>Future</td>
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<td></td>
<td>$285,310</td>
</tr>
<tr>
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<td>Manatee County SEWRF Upgrade</td>
<td>Future</td>
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<td></td>
<td>$9,866,747</td>
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<tr>
<td>Remainder LTB</td>
<td>Pinellas County</td>
<td>470</td>
<td>Lake Seminole Clean-up</td>
<td>Future</td>
<td></td>
<td></td>
<td>$16,700,000</td>
</tr>
<tr>
<td>Remainder LTB</td>
<td>Pinellas County</td>
<td>1365</td>
<td>Bridgeway Acres Pond A Dredging</td>
<td>Future</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tampa Bay Totals</strong></td>
<td><strong>863286</strong></td>
<td><strong>$124,483,674</strong></td>
<td><strong>3. c. Geographic scope of any proposed management activity:</strong></td>
<td><strong>2017 RA Update: No change.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The NMC Action Plan projects are located throughout the Tampa Bay watershed, as described and depicted in the previous section.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3.d. Estimated Pollutant Load Reduction Anticipated from each activity:</strong></td>
<td><strong>2017 RA Update:</strong> Based on projects implemented over the 2012-2016 period, it is estimated that cumulatively an additional 147.3 tons/yr of total nitrogen has been precluded from entering Tampa Bay (Table 7). In addition, Consortium participants anticipate completion of projects after 2016 that will be incorporated into the future, 2021 Reasonable Assurance Update. So far to date, ~ 482.8 tons/yr of total nitrogen is estimated to be precluded from entering Tampa Bay after 2016 (Table 8 &amp; Table 9).</td>
<td><strong>3.e. Written agreements committing partners to actions:</strong></td>
<td><strong>2017 RA Update:</strong> The Tampa Bay Nitrogen Management Consortium gave consensus approval (with no objections) at their September 29, 2017 meeting to submit this document to FDEP as the 2017 RA Update for Tampa Bay. Participation status, meeting notes, presentations, discussions and decision memos of NMC participants during the course of this 2017 RA Update can be found here: <a href="https://www.tbeptech.org/committees/ncm">https://www.tbeptech.org/committees/ncm</a></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.f. How will future growth and new sources be addressed:

**2017 RA Update:** Consistent with prior RA approvals and the 2009 RA Addendum, allocations to all TN loading sources in the Tampa Bay watershed have been formalized and cumulatively capped at the federally-recognized TMDL for each bay segment. To stay within the TMDL limits, allocations for interim, new and transferred sources were reviewed and updated during the 2017 RA Update. These reviews led to formal NMC concurrence of allocations assigned to each entity for the 2017-2021 Reasonable Assurance implementation period, and total allocations continue to remain within the TMDL limits for the Tampa Bay segments recognized under the 2002-2012 RA periods (Table 10 - Table 14). In addition, the FDEP SW District has provided updated information on facilities considered under the small source allocation for each bay segment. Based on FDEP SW District staff guidance, small sources are defined in Appendix 1 and include facilities that discharge less than 0.1 MGD to groundwater or surface waters (excluding facilities that have individual allocations from prior RA Updates).

Furthermore, the Tampa Bay NMC has developed recommended protocols to address any unforeseen need for a TN load allocation. Consortium participants have previously formalized a process\(^{12}\) to address new, missed or expanded TN sources in future RA updates, and FDEP has concurred with those recommendations.\(^ {13}\) Lastly, during the development of the 2017 RA Update, Consortium participants have developed recommendations for future assignment of any unassigned reservation allocation that may occur in the future (see Appendix 2).

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\(^{12}\) [https://www.tbeptech.org/NitrogenMgmtConsort/Key_Actions/TBNMC_FINAL_2012-01_Process_for_New_Missed_Expanded_Sources.pdf](https://www.tbeptech.org/NitrogenMgmtConsort/Key_Actions/TBNMC_FINAL_2012-01_Process_for_New_Missed_Expanded_Sources.pdf)

\(^{13}\) [https://www.tbeptech.org/NitrogenMgmtConsort/Key_Actions/FDEP_Response_NMC_Decision_Memo_12032012.pdf](https://www.tbeptech.org/NitrogenMgmtConsort/Key_Actions/FDEP_Response_NMC_Decision_Memo_12032012.pdf)
Table 10: Total nitrogen load allocation table for Old Tampa Bay for the 2017-2021 Reasonable Assurance implementation period. SW=Surface water discharge allocation, RE=Reuse discharge allocation.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Source</th>
<th>Percent Remaining Allocation (if applicable)</th>
<th>5-yr Average TMDL Equivalent Load (tons/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheval West</td>
<td>MS4</td>
<td>0.20%</td>
<td>0.7</td>
</tr>
<tr>
<td>City of Clearwater</td>
<td>MS4</td>
<td>2.70%</td>
<td>10.6</td>
</tr>
<tr>
<td></td>
<td>Point Source – Clearwater East SW</td>
<td></td>
<td>9.3</td>
</tr>
<tr>
<td></td>
<td>Point Source – Clearwater East RE</td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>Point Source – Clearwater Northeast SW</td>
<td></td>
<td>16.6</td>
</tr>
<tr>
<td></td>
<td>Point Source – Clearwater Northeast RE</td>
<td></td>
<td>1.1</td>
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<tr>
<td>Duke Energy</td>
<td>Point Source – Bartow Plant SW</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Heritage Harbor</td>
<td>NPS</td>
<td>0.20%</td>
<td>0.6</td>
</tr>
<tr>
<td>Hillsborough County</td>
<td>MS4</td>
<td>23.30%</td>
<td>91.6</td>
</tr>
<tr>
<td></td>
<td>Point Source – Dale Mabry SW</td>
<td></td>
<td>7.4</td>
</tr>
<tr>
<td></td>
<td>Point Source – Dale Mabry RE</td>
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<td>2.8</td>
</tr>
<tr>
<td></td>
<td>Point Source – Northwest Regional SW</td>
<td></td>
<td>2.9</td>
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<td></td>
<td>Point Source – Northwest Regional RE</td>
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<td>5.5</td>
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<tr>
<td></td>
<td>Point Source – River Oaks SW</td>
<td></td>
<td>13.4</td>
</tr>
<tr>
<td></td>
<td>Point Source – River Oaks RE</td>
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<td>1.6</td>
</tr>
<tr>
<td></td>
<td>Point Source – Van Dyke</td>
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<td>0.8</td>
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<tr>
<td>City of Largo</td>
<td>MS4</td>
<td>1.40%</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>Point Source – Largo SW</td>
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<td>16.4</td>
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<tr>
<td></td>
<td>Point Source – Largo RE</td>
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<td>2.6</td>
</tr>
<tr>
<td>MacDill Air Force Base</td>
<td>MS4</td>
<td>0.10%</td>
<td>0.4</td>
</tr>
<tr>
<td>City of Oldsmar</td>
<td>MS4</td>
<td>1.40%</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>Point Source – Oldsmar SW</td>
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<td>2.7</td>
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<td></td>
<td>Point Source – Oldsmar RE</td>
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<tr>
<td>On Top of the World</td>
<td>Point Source – On Top of the World RE</td>
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<td>0.5</td>
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<tr>
<td>Palm Bay</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0</td>
</tr>
<tr>
<td>Park Place</td>
<td>NPS</td>
<td>0.10%</td>
<td>0.4</td>
</tr>
<tr>
<td>Pasco County</td>
<td>MS4</td>
<td>0.40%</td>
<td>1.7</td>
</tr>
<tr>
<td>Pinellas County</td>
<td>MS4</td>
<td>14.70%</td>
<td>57.6</td>
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<tr>
<td></td>
<td>Point Source – W.E. Dunn RE</td>
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<tr>
<td></td>
<td>Point Source – Bridgeway Acres SW</td>
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<tr>
<td>City of Pinellas Park</td>
<td>MS4</td>
<td>1.00%</td>
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</tr>
<tr>
<td>City of Safety Harbor</td>
<td>MS4</td>
<td>1.30%</td>
<td>5</td>
</tr>
<tr>
<td>Entity</td>
<td>Source</td>
<td>Percent Remaining Allocation (if applicable)</td>
<td>5-yr Average TMDL Equivalent Load (tons/year)</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------</td>
<td>---------------------------------------------</td>
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<tr>
<td>City of St. Petersburg</td>
<td>MS4</td>
<td>0.90%</td>
<td>3.5</td>
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<td>Point Source – St. Pete Facilities RE</td>
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<tr>
<td>Stonebriar</td>
<td>NPS</td>
<td>0.10%</td>
<td>0.2</td>
</tr>
<tr>
<td>City of Tarpon Springs</td>
<td>MS4</td>
<td>0.40%</td>
<td>1.6</td>
</tr>
<tr>
<td>City of Tampa</td>
<td>MS4</td>
<td>5.30%</td>
<td>20.8</td>
</tr>
<tr>
<td>Westchase</td>
<td>NPS</td>
<td>0.40%</td>
<td>1.4</td>
</tr>
<tr>
<td>Westchase East</td>
<td>NPS</td>
<td>0.40%</td>
<td>1.7</td>
</tr>
<tr>
<td>Non-MS4/Non-Ag NPS</td>
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<td>2.60%</td>
<td>10.1</td>
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<tr>
<td>Atmospheric Deposition</td>
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<td>33.60%</td>
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<tr>
<td>Other (Groundwater,</td>
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<td>3.60%</td>
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<td>Springs, Conservation)</td>
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<tr>
<td>FDACS (Agriculture)</td>
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<td>6.10%</td>
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<td>Small Sources</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>486</strong></td>
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</table>
Table 11: Total nitrogen load allocation table for Hillsborough Bay for the 2017-2021 Reasonable Assurance implementation period. SW=Surface water discharge allocation, RE=Reuse discharge allocation.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Source</th>
<th>Percent Remaining Allocation (if applicable)</th>
<th>5-yr Average TMDL Equivalent Load (tons/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hillsborough County</td>
<td>MS4</td>
<td>22.60%</td>
<td>235.6</td>
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<td>Point Source – Falkenburg SW</td>
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<td></td>
<td>Point Source – Falkenburg RE</td>
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<td></td>
<td>Point Source – South County SW</td>
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<td>1.8</td>
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<td></td>
<td>Point Source – Pebble Creek SW</td>
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<td>Point Source – Pebble Creek RE</td>
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<td>0.1</td>
</tr>
<tr>
<td></td>
<td>Point Source – Valrico SW</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Point Source – Valrico RE</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>City of Lakeland</td>
<td>MS4</td>
<td>1.10%</td>
<td>10.9</td>
</tr>
<tr>
<td></td>
<td>Point Source – Lakeland SW</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Point Source – Lakeland RE</td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td>City of Mulberry</td>
<td>MS4</td>
<td>0.20%</td>
<td>2.1</td>
</tr>
<tr>
<td></td>
<td>Point Source – Mulberry SW</td>
<td></td>
<td>2.4</td>
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<tr>
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<td>MS4</td>
<td>3.70%</td>
<td>38.4</td>
</tr>
<tr>
<td></td>
<td>Point Source – Master Reuse System RE</td>
<td></td>
<td>5.8</td>
</tr>
<tr>
<td>City of Plant City</td>
<td>MS4</td>
<td>0.90%</td>
<td>9.2</td>
</tr>
<tr>
<td></td>
<td>Point Source – Plant City SW</td>
<td></td>
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<td>Point Source – Plant City RE</td>
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<td>67.5</td>
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<tr>
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<td>Point Source – NW Regional RE</td>
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<td>Point Source – SW Regional RE</td>
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</tr>
<tr>
<td>City of Tampa</td>
<td>MS4</td>
<td>4.80%</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Point Source – HF Curren SW</td>
<td></td>
<td>212.2</td>
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<td>Point Source – HF Curren RE</td>
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</tr>
<tr>
<td>City of Zephyrhills</td>
<td>MS4</td>
<td>0.20%</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td>Point Source – Zephyrhills RE</td>
<td></td>
<td>3</td>
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<tr>
<td>CSX</td>
<td>Point Source – Rockport Material Losses</td>
<td></td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>Point Source – Winston Yard SW</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Point Source – Rockport SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Newport SW (FKA Eastern Terminals SW)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Entity</td>
<td>Source</td>
<td>Percent Remaining Allocation (if applicable)</td>
<td>5-yr Average TMDL Equivalent Load (tons/year)</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Kinder Morgan</td>
<td>Point Source – Newport Material Losses (FKA East. Term. Material Losses)</td>
<td>5.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Material Losses – Port Sutton</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Material Losses – Tampaplex</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Hartford Terminal SW</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>Point Source – Port Sutton SW</td>
<td>25</td>
<td></td>
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<td></td>
<td>Point Source – Tampaplex SW</td>
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<td></td>
</tr>
<tr>
<td>Mosaic</td>
<td>Point Source – Riverview Material Losses</td>
<td>9.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Tampa Marine ML (FKA CF Material Losses)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Big Bend Material Losses</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Bartow SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Ft. Lonesome SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Green Bay SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Hookers Prairie SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Hopewell SW</td>
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<td>Point Source – Kingsford SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Mulberry SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – New Wales Stack Closure SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Nichols Mine SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Riverview SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Riverview Stack Closure SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – South Pierce SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Bonnie (FKA CF Bartow SW)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Tampa Ammonia SW (FKA CF Tampa NH4 SW)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Tampa Marine SW (FKA CF Tampa Phos. SW)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Port Sutton SW (FKA KM NH4 Facility SW)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Plant City SW (FKA CF Plant City SW)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – Mulberry Phosphogypsum Stack SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source – New Wales Chemical Plant SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agrifos</td>
<td>Point Source – Nichols Prep Plant SW</td>
<td>&lt;0.1%</td>
<td>0</td>
</tr>
<tr>
<td>Entity</td>
<td>Source</td>
<td>Percent Remaining Allocation (if applicable)</td>
<td>5-yr Average TMDL Equivalent Load (tons/year)</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Brewster Phosphogypsum</td>
<td>Point Source SW</td>
<td>0.10%</td>
<td>1</td>
</tr>
<tr>
<td>Alpha/Owens Corning</td>
<td>Point Source SW</td>
<td>0.10%</td>
<td>1</td>
</tr>
<tr>
<td>Coronet Industries</td>
<td>Point Source SW</td>
<td>0.50%</td>
<td>4.7</td>
</tr>
<tr>
<td>Estech Agricola</td>
<td>Point Source SW</td>
<td>0.30%</td>
<td>2.6</td>
</tr>
<tr>
<td>Exxon Mobil</td>
<td>Point Source SW</td>
<td>0.20%</td>
<td>1.7</td>
</tr>
<tr>
<td>Kerry I&amp;F Contracting</td>
<td>Point Source SW</td>
<td></td>
<td>1.3</td>
</tr>
<tr>
<td>Tampa Bay Water</td>
<td>Point Source SW</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>TECO Bayside</td>
<td>Point Source SW</td>
<td>0.10%</td>
<td>0.8</td>
</tr>
<tr>
<td>Trademark Nitrogen</td>
<td>Point Source SW</td>
<td>&lt;0.1%</td>
<td>0.2</td>
</tr>
<tr>
<td>Yara North America</td>
<td>Point Source SW</td>
<td>&lt;0.1%</td>
<td>0.3</td>
</tr>
<tr>
<td>Alafia Preserve</td>
<td>NPS</td>
<td>0.10%</td>
<td>0.6</td>
</tr>
<tr>
<td>Bloomingdale</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0</td>
</tr>
<tr>
<td>Donaldson Knoll</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.1</td>
</tr>
<tr>
<td>Eagle Ridge</td>
<td>NPS</td>
<td>0.10%</td>
<td>0.7</td>
</tr>
<tr>
<td>Lake St. Charles</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.4</td>
</tr>
<tr>
<td>Live Oak I</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.2</td>
</tr>
<tr>
<td>Live Oak II</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.1</td>
</tr>
<tr>
<td>Magnolia Park</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.1</td>
</tr>
<tr>
<td>MacDill Air Force Base</td>
<td>MS4</td>
<td>0.10%</td>
<td>0.7</td>
</tr>
<tr>
<td>Palm River</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0</td>
</tr>
<tr>
<td>Panther Trace</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.3</td>
</tr>
<tr>
<td>Panther Trace II</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.2</td>
</tr>
<tr>
<td>Rivercrest</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.3</td>
</tr>
<tr>
<td>City of San Antonio</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.3</td>
</tr>
<tr>
<td>Spring Lake</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.1</td>
</tr>
<tr>
<td>City of St. Leo</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0</td>
</tr>
<tr>
<td>Stone Crest</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0</td>
</tr>
<tr>
<td>Stone Dairy Creek</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0</td>
</tr>
<tr>
<td>Stonelake Ranch</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0</td>
</tr>
<tr>
<td>City of Temple Terrace</td>
<td>MS4</td>
<td>0.20%</td>
<td>2.1</td>
</tr>
<tr>
<td>Non-MS4/Non-Ag NPS</td>
<td></td>
<td>0.50%</td>
<td>5.2</td>
</tr>
<tr>
<td>Atmospheric Deposition</td>
<td></td>
<td>6.00%</td>
<td>63</td>
</tr>
<tr>
<td>Other (Groundwater, Springs,</td>
<td></td>
<td>13.50%</td>
<td>140.2</td>
</tr>
<tr>
<td>Conservation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entity</td>
<td>Source</td>
<td>Percent Remaining Allocation (if applicable)</td>
<td>5-yr Average TMDL Equivalent Load (tons/year)</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>FDACS (Agriculture)</td>
<td></td>
<td>25.80%</td>
<td>268.8</td>
</tr>
<tr>
<td>Small Sources</td>
<td></td>
<td></td>
<td>10.5</td>
</tr>
<tr>
<td>Lowry Park Zoo</td>
<td>Point Source SW</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Busch Gardens</td>
<td>Point Source SW</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Cypress Lakes WWTP</td>
<td>Point Source</td>
<td></td>
<td>0.3</td>
</tr>
<tr>
<td>Forest Lake Estates WWTP</td>
<td>Point Source</td>
<td></td>
<td>0.3</td>
</tr>
<tr>
<td>Windemere Utilities</td>
<td>Point Source</td>
<td></td>
<td>0.9</td>
</tr>
<tr>
<td>Country Meadows-Golden Lakes</td>
<td>Point Source</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>Unassigned reservation</td>
<td></td>
<td></td>
<td>50.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>1451</strong></td>
</tr>
</tbody>
</table>
Table 12: Total nitrogen load allocation table for Middle Tampa Bay for the 2017-2021 Reasonable Assurance implementation period. SW=Surface water discharge allocation, RE=Reuse discharge allocation.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Source</th>
<th>Percent Remaining Allocation (if applicable)</th>
<th>5-yr Average TMDL Equivalent Load (tons/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harbor Bay</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.2</td>
</tr>
<tr>
<td>Hillsborough County</td>
<td>MS4</td>
<td>9.90%</td>
<td>70.9</td>
</tr>
<tr>
<td></td>
<td>Point Source - South County RE</td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td>MacDill Air Force Base</td>
<td>MS4</td>
<td>1.00%</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Point Source - WWTP RE</td>
<td></td>
<td>0.7</td>
</tr>
<tr>
<td>Manatee County</td>
<td>MS4</td>
<td>3.00%</td>
<td>21.8</td>
</tr>
<tr>
<td>Pinellas County</td>
<td>MS4</td>
<td>0.50%</td>
<td>3.2</td>
</tr>
<tr>
<td>City of Pinellas Park</td>
<td>MS4</td>
<td>0.70%</td>
<td>5.3</td>
</tr>
<tr>
<td>City of St. Petersburg</td>
<td>MS4</td>
<td>6.50%</td>
<td>46.5</td>
</tr>
<tr>
<td></td>
<td>Point Source - St. Pete Facilities RE</td>
<td></td>
<td>20.8</td>
</tr>
<tr>
<td>Mosaic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TECO Big Bend</td>
<td>Point Source – SW</td>
<td></td>
<td>56.5</td>
</tr>
<tr>
<td></td>
<td>Point Source - RE</td>
<td></td>
<td>2.1</td>
</tr>
<tr>
<td>Non-MS4/Non-Ag NPS</td>
<td></td>
<td>0.50%</td>
<td>3.8</td>
</tr>
<tr>
<td>Atmospheric Deposition</td>
<td></td>
<td>35.20%</td>
<td>252.1</td>
</tr>
<tr>
<td>Other (Groundwater, Springs, Conservation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDACS (Agriculture)</td>
<td></td>
<td>33.40%</td>
<td>239.2</td>
</tr>
<tr>
<td>Small Sources</td>
<td></td>
<td></td>
<td>2.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>799</strong></td>
</tr>
</tbody>
</table>
Table 13: Total nitrogen load allocation table for Lower Tampa Bay for the 2017-2021 Reasonable Assurance implementation period. SW=Surface water discharge allocation, RE=Reuse discharge allocation.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Source</th>
<th>Percent Remaining Allocation (if applicable)</th>
<th>5-yr Average TMDL Equivalent Load (tons/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hillsborough County</td>
<td>MS4</td>
<td>&lt;0.1%</td>
<td>0</td>
</tr>
<tr>
<td>Lexington</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.1</td>
</tr>
<tr>
<td>Manatee County</td>
<td>MS4</td>
<td>7.80%</td>
<td>26.8</td>
</tr>
<tr>
<td></td>
<td>Point Source - Manatee County North RE</td>
<td></td>
<td>3.9</td>
</tr>
<tr>
<td>City of St. Petersburg</td>
<td>MS4</td>
<td>&lt;0.1%</td>
<td>0</td>
</tr>
<tr>
<td>Kinder Morgan Port Manatee Material Losses</td>
<td>Point Source</td>
<td></td>
<td>0.3</td>
</tr>
<tr>
<td>Piney Point Facility</td>
<td>Point Source SW</td>
<td></td>
<td>0.9</td>
</tr>
<tr>
<td>Non-MS4/Non-Ag NPS</td>
<td></td>
<td>0.50%</td>
<td>1.7</td>
</tr>
<tr>
<td>Atmospheric Deposition</td>
<td></td>
<td>81.80%</td>
<td>281</td>
</tr>
<tr>
<td>Other (Groundwater, Springs, Conservation)</td>
<td></td>
<td>1.20%</td>
<td>4.2</td>
</tr>
<tr>
<td>FDACS (Agriculture)</td>
<td></td>
<td>8.60%</td>
<td>29.7</td>
</tr>
<tr>
<td>Small Sources</td>
<td></td>
<td></td>
<td>0.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>349</strong></td>
</tr>
</tbody>
</table>
Table 14: Total nitrogen load allocation table for the Remainder of Lower Tampa Bay for the 2017-2021 Reasonable Assurance implementation period. SW=Surface water discharge allocation, RE=Reuse discharge allocation.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Source</th>
<th>Percent Remaining Allocation (if applicable)</th>
<th>5-yr Average TMDL Equivalent Load (tons/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Bradenton</td>
<td>MS4</td>
<td>1.80%</td>
<td>10.8</td>
</tr>
<tr>
<td></td>
<td>Point Source - Bradenton SW</td>
<td>0.40%</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>Point Source - Bradenton RE</td>
<td>&lt;0.1%</td>
<td>0</td>
</tr>
<tr>
<td>City of Gulfport</td>
<td>MS4</td>
<td>0.40%</td>
<td>2.2</td>
</tr>
<tr>
<td>Greyhawk Landing</td>
<td>NPS</td>
<td>0.10%</td>
<td>0.8</td>
</tr>
<tr>
<td>Harboursage at Braden River</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0</td>
</tr>
<tr>
<td>Heritage Harbour</td>
<td>NPS</td>
<td>0.10%</td>
<td>0.8</td>
</tr>
<tr>
<td>Heritage Harbour Marketplace</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.1</td>
</tr>
<tr>
<td>Lakewood Ranch</td>
<td>MS4</td>
<td>1.50%</td>
<td>8.7</td>
</tr>
<tr>
<td>Lexington</td>
<td>NPS</td>
<td>&lt;0.1%</td>
<td>0.1</td>
</tr>
<tr>
<td>Manatee County</td>
<td>MS4</td>
<td>22.00%</td>
<td>130.2</td>
</tr>
<tr>
<td></td>
<td>Point Source - Southeast RE</td>
<td>0.80%</td>
<td>4.6</td>
</tr>
<tr>
<td>Pinellas County</td>
<td>MS4</td>
<td>0.20%</td>
<td>1.1</td>
</tr>
<tr>
<td>City of Palmetto</td>
<td>MS4</td>
<td>0.80%</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td>Point Source - Palmetto SW</td>
<td>1.40%</td>
<td>8.2</td>
</tr>
<tr>
<td></td>
<td>Point Source - Palmetto RE</td>
<td>1.30%</td>
<td>7.5</td>
</tr>
<tr>
<td>Sarasota County</td>
<td>MS4</td>
<td>0.20%</td>
<td>1.2</td>
</tr>
<tr>
<td>City of St. Petersburg Beach</td>
<td>MS4</td>
<td>0.20%</td>
<td>1.2</td>
</tr>
<tr>
<td>City of St. Petersburg</td>
<td>MS4</td>
<td>1.30%</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>Point Source - St. Pete Facilities RE</td>
<td>0.10%</td>
<td>0.6</td>
</tr>
<tr>
<td>Tara</td>
<td>NPS</td>
<td>0.20%</td>
<td>1.1</td>
</tr>
<tr>
<td>University Place</td>
<td>NPS</td>
<td>0.10%</td>
<td>0.6</td>
</tr>
<tr>
<td>Waterlefe</td>
<td>NPS</td>
<td>0.10%</td>
<td>0.6</td>
</tr>
<tr>
<td>Tropicana</td>
<td>Point Source SW</td>
<td>&lt;0.1%</td>
<td>9.1</td>
</tr>
<tr>
<td>Non-MS4/Non-Ag NPS</td>
<td></td>
<td>&lt;0.1%</td>
<td>0</td>
</tr>
<tr>
<td>Atmospheric Deposition</td>
<td></td>
<td>13.00%</td>
<td>76.9</td>
</tr>
<tr>
<td>Other (Groundwater, Springs, Conservation)</td>
<td></td>
<td>10.90%</td>
<td>64.8</td>
</tr>
<tr>
<td>FDACS (Agriculture)</td>
<td></td>
<td>46.00%</td>
<td>272.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>629</td>
</tr>
</tbody>
</table>
3.g. Confirmed sources of funding

2017 RA Update: No change. Consortium participants continue to abide by the recommended funding levels\(^{14}\) for participation in the NMC’s process to deliver 5-year RA updates to the FDEP. For each 5-year RA period, all participating NMC entities with a 5-year annual average allocation less than one ton TN per year are requested to contribute a recommended nominal amount of $500, and all other sources are requested to contribute a one-time recommended amount of $6,000. The per-entity contribution can be reduced accordingly if more than 25 members contribute. Consortium contributions are due generally in Years 1-2 of an RA cycle, to allow time for development of the technical basis required for an update. All entities with allocations or providing regulatory oversight/input to the RA Update process (in-kind support) are invited to attend and encouraged to participate in all Consortium meetings and deliberations in the future. A chronology of NMC activities and meetings can be found here: [https://www.tbeptech.org/committees/ncn](https://www.tbeptech.org/committees/ncn).

In addition, Consortium participants have planned investments of $172,395,928 to continue projects listed in Table 8 and implement new projects listed in Table 9.

3.h. Implementation schedule:

2017 RA Update: No change. Consortium participants continue to develop future load reduction projects within the watershed and document these planned activities within the online Tampa Bay Action Plan Database ([http://apdb.tbeptech.org](http://apdb.tbeptech.org)). Table 8 shows a listing of ongoing projects being implemented by Consortium participants. Table 9 lists projects that are planned to be initiated/completed after 2016 by Consortium participants.

3.i. Enforcement programs, if the management strategy is not voluntary.

2017 RA Update: No change. Participation in the Tampa Bay Nitrogen Management Consortium will continue to be voluntary, and the NMC partners will continue to encourage point and nonpoint sources who are not currently participating in the NMC to join this effort. The allocation compliance assessment process referenced in Section 2.a. will continue to be employed during the 2017-2021 RA implementation period, and an assessment of the current 2012-16 RA period can be found in Appendix 3 - Appendix 7. Lastly, FDEP representatives of the NMC emphasize that FDEP and other regulatory agencies will continue to ensure that permitted facilities meet all permit requirements through existing regulatory and permit enforcement programs.

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\(^{14}\) [https://www.tbeptech.org/NitrogenMgmtConsort/Key_Actions/NMC_Action_Memo_25-NMC_Funding_and_Voting_Protocol.pdf](https://www.tbeptech.org/NitrogenMgmtConsort/Key_Actions/NMC_Action_Memo_25-NMC_Funding_and_Voting_Protocol.pdf)

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4. Procedures for Monitoring and Reporting Results:

4.a. A description of the water quality monitoring program to be implemented

2017 RA Update: No change. Existing water quality monitoring programs include monthly ambient collections conducted by the Environmental Protection Commission of Hillsborough County, Manatee County, and Pinellas County. Water quality samples from over 100 stations baywide are collected and analyzed on a monthly basis through the collective efforts of these monitoring programs. The Tampa Bay regional monitoring programs have been recently highlighted among other top programs in the nation.\(^\text{15}\)

4.b. Quality Assurance/Quality Control elements of monitoring

2017 RA Update: No change. All county monitoring programs and their laboratories have State-approved Quality Assurance Plans on file, and comply with FDEP’s QA rule, Chapter 62-160, including FDEP approved Standard Operating Procedures. All participating county laboratories are National Environmental Laboratory Accreditation Conference (NELAC) certified. Quarterly round-robin exchanges for statistically-rigorous inter-laboratory comparisons are conducted by the Southwest Florida Regional Ambient Monitoring Program (SWFL RAMP) participants.\(^\text{16}\)

4.c. Procedures for entering all appropriate data into STORET:

2017 RA Update: No change. The County programs continue to comply with the latest STORET data upload procedures developed by the FDEP. Through discussions of the SWFL RAMP, all Tampa Bay water quality monitoring data providers are anticipating a seamless transition to upload data to FDEP’s new WIN system after December 2017.

4.d. Responsible monitoring and reporting entity:

2017 RA Update: No change. The three entities identified in Section 4.a. continue to be responsible for collecting water quality data. TBEP staff continue to assimilate and summarize relevant data on an annual basis to provide compliance assessment reports to the FDEP. Reports for the 2012-2016 RA period can be found here: [https://www.tbeptech.org/data/tech-pubs](https://www.tbeptech.org/data/tech-pubs).

4.e. Frequency and reporting format for reporting monitoring results:

2017 RA Update: No change. As part of this update, the TBEP and TBNMC have funded the development of estimated TN, TP, TSS and BOD loads for the Tampa Bay watershed over the 2012-2016 RA Period\(^\text{17}\).

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\(^\text{16}\) Sherwood, E.T. et al. 2015. Tampa Bay estuary: Monitoring long-term recovery through regional partnerships. Regional Studies in Marine Science 4:1-11. [http://dx.doi.org/10.1016/j.rsma.2015.05.005](http://dx.doi.org/10.1016/j.rsma.2015.05.005).

In addition, the Consortium updated a Screening Level Tool for Estimating Annual Hydrologic Loadings to Tampa Bay\(^\text{18}\) for use to assess annual compliance of hydrologically-adjusted allocations.

4.f. Frequency and format for reporting on the implementation of all proposed management activities:

**2017 RA Update**: No change. Formal reporting of results and action plan projects will continue to occur every 5 years. Annual assessment of bay water quality conditions will continue during the 2017-2021 RA period.

4. g. Methods for evaluating progress towards goals:

**2017 RA Update**: No change. Formal reporting of chlorophyll-a threshold compliance will continue on an annual basis and integrate any new seagrass acreage estimates or trends. If exceedances of the chlorophyll-a thresholds occur in two concurrent years in any one bay segment, additional assessment steps are required by the Consortium. Otherwise, Reasonable Assurance updates with a full assessment of loading conditions to Tampa Bay will occur every 5 years.

5. Description of Proposed Corrective Actions:

**2017 RA Update:** One annual exceedance of the chlorophyll-a threshold occurred in the Old Tampa Bay segment during the 2012-2016 RA period. Although seagrass conditions in this bay segment still show increasing acreage trends, bay managers continue to explore the feasibility and implementation of management actions that could improve this bay segment’s overall ecological condition and water quality. Several Tampa Bay Estuary Program (TBEP) research initiatives and Technical Advisory Committee recommendations have directed research and restoration efforts in this bay segment and its watershed. As a result, several cooperative projects have been implemented over the 2012-2016 RA period and continue to be implemented today. Furthermore, TBEP and Consortium partners continue to implement habitat restoration, stormwater infrastructure and point source improvement projects throughout the Tampa Bay watershed that cumulatively contribute to the Bay’s overall ecological improvement. A summary of relevant projects focused in Old Tampa Bay follows.

**Pinellas Countywide Wastewater and Stormwater Task Force**

Project Partner(s): Pinellas County & 17 Municipalities within Pinellas County

Project Summary & Accomplishments:

The Task Force was initiated in 2016 with 3 main goals: 1) Avoid and mitigate wastewater spills, overflows and releases of sewage into the environment, particularly coastal water bodies; 2) Seek opportunities to address drainage and stormwater issues that impact the sewer system; and 3) Increase capacity and resiliency of collective sewer system and wastewater treatment infrastructure throughout Pinellas County. Approximately 7 action plan project categories have been identified and are currently being implemented to address the goals above. A progress report on accomplishments undertaken by the Task Force has been completed and can be viewed here: [http://www.pinellascounty.org/taskforce/pdf/agenda-minutes/2017/06-22-17-Wastewater-Stormwater-Tasks-Force-Progress-Report.PDF](http://www.pinellascounty.org/taskforce/pdf/agenda-minutes/2017/06-22-17-Wastewater-Stormwater-Tasks-Force-Progress-Report.PDF). In addition, Task Force representatives also participate in a broader regional Utilities Forum convened by the FDEP SW District on a quarterly basis.

Project Funding:

- FY2017 Stormwater/Wastewater Capital Budget: $157 Million

**Be Floridian Fertilizer Education Program**

Project Partner(s): TBEP, Pinellas County

Project Summary & Accomplishments:

In 2010, TBEP initiated a 5-year social marketing campaign to support local ordinances restricting application of nitrogen fertilizer on residential landscapes during the summer in Tampa Bay, where

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frequent storm events can wash fertilizer into waterways and contribute to degraded water quality. The campaign, called “Be Floridian,” targeted homeowners, retail outlets and lawn care professionals. Pre-campaign formative research indicated that the greatest challenge was to ensure residents understood why fertilizer restrictions are needed. The campaign reminded people why they live in the Tampa Bay area using multiple marketing methods and a roving flock of painted flamingos (i.e. relaying the natural capital of beautiful water quality, water-based recreational activities, and beaches). In doing so, the campaign emphasized that True Floridians know better than to fertilize in the summer, and a majority of homeowners surveyed across the Tampa Bay area now understand that applying fertilizer before heavy rain is not a good idea. Be Floridian is now currently implemented by municipalities throughout Florida.

Project Funding:

- TBEP FY12-13 through FY16-17 Funds: $320,000
- FDOT Grant: $10,000
- 2012 Tampa Bay Environmental Fund Grant: $75,000

**Autonomous Water Quality and Harmful Algal Bloom Monitoring (FL) in Old Tampa Bay**

Project Partner(s): FWCC/FWRI

Project Summary & Accomplishments:

Between May 2013 and October 2014, FWRI collected temporally-and spatially-rich water quality data sets, filling existing monitoring gaps within Old Tampa Bay. FWRI identified the extent and duration of harmful algal blooms (HABs) and mapped algal biomass in surface waters for early bloom detection and documentation of bloom patchiness. Their analyses revealed a strong seasonal cycle in phytoplankton dynamics and identified factors that contributed to high chlorophyll a concentrations in the system. FWRI have made the high-resolution data available to stakeholders for use in continued monitoring, modeling, and management efforts in Old Tampa Bay.

Project Funding:

- 2012/13 Tampa Bay Environmental Fund Grant: $50,000
- FWRI Matching Contributions: $50,815

**Safety Harbor Waterfront Park Habitat Restoration**

Project Partner(s): City of Safety Harbor, SWFMWD, FDOT

Project Summary & Accomplishments:

This shoreline restoration project resulted in: 1) the removal of 2 acres of invasive vegetation and debris from disturbed mangrove habitat, 2) grading of the project area to elevations suitable for long-term
mangrove establishment and growth, and 3) planting of native vegetation across the two (2) acre site during several volunteer planting events.

Project Funding:

- 2014 Tampa Bay Env. Restoration Fund Grant: $70,000 (SWFWMD; $25,000 from FDOT)
- City of Safety Harbor Matching Contributions: $70,000

**Seeding Potential of *Pyrodinium bahamense* Cysts in Old Tampa Bay**

Project Partner(s): FWCC/FWRI

Project Summary & Accomplishments:

The overall goal of this project was to characterize seeding potential of *Pyrodinium* cyst beds in OTB. FWRI quantified cyst abundance, germination, and sediment mobility in the upper five centimeters of sediment cores taken seasonally from three sites in OTB between August 2015 and September 2016, with the premise that buried cysts may serve as an important seeding source, especially in areas of increased sediment mobility. FWRI further characterized temporal patterns in cyst dormancy within this region.

Project Funding:

- 2015 Tampa Bay Env. Restoration Fund Grant: $83,150
- FWRI Matching Contributions: $89,212

**Old Tampa Bay Integrated Model Development & Investigations of Causeway Modifications that Could Have Positive Ecological Benefits in OTB**

Project Partner(s): FDOT, SWFWMD, TBEP

Project Summary & Accomplishments:

The Tampa Bay Estuary Program (TBEP), in partnership with the Southwest Florida Water Management District (SWFWMD), developed an integrated ecosystem model to assess potential, large-scale management actions that could improve Old Tampa Bay’s (OTB) ecological condition. The integrated model included the development of a linked watershed, bay hydrodynamic, bay water/sediment quality, and set of ecological models (biota and seagrass suitability)\(^{19}\). The new tool was used to simulate the net environmental benefits of potential, large-scale management actions relative to baseline conditions (2000-2009 period) in OTB. Because much has been done in the Tampa Bay region to kick-start the Bay’s

recovery (e.g. wastewater treatment plant upgrades, enhanced stormwater regulations, residential fertilizer use ordinances, etc.), the models were intended to simulate actions that would require significant investment and buy-in from the region. Such actions as bridge/causeway infrastructure modifications, modifying managed freshwater inflows, and continued wastewater/stormwater infrastructure improvements were considered under the initial set of simulations. The model is continuing to be used to investigate potential ecological benefits of modifying the Courtney Campbell Causeway and Howard Frankland causeways.

Project Funding:

- Initial Model Development: $1,000,000 (SWFWMD); $200,000 (TBEP)
- Continued Investigations: FDOT/TBEP In-Kind Contributions

**Increased Water Quality for County Permitted Stormwater Facilities – Eagle Lake Park**

Project Partner(s): Pinellas County Environmental Management, SWFWMD

Project Summary & Accomplishments:

The project will design and construct improvements to Eagle Lake Park stormwater facilities to increase water quality treatment and provide public awareness about such activities. Eagle Lake Park is located within the Allen’s Creek watershed, a tributary to Old Tampa Bay.

Project Funding:

- 2016 Tampa Bay Env. Restoration Fund Grant: $130,000 (PC & SWFWMD)
- Pinellas County Matching Contributions: $130,000 (Penny for Pinellas)

**Mobbly Bayou Habitat Restoration**

Project Partner(s): Southwest Florida Water Management District, City of Oldsmar

Project Summary & Accomplishments:

This project will focus on the restoration and enhancement of tidal creeks and estuarine tidal habitats within the Mobbly Bayou Preserve (an embayment of Old Tampa Bay). Construction will consist of traditional habitat restoration techniques and hydro-blasting to remove spoil mounds, create littoral shelves, and establish ditch blocks to restore natural hydrology and increase estuarine habitat.

Project Funding:

- 2017 Tampa Bay Env. Restoration Fund Grant: $200,000 ($19,229 from SWFWMD)
- SWFWMD Matching Contributions: $900,000
6. Summary of progress since 2012 Reasonable Assurance Update Report

Data and observations from Tampa Bay indicate that continuing efforts to reduce nitrogen loading by the NMC partners are resulting in more than adequate water quality for the expansion of seagrasses. A summary of progress since the 2012 Tampa Bay Reasonable Assurance Update is below:

Management Actions & Restoration Investments

- More than 470 nitrogen load reduction projects have been implemented by Consortium participants since 1992. Collectively over the twenty-five year period from 1992-2016, ~529.4 tons/year of TN loads have been precluded from entering Tampa Bay. Since 1992, over $710 million has been invested by Consortium participants towards nitrogen load reduction projects in the Bay. When accounting for additional land acquisition and preservation activities, as well as educational stewardship programs within the watershed, the total amount invested is over $2.47 billion (as reported in the Tampa Bay Action Plan Database).
- The number of Tampa Bay Nitrogen Management Consortium participants continues to increase with over 45 participating public and private partners.
- Cumulatively, baywide TN load reductions over the 2012-2016 time period were estimated to be 147.3 tons/year. Additional ongoing, planned and budgeted projects post-2016 are expected to reduce TN loading by 482.8 tons at cost equal to $172,395,928 in the future.
- The Consortium local government and private partners have agreed to maintain TN load allocations within the federally-recognized TMDLs for each bay segment and as updated in Table 10 - Table 14. Additionally, the Consortium continues to recognize that any load reductions generated by the entity over the 2007-2021 period will remain as a credit with that entity indefinitely, as described in Section IX.D. of the 2009 RA Addendum.

Environmental Indicators

- From 2012 to 2016, baywide seagrass coverage increased by 7,013 acres. To date, total seagrass acreage in the bay (41,655 acres) is the greatest it has ever been estimated, including in the 1950s.
- Time series plots show that chlorophyll-a thresholds have been consistently met in all four major bay segments (the exception being in 2015 for Old Tampa Bay). Bay managers continue to evaluate appropriate management actions within the Old Tampa Bay segment to improve its overall ecological integrity and reduce the potential for future chlorophyll-a exceedances in this bay segment. TBEP and its partners continue to make significant investments (>200 million) towards implementing projects within this bay segment.

Nitrogen Management Consortium Partnership Recognition

- 1st Place Partnership: 2011 EPA Gulf of Mexico Program Gulf Guardian Awards. The TBNMC was recognized as a highly successful public-private partnership that has proactively and...
voluntarily developed pollution-reduction actions for the Tampa Bay estuary. The Consortium’s collaborative approach to meeting water quality targets was recognized as one of the most unique and successful partnerships in the entire country.

- **One Bay McIntosh Award: 2016 Tampa Bay Regional Planning Council Future of the Region Awards.** The TBEP and its partners (including TBNMC participants) were collectively recognized for the regional collaboration that has successfully restored Tampa Bay seagrass to 1950’s levels – a goal that TBEP established in 1996.

- **Coastal Stewardship Award: 2017 Coastal and Estuarine Research Federation Biennial Conference.** The TBNMC was recognized for the impressive achievements in all the key criteria considered important in the mission of CERF to promote the wise use of science and management toward the stewardship of estuaries and coasts around the world. The TBNMC partners were further recognized for their commitment towards collaborating to maintain water quality adequate to continue the Tampa Bay ecosystem’s recovery.
### Appendix 1: List of facilities defined under the small source allocations for each bay segment (see Table 10 - Table 14).

<table>
<thead>
<tr>
<th>ID</th>
<th>County</th>
<th>Bay Segment</th>
<th>Facility ID</th>
<th>Name</th>
<th>IW/DW</th>
<th>MGD</th>
<th>Tons/Year @ 10mg/L</th>
<th>Attenuation Rate</th>
<th>Annual Load</th>
<th>FREQ</th>
<th>Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hillsborough</td>
<td>Hillsborough Bay</td>
<td>FLA012178</td>
<td>Waterside MHP</td>
<td>0.012</td>
<td>0.18</td>
<td>70%</td>
<td>0.055</td>
<td>Perc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Hillsborough</td>
<td>Hillsborough Bay</td>
<td>FLA012162</td>
<td>Lamplighter MHP</td>
<td>0.096</td>
<td>1.46</td>
<td>70%</td>
<td>0.438</td>
<td>AA</td>
<td>Perc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Hillsborough</td>
<td>Hillsborough Bay</td>
<td>FLA012190</td>
<td>Featherock</td>
<td>0.08</td>
<td>1.22</td>
<td>70%</td>
<td>0.365</td>
<td>3M</td>
<td>Perc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Hillsborough</td>
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<td>FLA012168</td>
<td>Paradise Village MHP</td>
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<td>1.17</td>
<td>70%</td>
<td>0.351</td>
<td>AA</td>
<td>Perc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Pasco</td>
<td>Hillsborough Bay</td>
<td>FLA012820</td>
<td>Hillcrest RV Resort WWTF</td>
<td>0.07</td>
<td>1.06</td>
<td>70%</td>
<td>0.319</td>
<td>AA</td>
<td>Perc</td>
<td></td>
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<tr>
<td>8</td>
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<td>FLA012803</td>
<td>Ramblewood MHP WWTF</td>
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<td>0.91</td>
<td>90%</td>
<td>0.091</td>
<td>AA</td>
<td>SF/Perc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Hillsborough</td>
<td>Hillsborough Bay</td>
<td>FLA012208</td>
<td>The Oaks of Thonotosassa MHP WWTP</td>
<td>0.06</td>
<td>0.91</td>
<td>90%</td>
<td>0.091</td>
<td>3M</td>
<td>SF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Hillsborough</td>
<td>Hillsborough Bay</td>
<td>FLA012121</td>
<td>Southern Aire RVP</td>
<td>0.08</td>
<td>1.22</td>
<td>70%</td>
<td>0.365</td>
<td>3M</td>
<td>Perc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Pasco</td>
<td>Hillsborough Bay</td>
<td>FLA012778</td>
<td>Country Aire Village WWTF</td>
<td>0.04</td>
<td>0.61</td>
<td>70%</td>
<td>0.182</td>
<td>AA</td>
<td>Perc</td>
<td></td>
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<tr>
<td>12</td>
<td>Hillsborough</td>
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<td>Paradise Village #2-South</td>
<td>0.04</td>
<td>0.61</td>
<td>70%</td>
<td>0.182</td>
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<td>Perc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
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<td>Hillsborough Bay</td>
<td>FLA012232</td>
<td>Parkwood Estates Mobile home Park</td>
<td>0.048</td>
<td>0.73</td>
<td>70%</td>
<td>0.219</td>
<td>3M</td>
<td>Perc</td>
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<td></td>
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<td>14</td>
<td>Hillsborough</td>
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<td>FLA012128</td>
<td>Briarwood MHP</td>
<td>0.035</td>
<td>0.53</td>
<td>70%</td>
<td>0.160</td>
<td>3M</td>
<td>Perc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Hillsborough</td>
<td>Hillsborough Bay</td>
<td>FLA012200</td>
<td>Spanish Main Travel Resort</td>
<td>0.035</td>
<td>0.53</td>
<td>70%</td>
<td>0.160</td>
<td>3M</td>
<td>Perc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Hillsborough</td>
<td>Hillsborough Bay</td>
<td>FLA012113</td>
<td>Durrant High School WWTP</td>
<td>0.033</td>
<td>0.50</td>
<td>70%</td>
<td>0.150</td>
<td>3M</td>
<td>Perc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Hillsborough</td>
<td>Hillsborough Bay</td>
<td>FLA012223</td>
<td>Eastfield Slopes</td>
<td>0.03</td>
<td>0.46</td>
<td>70%</td>
<td>0.137</td>
<td>AA</td>
<td>Perc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Hillsborough</td>
<td>Hillsborough Bay</td>
<td>FLA012139</td>
<td>STRAWBERRY SQUARES</td>
<td>0.027</td>
<td>0.41</td>
<td>70%</td>
<td>0.123</td>
<td>3M</td>
<td>Perc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Hillsborough</td>
<td>Hillsborough Bay</td>
<td>FLA012186</td>
<td>Windward Knoll</td>
<td>0.026</td>
<td>0.40</td>
<td>70%</td>
<td>0.119</td>
<td>3M</td>
<td>Perc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Pasco</td>
<td>Hillsborough Bay</td>
<td>FLA012822</td>
<td>Arbor Oaks</td>
<td>0.025</td>
<td>0.38</td>
<td>70%</td>
<td>0.114</td>
<td>3M</td>
<td>Perc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Pasco</td>
<td>Hillsborough Bay</td>
<td>FLA012836</td>
<td>Grove Ridge Estates</td>
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**Lower Tampa Bay**

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**Middle Tampa Bay**

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NMC Approved: September 29, 2017
2017 Tampa Bay RA Update
-49-
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**SUM (NOT ATTENTUATED)** 42

**SUM (ALL BAY SEGMENTS)** 12.13

NMC Approved: September 29, 2017

2017 Tampa Bay RA Update

-50-
On behalf of the Tampa Bay Nitrogen Management Consortium (TBNMC) co-chairs, please find below recommendations for consideration under development of the 2021 Reasonable Assurance Update (anticipated to be due to FDEP by December 31, 2021). The recommendations stem from discussions of the Consortium between January 2013 and September 2017 during the development of the 2017 RA Update. As such, these recommendations are incorporated into the 2017 RA Update as an appendix to that document.

**Unassigned Reserved Allocations**

**Background:**

For the 2017 RA Update, Consortium participants agreed that allocations developed under the 2009 RA Addendum be maintained through 2021. The exception to this was the assignment of allocations to new, interim or acquired sources that occurred since the 2009 RA Addendum and 2012 RA Update were approved. Tables 10-14 contained in the 2017 RA Update detail the revised allocations for each of the bay segments recognized under the current RA plan. The total allocations for each bay segment remain equal to the federally-recognized TMDL for Tampa Bay and previous RA plans submitted to the FDEP. In the updated table for Hillsborough Bay, an “Unassigned reservation” allocation has been defined in the 2017 RA Update. The “unassigned reservation” allocation resulted from the update and assignment of allocations from previously recognized interim allocation sources listed in the 2009 RA Addendum and 2012 RA Update. Consensus approval by the TBNMC of how the “unassigned reservation” allocation should be considered in future RA plans and assessments was developed at the June 29 and September 29, 2017 TBNMC meetings. The recommendations are below.

**Consortium Recommendations:**

1. This allocation will be held as a reservation for future bay segment and entity compliance assessments.
2. Permanent transfer of any portion of the unassigned reservation allocation to existing or new sources will be contingent upon Consortium consensus approval and follow the protocol detailed in NMC Decision Memo 2012-01\(^\text{20}\) and then later approved by the FDEP\(^\text{21}\).


Appendix 3: Old Tampa Bay allocation assessment for the 2012-2016 Reasonable Assurance period.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Source</th>
<th>% Allocation (Based on Percentage of Remaining Load)</th>
<th>Allocated TMDL Load (tons/yr)</th>
<th>Mean 2012-2016 Loads (tons/yr), Entities/Facilities with % Allocations Hydrologically Normalized BASIN</th>
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<tbody>
<tr>
<td>Cheval West</td>
<td>MS4</td>
<td>0.18%</td>
<td>0.7</td>
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<td>9.3</td>
<td>5.4</td>
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<td>0.0</td>
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<tr>
<td></td>
<td>Point Source - Clearwater Northeast SW</td>
<td>16.6</td>
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<td>Point Source - Clearwater Northeast RE</td>
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<td></td>
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<tr>
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<td>MS4</td>
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<td>Heritage Harbor</td>
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<td>Point Source - Dale Mabry SW</td>
<td>7.4</td>
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<td></td>
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<td>1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source - Northwest Regional SW</td>
<td>2.9</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
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<td>Point Source - Northwest Regional RE</td>
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<td>5.2</td>
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<td>Point Source - River Oaks SW</td>
<td>13.4</td>
<td>11.0</td>
<td></td>
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<tr>
<td></td>
<td>Point Source - River Oaks RE</td>
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<td>2.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source - Van Dyke RE</td>
<td>0.8</td>
<td>0.9</td>
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</tr>
<tr>
<td></td>
<td>MS4</td>
<td>23.34%</td>
<td>91.6</td>
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<td></td>
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<td>City of Largo</td>
<td>Point Source - Largo SW</td>
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<td></td>
<td>Point Source - Largo RE</td>
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<tr>
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<td>MS4</td>
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<td></td>
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<td>32.6</td>
</tr>
<tr>
<td>MacDill Air Force Base</td>
<td>MS4</td>
<td>0.09%</td>
<td>0.4</td>
<td>0.3</td>
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<td>Entity</td>
<td>Source</td>
<td>% Allocation (Based on Percentage of Remaining Load)</td>
<td>Allocated TMDL Load (tons/yr)</td>
<td>Mean 2012-2016 Loads (tons/yr), Entities/Facilities with % Allocations Hydrologically Normalized BASIN</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------------------------</td>
<td>----------------------------------------------------</td>
<td>------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>City of Oldsmar</td>
<td>Point Source - Oldsmar SW</td>
<td>2.7</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source - Oldsmar RE</td>
<td>0.5</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MS4</td>
<td>1.38%</td>
<td>5.4</td>
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<tr>
<td></td>
<td>TOTAL</td>
<td>8.7</td>
<td>6.6</td>
<td></td>
</tr>
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<td>On Top of the World</td>
<td>Point Source - OTOTW RE</td>
<td>0.5</td>
<td>0.8</td>
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</tr>
<tr>
<td>Palm Bay</td>
<td>MS4</td>
<td>0.01%</td>
<td>0.0</td>
<td></td>
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<tr>
<td>Park Place</td>
<td>MS4</td>
<td>0.10%</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Pasco County</td>
<td>MS4</td>
<td>0.44%</td>
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<td></td>
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<tr>
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<td>Point Source - W.E. Dunn RE</td>
<td>2.3</td>
<td>0.8</td>
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</tr>
<tr>
<td></td>
<td>Point Source - Bridgeway Acres SW</td>
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<td>2.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MS4</td>
<td>14.66%</td>
<td>57.6</td>
<td>38.4</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>61.1</td>
<td>41.3</td>
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</tr>
<tr>
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<td>Point Source - St. Pete Facilities RE</td>
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<td>3.8</td>
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<tr>
<td></td>
<td>MS4</td>
<td>0.88%</td>
<td>3.5</td>
<td>2.8</td>
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<td></td>
<td>TOTAL</td>
<td>8.2</td>
<td>6.6</td>
<td></td>
</tr>
<tr>
<td>Stonebriar</td>
<td>MS4</td>
<td>0.05%</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>City of Tarpon Springs</td>
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<td>0.7</td>
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<td>City of Tampa</td>
<td>MS4</td>
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<td>20.8</td>
<td>17.9</td>
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<td>Westchase</td>
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<td>Duke Energy Bartow</td>
<td>Point Source (2 yrs data)</td>
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</table>

*Interim Allocation, as identified in the 2009 RA Addendum and 2012 RA Update*
Appendix 4: Hillsborough Bay allocation assessment for the 2012-2016 Reasonable Assurance period.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Source</th>
<th>% Allocation (Based on Percentage of Remaining Load)</th>
<th>Allocated TMDL Load (tons/yr)</th>
<th>Mean 2012-2016 Loads (tons/yr), Entities/Facilities with % Allocations Hydrologically Normalized BASIN</th>
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<tbody>
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<td>Lowry Park Zoo</td>
<td>Point Source - Lowry Park SW</td>
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<tr>
<td>Hillsborough County</td>
<td>Point Source - Falkenburg SW</td>
<td>15.2</td>
<td>15.3</td>
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<tr>
<td></td>
<td>Point Source - Falkenburg RE</td>
<td>2.8</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source - Pebble Creek SW</td>
<td>0.3</td>
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</tr>
<tr>
<td></td>
<td>Point Source - Pebble Creek RE</td>
<td>0.1</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
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<td>Point Source - South County SW</td>
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<td>5.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source - Valrico SW</td>
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<td>4.4</td>
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<td>Point Source - Valrico RE</td>
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<td></td>
<td>MS4</td>
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<td>Mean 2012-2016 Loads (tons/yr), Entities/Facilities with % Allocations Hydrologically Normalized BASIN</td>
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<td>City of Lakeland</td>
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<td>MS4</td>
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<td>10.5</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
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<td>Point Source - Mulberry SW</td>
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<td>MS4</td>
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<td>TOTAL</td>
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<td>Pasco County</td>
<td>Point Source - Master Reuse System RE</td>
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<td>5.8</td>
<td>4.8</td>
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<td>MS4</td>
<td>3.69%</td>
<td>38.4</td>
<td>24.4</td>
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<td>TOTAL</td>
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<td>44.2</td>
<td>29.2</td>
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<td>City of Plant City</td>
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NMC Approved: September 29, 2017
2017 Tampa Bay RA Update
-54-
<table>
<thead>
<tr>
<th>Entity</th>
<th>Source</th>
<th>% Allocation (Based on Percentage of Remaining Load)</th>
<th>Allocated TMDL Load (tons/yr)</th>
<th>Mean 2012-2016 Loads (tons/yr), Entities/Facilities with % Allocations Hydrologically Normalized BASIN</th>
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<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>MS4</td>
<td>0.88%</td>
<td>9.2</td>
<td>8.4</td>
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<td>TOTAL</td>
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<td>13.2</td>
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<td>Polk County</td>
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<td>1.1</td>
<td>0.2</td>
</tr>
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<td>6.47%</td>
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<td>58.2</td>
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<td>Point Source - HF Curren RE</td>
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<td>2.1</td>
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<tr>
<td></td>
<td>Point Source - Winston Yard</td>
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<tr>
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<td>Point Source - Rockport</td>
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<tr>
<td></td>
<td>Point Source - Newport Material Losses (kfa Eastern)</td>
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<tr>
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<td>Point Source - Rockport/Newport (fka Eastern Terminals)</td>
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<td></td>
<td>26.8</td>
<td>8.4</td>
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<td>Point Source - Port Sutton Material Losses</td>
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<td>Point Source - Tampaplex</td>
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<tr>
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<td>Point Source - Hartford Terminal*</td>
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</tr>
<tr>
<td>Entity</td>
<td>Source</td>
<td>% Allocation (Based on Percentage of Remaining Load)</td>
<td>Allocated TMDL Load (tons/yr)</td>
<td>Mean 2012-2016 Loads (tons/yr), Entities/Facilities with % Allocations Hydrologically Normalized BASIN</td>
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<tr>
<td>Kerry I&amp;F Contracting</td>
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<td>Point Source - Port Sutton*</td>
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<tr>
<td></td>
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<td>0.52%</td>
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<td>Point Source - Hopewell</td>
<td>0.25%</td>
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<td>2.0</td>
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<td>Point Source - Kingsford</td>
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<td>64.3</td>
<td>11.3</td>
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<td>Point Source - Mulberry</td>
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<td>5.6</td>
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<td></td>
<td>Point Source - New Wales Stack Closure</td>
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<tr>
<td></td>
<td>Point Source - Nichols Mine</td>
<td>0.33%</td>
<td>3.5</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>Point Source - Riverview</td>
<td>0.84%</td>
<td>8.8</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>Point Source - Riverview Stack Closure</td>
<td>0.47%</td>
<td>4.9</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>Point Source - Port Sutton Ammonia Terminal*</td>
<td>0.18%</td>
<td>1.9</td>
<td>7.3</td>
</tr>
<tr>
<td></td>
<td>Point Source - South Pierce</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entity</td>
<td>Source</td>
<td>% Allocation (Based on Percentage of Remaining Load)</td>
<td>Allocated TMDL Load (tons/yr)</td>
<td>Mean 2012-2016 Loads (tons/yr), Entities/Facilities with % Allocations Hydrologically Normalized BASIN</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Agrifos</td>
<td>Point Source - Nichols Prep Plant</td>
<td>0.00%</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Brewster Phosphogypsum</td>
<td>Point Source - Brewster Phosphogypsum</td>
<td>0.10%</td>
<td>1.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Alpha/Owens Corning</td>
<td>Point Source - Alpha/Owens Corning</td>
<td>0.10%</td>
<td>1.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Coronet Industries</td>
<td>Point Source - Coronet Industries</td>
<td>0.45%</td>
<td>4.7</td>
<td>1.6</td>
</tr>
<tr>
<td>Estech Agricola</td>
<td>Point Source - Estech Agricola</td>
<td>0.25%</td>
<td>2.6</td>
<td>2.5</td>
</tr>
<tr>
<td>Exxon Mobil</td>
<td>Point Source - Exxon Mobil</td>
<td>0.16%</td>
<td>1.7</td>
<td>0.0</td>
</tr>
<tr>
<td>TECO Bayside</td>
<td>Point Source - TECO Bayside</td>
<td>0.07%</td>
<td>0.8</td>
<td>0.4</td>
</tr>
<tr>
<td>Trademark Nitrogen</td>
<td>Point Source - Trademark Nitrogen</td>
<td>0.00%</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Yara North America</td>
<td>Point Source - Yara North America</td>
<td>0.03%</td>
<td>0.3</td>
<td>0.9</td>
</tr>
<tr>
<td>Alafia Preserve</td>
<td>Nonpoint Source/MS4</td>
<td>0.06%</td>
<td>0.6</td>
<td>0.4</td>
</tr>
<tr>
<td>Bloomingdale</td>
<td>Nonpoint Source/MS4</td>
<td>0.00%</td>
<td>0.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Donaldson Knoll</td>
<td>Nonpoint Source/MS4</td>
<td>0.01%</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Eagle Ridge</td>
<td>Nonpoint Source/MS4</td>
<td>0.07%</td>
<td>0.7</td>
<td>0.8</td>
</tr>
<tr>
<td>Lake St. Charles</td>
<td>Nonpoint Source/MS4</td>
<td>0.04%</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Live Oak I</td>
<td>Nonpoint Source/MS4</td>
<td>0.02%</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Live Oak II</td>
<td>Nonpoint Source/MS4</td>
<td>0.01%</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Magnolia Park</td>
<td>Nonpoint Source/MS4</td>
<td>0.00%</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>MacDill Air Force Base</td>
<td>Nonpoint Source/MS4</td>
<td>0.07%</td>
<td>0.7</td>
<td>1.0</td>
</tr>
<tr>
<td>Palm River</td>
<td>Nonpoint Source/MS4</td>
<td>0.00%</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Panther Trace</td>
<td>Nonpoint Source/MS4</td>
<td>0.03%</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Panther Trace II</td>
<td>Nonpoint Source/MS4</td>
<td>0.02%</td>
<td>0.2</td>
<td>0.7</td>
</tr>
<tr>
<td>Rivercrest</td>
<td>Nonpoint Source/MS4</td>
<td>0.03%</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Entity</td>
<td>Source</td>
<td>% Allocation (Based on Percentage of Remaining Load)</td>
<td>Allocated TMDL Load (tons/yr)</td>
<td>Mean 2012-2016 Loads (tons/yr), Entities/Facilities with % Allocations Hydrologically Normalized BASIN</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>City of San Antonio</td>
<td>Nonpoint Source/MS4</td>
<td>0.03%</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Spring Lake</td>
<td>Nonpoint Source/MS4</td>
<td>0.01%</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>St. Leo</td>
<td>Nonpoint Source/MS4</td>
<td>0.00%</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Stone Crest</td>
<td>Nonpoint Source/MS4</td>
<td>0.00%</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Stone Dairy Creek</td>
<td>Nonpoint Source/MS4</td>
<td>0.00%</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Stonelake Ranch</td>
<td>Nonpoint Source/MS4</td>
<td>0.00%</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>City of Temple Terrace</td>
<td>Nonpoint Source/MS4</td>
<td>0.20%</td>
<td>2.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Mosaic</td>
<td>New Load: Big Bend Material Losses</td>
<td></td>
<td></td>
<td>0.7</td>
</tr>
<tr>
<td>Kinder Morgan</td>
<td>New Load: Point Source - Tampaplex Bulk Terminal</td>
<td></td>
<td></td>
<td>0.0</td>
</tr>
<tr>
<td>Busch Gardens</td>
<td>New Load: Point Source - Busch Gardens</td>
<td></td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>Mosaic</td>
<td>New Load: Point Source - Mulberry Phosphogypsum Stack</td>
<td>0.00%</td>
<td>0.0</td>
<td>1.8</td>
</tr>
<tr>
<td>Mosaic</td>
<td>New Load: Point Source - New Wales Chemical Plant</td>
<td>0.00%</td>
<td>0.0</td>
<td>14.1</td>
</tr>
</tbody>
</table>

*Interim Allocation, as identified in the 2009 RA Addendum and 2012 RA Update*
Appendix 5: Middle Tampa Bay allocation assessment for the 2012-2016 Reasonable Assurance period.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Source</th>
<th>% Allocation (Based on Percentage of Remaining Load)</th>
<th>Allocated TMDL Load (tons/yr)</th>
<th>Mean 2012-2016 Loads (tons/yr), Entities/Facilities with % Allocations Hydrologically Normalized BASIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harbor Bay</td>
<td>MS4</td>
<td>0.03%</td>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Hillsborough County</td>
<td>Point Source - South County RE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MS4</td>
<td>9.91%</td>
<td>70.9</td>
<td>72.2</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td>71.4</td>
<td>72.7</td>
</tr>
<tr>
<td>MacDill Air Force Base</td>
<td>Point Source - MacDill AFB RE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MS4</td>
<td>0.97%</td>
<td>7.0</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td>7.7</td>
<td>3.9</td>
</tr>
<tr>
<td>Manatee County</td>
<td>MS4</td>
<td>3.05%</td>
<td>21.8</td>
<td>20.8</td>
</tr>
<tr>
<td>Pinellas County</td>
<td>MS4</td>
<td>0.45%</td>
<td>3.2</td>
<td>2.1</td>
</tr>
<tr>
<td>City of Pinellas Park</td>
<td>MS4</td>
<td>0.74%</td>
<td>5.3</td>
<td>3.5</td>
</tr>
<tr>
<td>City of St. Petersburg</td>
<td>Point Source - St. Pete Facilities RE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MS4</td>
<td>6.49%</td>
<td>46.5</td>
<td>27.3</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td>67.3</td>
<td>44.4</td>
</tr>
<tr>
<td>Mosaic</td>
<td>Point Source - Four Corners</td>
<td>4.09%</td>
<td>29.3</td>
<td>30.1</td>
</tr>
<tr>
<td>TECO Big Bend</td>
<td>Point Source - Big Bend SW*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point Source - Big Bend RE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td>58.6</td>
<td>52.8</td>
</tr>
</tbody>
</table>

*Interim Allocation, as identified in the 2009 RA Addendum and 2012 RA Update
Appendix 6: Lower Tampa Bay allocation assessment for the 2012-2016 Reasonable Assurance period.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Source</th>
<th>% Allocation (Based on Percentage of Remaining Load)</th>
<th>Allocated TMDL Load (tons/yr)</th>
<th>Mean 2012-2016 Loads (tons/yr), Entities/Facilities with % Allocations Hydrologically Normalized BASIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hillsborough County</td>
<td>MS4</td>
<td>0.01%</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Lexington</td>
<td>MS4</td>
<td>0.04%</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Manatee County</td>
<td>Point Source - Manatee County North RE</td>
<td></td>
<td>3.9</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>Point Source - Manatee County North SW</td>
<td></td>
<td>0.0</td>
<td>0.8</td>
</tr>
<tr>
<td>Manatee County</td>
<td>MS4</td>
<td>7.81%</td>
<td>26.8</td>
<td>15.6</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td>30.7</td>
<td>19.8</td>
</tr>
<tr>
<td>City of St. Petersburg</td>
<td>MS4</td>
<td>0.01%</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Kinder Morgan Port</td>
<td>Point Source - Material Losses</td>
<td></td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Manatee</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piney Point Facility*</td>
<td>Point Source - Piney Point</td>
<td></td>
<td>0.9</td>
<td>0.9</td>
</tr>
</tbody>
</table>

*Interim Allocation, as identified in the 2009 RA Addendum and 2012 RA Update
### Appendix 7: Remainder of Lower Tampa Bay allocation assessment for the 2012-2016 Reasonable Assurance period.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Source</th>
<th>% Allocation (Based on Percentage of Remaining Load)</th>
<th>Allocated TMDL Load (tons/yr)</th>
<th>Mean 2012-2016 Loads (tons/yr), Entities/Facilities with % Allocations Hydrologically Normalized BASIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Bradenton</td>
<td>Point Source - Bradenton SW</td>
<td></td>
<td>18.6</td>
<td>17.0</td>
</tr>
<tr>
<td></td>
<td>Point Source - Bradenton RE</td>
<td></td>
<td>0.6</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>MS4</td>
<td>1.82%</td>
<td>10.8</td>
<td>7.0</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td>30.0</td>
<td>25.8</td>
</tr>
<tr>
<td>City of Gulfport</td>
<td>MS4</td>
<td>0.37%</td>
<td>2.2</td>
<td>1.3</td>
</tr>
<tr>
<td>Greyhawk Landing</td>
<td>MS4</td>
<td>0.14%</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>Harbourage at Braden River</td>
<td>MS4</td>
<td>0.00%</td>
<td>0.0</td>
<td>0.1</td>
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<tr>
<td>Heritage Harbour</td>
<td>MS4</td>
<td>0.14%</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>Heritage Harbour Marketplace</td>
<td>MS4</td>
<td>0.02%</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Lakewood Ranch</td>
<td>MS4</td>
<td>1.47%</td>
<td>8.7</td>
<td>6.2</td>
</tr>
<tr>
<td>Lexington</td>
<td>MS4</td>
<td>0.02%</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Manatee County</td>
<td>Point Source - Southeast RE</td>
<td></td>
<td>2.7</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>MS4</td>
<td>21.95%</td>
<td>130.2</td>
<td>78.7</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td>132.9</td>
<td>86.2</td>
</tr>
<tr>
<td>Pinellas County</td>
<td>MS4</td>
<td>0.18%</td>
<td>1.1</td>
<td>0.7</td>
</tr>
<tr>
<td>City of Palmetto</td>
<td>Point Source - Palmetto SW</td>
<td></td>
<td>2.2</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>Point Source - Palmetto RE</td>
<td></td>
<td>1.0</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>MS4</td>
<td>0.77%</td>
<td>4.6</td>
<td>3.7</td>
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<tr>
<td></td>
<td>TOTAL</td>
<td></td>
<td>7.7</td>
<td>5.5</td>
</tr>
<tr>
<td>Sarasota County</td>
<td>MS4</td>
<td>1.38%</td>
<td>8.2</td>
<td>4.4</td>
</tr>
<tr>
<td>City of St. Petersburg Beach</td>
<td>MS4</td>
<td>0.21%</td>
<td>1.2</td>
<td>0.8</td>
</tr>
<tr>
<td>City of St. Petersburg</td>
<td>Point Source - St. Pete Facilities RE</td>
<td>0.16%</td>
<td>1.6</td>
<td>1.3</td>
</tr>
<tr>
<td>Entity</td>
<td>Source</td>
<td>% Allocation (Based on Percentage of Remaining Load)</td>
<td>Allocated TMDL Load (tons/yr)</td>
<td>Mean 2012-2016 Loads (tons/yr), Entities/Facilities with % Allocations Hydrologically Normalized BASIN</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------</td>
<td>------------------------------------------------------</td>
<td>-----------------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Tara</td>
<td>MS4</td>
<td>1.27%</td>
<td>7.5</td>
<td>5.4</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>9.1</td>
<td>6.7</td>
</tr>
<tr>
<td>University Place</td>
<td>MS4</td>
<td>0.18%</td>
<td>1.1</td>
<td>0.6</td>
</tr>
<tr>
<td>Waterlefe</td>
<td>MS4</td>
<td>0.11%</td>
<td>0.6</td>
<td>0.4</td>
</tr>
<tr>
<td>Tropicana*</td>
<td>Point Source - Tropicana SW</td>
<td>0.10%</td>
<td>0.6</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9.1</td>
<td>0.0</td>
</tr>
</tbody>
</table>

*Interim Allocation, as identified in the 2009 RA Addendum and 2012 RA Update
November 15, 2017

Ms. Holly Greening  
Executive Director  
Tampa Bay Estuary Program  
263 13th Ave South, Suite 350  
St. Petersburg, FL 33701

Dear Ms. Greening:

This letter is to inform you, the Tampa Bay Estuary Program, and other members of the Tampa Bay Nitrogen Management Consortium of the continued approval by the Florida Department of Environmental Protection of the Nitrogen Management Consortium’s Reasonable Assurance Plan (RA). The 2017 update demonstrates that reasonable progress towards attainment of the narrative nutrient criteria and associated Class III designated uses continues because of the completed and proposed management actions, and compliance with the allocations.

On October 31, 2017, the department received the Tampa Bay Nitrogen Management Strategy – 2017 Reasonable Assurance Update Document and following a review of the document concluded the 2017 update demonstrates not only the attainment of the RA seagrass targets, but also the total nitrogen numeric nutrient criteria. Because of this success, all segments covered by the RA will be placed in assessment category 2 for total nitrogen. This assessment category designation identifies the segments as not impaired and attaining their designated uses.

I would like to close by emphasizing our appreciation for the outstanding job that you and the stakeholders have done over the years. Taking a valuable water resource, such as Tampa Bay, from impaired to restored is no easy feat. We are especially appreciative of the way stakeholders have continued to embrace this comprehensive restoration plan, and commend them for their efforts to protect and restore Tampa Bay.
If you have additional questions about the information provided in this letter or the assessments, please contact me (850-245-8416, Julie.Espy@dep.state.fl.us).

Sincerely,

Julie Espy, Program Administrator
Water Quality Assessment Program

Cc: Drew Bartlett, FDEP
    Tom Frick, FDEP
    Mary Walker, US EPA Region 4
    Julie Espy, FDEP