# DRAFT MANAGEMENT STRATEGY BLUE CRAB

Estimated Percent Complete: 90%

### OUTCOMES

Maintain a sustainable blue crab population based on the current 2012 target of 215 million adult females. Refine population targets through 2025 based on best available science.

Manage for a stable and productive crab fishery including working with the industry, recreational crabbers and other stakeholders to improve commercial and recreational harvest accountability. By 2018, evaluate the establishment of a Bay-wide, allocation-based management framework with annual levels set by the jurisdictions for the purpose of accounting for and adjusting harvest by each jurisdiction.

# FACTORS INFLUENCING

### • Harvest and Fishery Conditions

Harvest and effort levels

- Gear type, season lengths, harvest controls
   Interannual harvest changes
   Spatial variability
- **Economic factors**

#### Data Gaps

- Need data to better inform management decisions

  Harvest and effort reporting
- Summer population data
- Natural mortality

#### Population Dynamics

- Highly variable recruitment and spawning Complex life history
- Variety of factors affect adult growth and survival

#### • Ecosystem

Habitat Loss

- Predation and prey availabilityDissolved Oxygen
- Disease
  - Climate Change

# GAPS

- Need to reduce uncertainty in the data, such as abundance estimates, which management uses to inform decisions
- Reducing uncertainty will allow for a more informed evaluation of an allocation-based management framework
- Focus reducing uncertainty on:
  - CBSAC priorities—winter dredge survey gear selectivity and harvest/effort reporting
    Economic value of the fishery and impacts of regulatory changes and stock fluctuations on this value

- Plan for and implement the 2016 benchmark stock assessment which will provide updates to the current female reference points and provide guidance on developing male reference pointe. Jurisdictions will continue managing under the current reference points until the stock assessment is complete.
- Jurisdictions will evaluate the overall benefits of a shift to a Bay-wide Allocation Based Management Framework. An allocation-based management framework would require the following steps:
  - Calculate a Bay wide total allowable catch (TAC) of blue crabs based on the results of the most recent stock assessment annual Baywide winter dredge survey.
  - Develop and explore options for allocating a percentage of the Baywide TAC to jurisdictions.
  - Develop and implement a Management Plan based on the TAC and jurisdictional allocation.

# DRAFT MANAGEMENT STRATEGY FISH HABITAT

Estimated Percent Complete: 80%

# OUTCOMES

Continually improve effectiveness of fish habitat conservation and restoration efforts by identifying and characterizing critical spawning, nursery and forage areas within the Bay and tributaries for important fish and shellfish, and use existing and new tools to integrate information and conduct assessments to inform restoration and conservation efforts.

### FACTORS INFLUENCING

# Top priorities listed for each habitat type

#### Tidal saltwater—Subtidal

- Water quality (DO, sedimentation)
- Land use change/urbanization
- Bottom type and loss of habitat structure

#### Tidal saltwater—Nearshore

- Land use change/urbanization
- Shoreline hardening
- Climate change (sea level rise)

#### Freshwater—Cold nontidal

- Land use change/urbanization
  - Impervious surface and loss of forest cover

#### Freshwater—Warm nontidal

- Land use change/urbanization
  - Impervious surface
- Water Quality (nutrient and sediment loads)

#### Freshwater—Tidal

- Land use change/urbanization
- Water quality (turbidity)
- Loss of wetlands
- Climate change (sea level rise and saltwater intrusion)

#### GAPS

#### Science

- Environmental factors currently limiting fish recruitment
- Identifying areas of "high quality" fish habitat suggesting which waters are most important to critical life stages for fish
- Integrating and synthesizing existing data and understanding into decision support tools and models
- Valuation of ecosystem services and value of habitats supporting priority species
- Understanding the limits that restoration can achieve

#### Management

- Multi-agency coordination
- Regulatory authority to protect critical fish habitat
- Public communication on the threats posed by loss of habitat
- Involvement of local communities, specifically inclusion of fish habitat protections in local planning efforts

- <u>Identify and prioritize threats</u> to fish habitat at the jurisdictional and Bay wide scale and propose actions to manage the threats.
- <u>Compile</u> and identify available data on habitats, habitat vulnerabilities, and fish utilization at different life stages to develop a set of criteria for identifying areas of "high value fish habitat."
- <u>Map and target "high value fish habitat"</u> for improved conservation and restoration. Develop spatial tools for priority habitats and species to inform management decisions. Develop thresholds (area of fish habitat we do not want to go below by region) to set clear fish habitat conversation targets.
- <u>Communicate importance of fish habitat</u> to general public and local community leaders by engaging in a conversation about the tradeoffs associated with competing uses of land and waters.
- Evaluate ways to enhance fish habitat protection by reviewing examples from other regions and actively engaging with the Atlantic Coast Fish Habitat Partnership.

# DRAFT MANAGEMENT STRATEGY FORAGE FISH

Estimated Percent Complete: 80%

# OUTCOME

Continually improve the Partnership's capacity to understand the role of forage fish populations in the Chesapeake Bay. By 2016, develop a strategy for assessing the forage fish base available as food for predatory species in the Chesapeake Bay.

#### FACTORS INFLUENCING

# Forage Abundance

- Predation
- Water quality
- Land use and watershed development
- Fishing and catch removals
- Climate change
- Food resources for forage species

# Assessment Ability

- Monitoring/survey capacity
- Data analysis/synthesis
- ♦ Data limitations
- Baywide coordination

#### GAPS

- ♦ Trends of key forage taxa, especially invertebrates and unmanaged fish species.
- Definition of "ideal" state for forage species (species abundance, habitat, water quality).
- ♦ Comprehensive monitoring.
- Economic data on the value of forage species.

- Define forage species and what comprises the forage base.
  - Explain their role both as an economic value to humans and as a food source for commercially/recreationally valuable predator species. Refer to STAC workshop key species list.
- Determine the status of the forage base.
  - STAC Forage Workshop: Key and important forage taxa and groups have been defined; a suite of potentially useful metrics and indicators to assess forage has been identified; research priorities that both managers and scientists agree on have been set.
- Inform management decisions to better address sustainability of the forage base.
  - Work with fishery managers to set clear management objectives for forage, which will serve to identify the specific metrics and indicators that are most appropriate.
  - Develop indicators based on fishery manager input and priority factors affecting forage base. Use indicators to identify and promote actions that protect habitats that support forage base productivity.
- Maximize the efficiency of monitoring programs and build on existing efforts.
  - Map areas and habitats important for the production and maintenance of forage, with special emphasis on shoreline habitat, land use change and developments in the tributaries throughout the watershed.
  - © Consider options to improve phytoplankton and zooplankton monitoring bay wide.

# DRAFT MANAGEMENT STRATEGY OYSTER RESTORATION

Estimated Percent Complete: 90%

#### GAPS

Continually increase finfish and shellfish habitat and water quality benefits from restored oyster populations. Restore native oyster habitat and populations in 10 tributaries by 2025 and ensure their protection.

#### FACTORS INFLUENCING

- Low population and disease
- Resource Availability
  - Funding
  - Shell/substrate
  - Hatchery spat supply
- Water Quality
- Enforcement
- Spat set variability
- Shell Loss
- Oyster Resource Management
  - Permitting
  - Bottom ownership
  - Designation of sanctuary areas
- Connectivity
- Hard bottom availability
- Public support
- Climate change/ocean acidification
- Innovative restoration techniques
- Navigation

### GAPS

- Funding limitations and challenges
- Selection of future tributaries
  - Consider current bottom uses, regulations, biological/physical conditions
  - High potential for restoration success

- General approach for implementing tributary-scale restoration:
  - Tributary selection process
    - Three already selected in Maryland: Harris Creek, Tred Avon River, Little Choptank River,
    - Three already selected in Virginia: Lafayette River, Lynnhaven River, Piankatank River
  - Data collection
  - Set acreage target
  - Develop plan
  - Implementation
  - Monitoring
- Future Protection
  - Sanctuary vs harvest areas; enforcement
- Engagement/communication with local communities
  - Outreach and communication with local communities, especially near restoration sites
  - Water quality and land use impacts on oyster restoration success

# DRAFT MANAGEMENT STRATEGY BLACK DUCK

Estimated Percent Complete: 60%

**OUTCOME:** By 2025, restore, enhance and preserve wetland habitats that support a wintering population of 100,000 black ducks, a species representative of the health of tidal marshes across the watershed. Refine population targets through 2025 based on best available science.

#### FACTORS INFLUENCING

### Natural System Factors

- Habitat loss, degradation and fragmentation
- Food availability—affected by competition and proximity to disturbance
- Shoreline disturbance (dredging, marina/housing development)
- Invasive species
- Climate impacts (sea level rise, flooding, salt marsh migration/salinity changes, large storm events, migration pattern or wintering range shift)
- Habitat loss and fragmentation at other ends of the Atlantic flyway population's range

### **Human System Factors**

- Adequate financial resources (administration and incentives)
- Effective policy in place for achieving goals
- Sufficient knowledge about black duck habitat needs
- Permitting issues
- Adequate extension infrastructure (outreach and technical assistance)

#### GAPS

- NY, PA, WV involvement
- Reliable sea level rise information
- Breeding survey data analysis
- Habitat-based metric to measure progress towards this outcome

#### MANAGEMENT APPROACHES

## Conservation Actions in key areas of available foraging habitat for black ducks:

- <u>Habitat Restoration</u>—restoring wetlands or vegetation to impacted wetlands in areas where black ducks have historically bred or wintered (tidal wetland hydrology restoration, riparian restoration of key parcels on breeding grounds, migration routes and wintering grounds).
- <u>Habitat enhancement and management</u>—improving water level management on managed wetlands, restoring SAV or converted wetlands, open marsh management, restoring and managing riparian buffers, beaver management, controlling exotic and invasive species, prescribed burning, implementing farm bill conservation programs, or enhancing habitat on federal land.
- Other Conservation Actions Benefiting Waterfowl Habitat—Review regulatory legislation and enforcement, stream-line regulation, mitigation, information/education, extension education on best management practices, simplify/ streamline permitting process, public use management, watershed protection and management, predator management (especially on bay islands), and eliminate waterfowl release (captive waterfowl).
- <u>Choosing Appropriate Sites</u>—explore areas where dense populations of black ducks are know to (and historically) occur and where food availability is high but risk to habitat loss due to sea-level rise and/or land conversion is low.

# DRAFT MANAGEMENT STRATEGY BROOK TROUT

Estimated Percent Complete: 70%

**OUTCOME:** Restore and sustain naturally reproducing brook trout populations in Chesapeake headwater streams with an eight percent increase in occupied habitat by 2025.

# FACTORS INFLUENCING

- Land use practices and land use change; loss of riparian vegetation, increased number of fish passage barriers, increased impervious surfaces
- Acid effects (e.g., min drainage, legacy mines, acid precipitation); loss of habitat, habitat fragmentation, loss of genetic diversity
- Climate Change; increased stream water temperatures, increased probability of invasive/ exotic species

### GAPS

- "Detailed content for this section pending previously requested input from State natural resource/regulatory agency contacts, or key partner organizations. Input to be provided by March 6 during course of Management Board review."
- New York data being incorporated into 2011 population re-assessment
- Baseline for occupancy cross-check with Visualization tool model outputs
- Ranking and Futuring tools to guide Biennial Workplan; expected March 2015

- Use the Priority Brook Trout Conservation Strategies
- Identify Priority Focal Areas for Brook Trout Conservation (Wild Brook Trout only)
- Consider climate change in determining priorities
- Apply decision support tools
  - Brook Trout Integrated Spatial Data and Tools website
  - Chesapeake Bay Fish Passage Prioritization
  - Riparian Restoration for Climate Change Resilience tool
  - Chesapeake Bay Brook Trout Model decision support application

# DRAFT MANAGEMENT STRATEGY FISH PASSAGE

Estimated Percent Complete: 90%

**OUTCOME:** Continually increase available habitat to support sustainable migratory fish populations in Chesapeake Bay freshwater rivers and streams. By 2025, restore historical fish migratory routes by opening 1,000 additional stream miles, with restoration success indicated by the consistent presence of alewife, blueback herring, American shad, hickory shad, American eel and brook trout, to be monitored in accordance with available agency resources and collaboratively developed methods.

#### FACTORS INFLUENCING

- Selecting Most Cost-Effective Projects for Implementation
- Funding and Staff Resources
  - ♦ Stream barrier removal funding and additional fish passage staff
- Community/Landowner willingness
  - Obtaining permission from private dam owners has proven to be complicated, legal action against dams in noncompliance with existing laws is costly and time consuming
- Target species populations in decline region wide:
  - → Target species, particularly river herring, shad and American eel, have been declining nationwide. Fish populations can be impacted by the following: habitat conditions and water quality, bycatch, climate change, overfishing and many others. This does not directly influence whether the mileage outcome is met but instead as factors influencing the overall recover of a target fish species.
- Understanding the ancillary benefits of dam removal:
  - Policy makers, dam owners and local government need to be aware that dam removal projects can also result in reduced liability for dam owners, improve public safety, and less nuisance flooding

#### GAPS

- Funding for stream barrier removal
  - ♦ The average cost of removal in MD, VA, and PA is about \$200,000, which means partners will need upwards of \$20,000,000 in project implementation funds to meet the outcome.
- Additional Fish Passage Staff
  - Even if project implementation funds were available, each state must secure the resources in order to hire additional staff to manage and implement these restoration projects.

- **Prioritization of projects using the GIS-based Fish Passage Prioritization Tool**. The tool determines high priority barrier removal projects based on the following: first blockages (the first barrier fish encounter on their spawning runs from the ocean to the headwaters), benefits to multiple species, largest habitat gains, high quality habitat, Brook trout
- Obtain the Mileage Goal. Open 132 miles every two years by working on existing dam removal projects and applying for restoration grants to fund design and removal of barrier projects.
- **Project Development:** Fish passage coordinators will develop new barrier removal projects using the Fish Passage Prioritization tool, conduct assessment and design studies on potential projects, and focus on high priority communities to test several dam owner incentives and community outreach tools
- Local Government: Local governments, watershed associations, nonprofits and the private sector, including private dam owners, have a role in this strategy. Local governments often own the dams targeted for removal and permission is needed to pursue the project. Nonprofits are often managing and implementing removal projects, providing funding for projects and conducting outreach.

# DRAFT MANAGEMENT STRATEGY SAV

Estimated Percent Complete: 80%

**Outcome:** Sustain and increase the habitat benefits of SAV (underwater grasses) in the Chesapeake Bay. Achieve and sustain the ultimate outcome of 185,000 acres of SAV Bay-wide necessary for a restored Bay. Progress toward this ultimate outcome will be measured against a target of 90,000 acres by 2017 and 130,000 acres by 2025.

#### FACTORS INFLUENCING

#### **Habitat Conditions:**

SAV require shallow (<2m water), sufficient water quality and salinity for target species, high water clarity, climate change.

### **Human Impacts:**

Physical interruption of SAV through anthropogenic activities (e.g., dredging, propeller scarring, aquaculture facilities, introduction of invasive species) as well as the indirect effect of localized water quality degradation (e.g., physical habitat changes due to shoreline alteration or sedimentation from chances in land use or in water activities like clam dredging).

#### GAPS

- ♦ Funding and capacity for bay grass planting will need to be increased dramatically to meet the restoration goal.
- Significant investments in research must be made to improve the body of knowledge surrounding restoration techniques (watershed impacts on SAV, Succession, Species diversity, genetic diversity, etc.)
- Information is needed on basic ecology of SAV, factors influencing growth and reproduction and the best methods of restoration and each species may have different habitat requirements.

#### **Restoration Science**

- Restore water clarity by meeting pollutant allocations set by the Chesapeake Bay TMDL
- Protect existing SAV by characterizing threats and developing protection measures, establishing protection area criteria, minimizing the effects of invasive species, and increasing understanding of potential effects of sea-level rise
- Restore SAV where possible, targeting sites with suitable water quality and high potential to benefit living resources
- Enhance research, citizen involvement, and education

# DRAFT MANAGEMENT STRATEGY STREAM HEALTH

Estimated Percent Complete: 80%

**OUTCOME:** Continually improve stream health and function throughout the watershed. Improve health and function of ten percent of stream miles above the 2008 baseline for the Chesapeake Bay watershed.

#### FACTORS INFLUENCING

#### • Ecological stressors & Factors

- -Within the stream channel and floodplain: Excessive sediment and nutrients from unstable stream banks and legacy sediments, limited nutrient and organic processing-instream, alteration in channel form and function resulting in instability and disequilibrium affecting diversity and quality of habitat, flow alteration and flashy hydrology, concentrated flows and reduction in baseflows, removal/loss of forested riparian areas and the benefits provided by shading
- <u>-Watershed-based factors:</u> Impervious cover, excessive nutrient loading to streams from excess untreated runoff, sufficient implementation of BMPs, leaky wastewater infrastructure, toxicity of effluent from resource extraction activities, road de-icing practices, thermal impacts, invasive species, endocrine disrupting chemicals
- Policy and Administration Factors: Review and approval of stream restoration projects for WIP implementation, lack of common watershed, stressor and stream assessment and restoration guidelines, integration of water quality and living resource goals during WIP stream restoration, MS4 permit focus on water quality, adequate financial resources, adequate extension infrastructure to communicate newest research and technical guidance to jurisdictions, availability of land to retrofit and implement upland BMPs (urban areas)
- Scientific Knowledge & Application of Research: robust stream restoration monitoring, possible lag times that affect ability to evaluate the effect of upland BMP on stream health, suitability of existing approach to define reference conditions for restoration efforts, insufficient data to develop bay-wide fish-based indicator, limitations to applicability of Chessie BIBI

#### GAPS

- Information & Data: Benthic macro invertebrate data from enough streams with enough frequency to track progress over time, Bay-wide and stream metrics other than biological indices to assess physical and chemical health and function, update or review of methods to define reference conditions or endpoints for streams, sufficiency of data to demonstrate effectiveness of stream restoration practices, sufficiency of data to demonstrate restoration of stream processes following installation of upland watershed BMPs
- Regulatory & Programmatic: Uniform design process for stream restoration that can measure change in stream functions and/project success based on a project goals and objectives, Information needs to support innovative, effective design approaches to identify restoration potential and success for different land uses, stream types, and current and future site constraints, causes of impairment/stressors, Identification of local and watershed priority stressors that affect local steam health and management actions to results in function lift, Coordinating/collaborating with other Goal implementation teams focused on stream condition
- **Prioritization:** targeting procedures for cost-effective restoration actions and design approaches that will achieve both water quality and biological functional improvement, investments in research to improve the body of knowledge surrounding restoration techniques and net benefit to stream and watershed health

- Identify an appropriate suite of metrics to measure the multiple facets of stream health
- Provision of adequate funding and technical resources to support functional lift in stream restoration projects, in addition to nutrient and sediment reduction.
- Ongoing coordination with state and federal stream and wetland permitting authorities to ensure that stream restoration projects used for credit in the Bay TMDL are consistently applied and meet or exceed permitting requirements established to protect waters of the US.
- Develop and promote holistic stream restoration design guidelines that identified the level of degradation and improvement of stream functions and key stressors/factors limiting potential uplift.
- Local Engagement: Engage with local gov't to inform landowners as well as the general public of beneficial stream restoration and maintenance practices and their impact on the community.

# DRAFT MANAGEMENT STRATEGY WETLANDS

Estimated Percent Complete: 80%

**OUTCOME:** Continually increase the capacity of wetlands to provide water quality and habitat benefits throughout the watershed. Create or re-establish 85,000 acres of tidal and non-tidal wetlands and enhance the function of an additional 150,000 acres of degraded wetlands by 2025. These activities may occur in any land use (including urban) but primarily occur in agricultural or natural landscapes.

#### FACTORS INFLUENCING

- **Funding**: dedicated funding for restoration project implementation is not sufficient to meet the current wetland outcome
- Landowner Willingness/Marketing and Outreach: increasing and incentivizing landowner willingness is essential to the success of wetland restoration and enhancement
- Inaccurate and Incomplete Reporting: the workgroup is not confident that all wetland restoration projects are being reported correctly to Chesapeake Bay Program
- Understanding of Need for Restoration among Decision Makers: conflicting state priorities can impede restoration efforts, sea level rise may reduce tidal wetlands if no migration corridor exists (need to protect and remove barriers from migration corridors)
- Technical Understanding among Restoration Practitioners: funding does not always exist for technical training and regulators should support restoration projects designed to holistically address requirements under multiple programs and provide multiple creditable benefits
- Climate Change: implementers must focus on the effects of changing weather patterns rather than the causes

#### GAPS

- Tracking Wetland Restoration and Enhancement: There is a need to streamline wetland restoration and enhancement tracking and improve reporting overall, as well as the accuracy of the data reported. Trainings for state NEIEN contacts and restoration practitioners would be useful.
- Map of Focus Areas: There currently is no overall Chesapeake Bay watershed map of priority wetland restoration and enhancement areas.
- **Funding:** Dedicated funding for restoration and enhancement project implementation is not sufficient to meet the Wetland Outcome goals.
- Staffing: Need for more coordinated outreach and technical personnel to engage landowners and increase staff capacity to develop design plans for restoration projects
- Data: some states lack a comprehensive map of wetland resources in their state
- Targeting/Prioritization Tools: no overall wetland restoration/ enhancement targeting and prioritization tool for the Chesapeake Bay watershed.

- Reporting: work with NEIEN contacts to develop flow chart of how wetland restoration projects are reported from all organizations
- **Prioritization:** identify outcomes and criteria to prioritize areas in each state for restoration, focus efforts on projects that benefit species requiring high quality wetland habitats and incorporate water quality benefits where possible, identify areas where wetlands can be restored without taking ag land out of production, and identify opportunities for large acreage gains
- Identify and develop solutions to barriers to accelerate wetland restoration
- Increase technical understanding of factors that influence project success: Identify tools, models and other science needs for improving wetland restoration

# DRAFT MANAGEMENT STRATEGY RIPARIAN FOREST BUFFER

Estimated Percent Complete: 95%

**OUTCOME:** Continually increase the capacity of forest buffers to provide water quality and habitat benefits throughout the watershed. Restore 900 miles of riparian forest buffer and conserve existing buffers until at least 70 percent of riparian areas throughout the watershed are forested.

# FACTORS INFLUENCING

- There are competing priorities for riparian agriculture land and technical assistance, and it is not clearly communicated that RFB is the desired use of this land for water quality and habitat
- USDA and EPA are leading a RFB Leadership Initiative based on fed-state partnerships that includes a
  State Task Force process (expected completion:
  March 2015)
- The Conservation Reserve Enhancement Program (CREP) is a funded, federal/state (80/20), cost-share program that targets RFB restoration.
- Many RFB acres under contract will expire in 2015-2016 and the contract can be renewed or rolled into a conservation program
- New riparian science and technology, including high resolution imagery and GIS targeting, can help identify landowners, where buffers are being lost/ gained, and priority acres to restore.

#### GAPS

- CREP programs are not being used to their full potential in the Bay states and should be adjusted
- Current outreach, technical assistance, and administration for RFB could be strengthened with additional staff help, incentives, training, and clear-communication that RFB is a priority practice
- Partners are under-prepared to ramp-up outreach/administration around CREP contract renewal
- RFB prioritizing tools are not widely used by agencies implementing RFB
- Land use regulations and stormwater programs could help retain buffers

- Designate a high-level state employee to serve as the single-point of contact for various agencies responsible for RFB
- CREP: update state Agreements, increase incentives and flexibility
- State, federal, and local leadership clearly communicates this practice as a priority for water quality and wildlife; stay at uned to updates on CREP enrollment
- Provide updated trainings for CREP partners and NGO's on new incentives, tools, and lessons-learned
- Implement a multi-faceted outreach strategy to provide cost-effective, timely, and coordinated support to local outreach efforts
- Develop actions for other CBP outcomes (water quality, wetland, brook trout, etc.) that will also support the RFB outcome
- Stormwater programs account for reduced habitat and WQ benefits when buffers are lost
- Local government use land use regulations to retain buffers during conversion of ag land

# DRAFT MANAGEMENT STRATEGY TOXIC CONTAMINANTS—RESEARCH

Estimated Percent Complete: 45%

**OUTCOME:** Continually increase our understanding of the impacts and mitigation options for toxic contaminants. Develop a research agenda and further characterize the occurrence, concentrations, sources and effects of mercury, PCBs and other contaminants of emerging and widespread concern. In addition, identify which best management practices might provide multiple benefits of reducing nutrient and sediment pollution as well as toxic contaminants in waterways.

### FACTORS INFLUENCING

- Lack of watershed-wide monitoring programs on the condition of fish and wildlife and occurrence of toxic contaminants.
- No consolidated information sources of existing data.
- High cost of generating new data for on toxic contaminants and associated biological monitoring.
- Ability to determine which pollutants are causing the degradation of fish and wildlife due to wide range and mixtures compounds occurring in the watershed.

# GAPS

- Understanding of the implications of contaminant groups mixing.
- Identification of sources and inputs of the contaminants.
- Primary contaminants effecting fish and wildlife.

# MANAGEMENT APPROACHES

The research agenda is the primary mechanism for the management approach. The issues addressed in the research agenda are:

- Safety of fish for human consumption: PCBs and Hg are the primary causes of fish consumption advisories. Further research may be need on their sources and transport to waterways.
- **Fish kills**: assess the role of contaminants and other factors, such as algal toxins related to high nutrients, causing fish kills in the watershed.
- Fish health: determine the primary contaminants degrading fish health, including intersex, compromised reproductive systems, tumors, and skin lesions.
- Begin to assess effects of EDCs on fish and wildlife and potential human health concerns
- Better understand the **effects of contaminants on pollinators** and other selected wildlife species.
- Mitigation options: for the contaminants found to have the primary effects on fish and wildlife we will explore mitigation options to reduce their impacts. One of the first activities will be assessing nutrient and sediment BMPs for their potential benefits to reduce contaminants.

# DRAFT MANAGEMENT STRATEGY URBAN TREE CANOPY

Estimated Percent Complete: 95%

**OUTCOME:** Continually increase urban tree canopy capacity to provide air quality, water quality and habitat benefits throughout the watershed. Expand urban tree canopy by 2,400 acres by 2025.

#### FACTORS INFLUENCING

- Tree canopy progress is influenced by:
  - State and local policies and ordinances
  - Funding/partnerships
  - Community outreach and buy-in
  - Knowledge and technical capacity
- Achieving a <u>net gain</u> in urban and community tree canopy requires well-rounded investment in:
  - Tree canopy protection
  - Tree planting
  - Tree survival/maintenance over time
  - Assessment/tracking of progress and adaptive management
- Factors that reduce canopy must be accounted for and well managed, e.g.:
  - Development, utility line conflicts
  - Storms and other climate related impacts
  - Pests/diseases (e.g. Emerald Ash Borer)

### GAPS

- Tree canopy progress tends to be locally driven, but local funding and staff capacity is very limited in most parts of the watershed.
- Tree canopy/planting is one of the most costeffective BMPs for achieving multiple goals (water/ air/habitat/health/energy) but it is not well integrated into TMDL-WIP, stormwater, and other regulatory programs.
- Tracking systems to assess progress are not yet well-developed, though good tools exist to build upon.

- Provide technical assistance, training, and resources to local governments to enhance tree canopy protection, planting, and maintenance.
- Develop funding partnerships in arenas with most need and opportunity— e.g. schools, civic groups, underserved communities, etc.
- Strengthen state incentive programs and policies where needed to help local governments and partners achieve and track tree canopy goals.
- Work with TMDL-WIP and stormwater programs (federal/state/local) to integrate tree planting as a priority BMP for water quality and other benefits.
- Develop more robust and consistent methods for tracking tree canopy progress through a combination of tree planting BMP data (for TMDL) and periodic canopy assessments with high resolution aerial imagery.

# DRAFT MANAGEMENT STRATEGY WATER QUALITY

Estimated Percent Complete: 95%

**2017 WIP Outcome:** By 2017, have practices and controls in place that are expected to achieve 60 percent of the nutrient and sediment pollution load reductions necessary to achieve applicable water quality standards compared to 2009 levels.

**2025 WIP Outcome:** By 2025, have all practices and controls installed to achieve the Bay's dissolved oxygen, water clarity/submerged aquatic vegetation and chlorophyll a standards as articulated in the Chesapeake Bay TMDL document.

Water Quality Standards Attainment & Monitoring Outcome: Continually improve the capacity to monitor and assess the effects of management actions being undertaken to implement the Bay TMDL and improve water quality. Use the monitoring results to report annually to the public on progress made in attaining established Bay water quality standards and trends in reducing nutrients and sediment in the watershed.

### FACTORS INFLUENCING

- Continuing to sustain the capacity of governments and the private sector to implement practices
- Understanding factors affecting ecosystem response to pollutant load reductions to focus management efforts and strategies
- Improving identification of sources and their contributions to nutrient and sediment loads
- Quantifying reductions from pollution control practices and verifying their continued performance
- Delivering the necessary financial capacity to implement practices and programs
- Conducting a detailed multi-year assessment of chlorophyll in tidal James River
- Factoring in effects from climate change
- Assessing implementation potential of filter feeders for nutrient and sediment reductions
- Examining impact of lower Susquehanna dams on pollutant loads to the Bay
- Enhancing next generation of decision support tools
- Revising Watershed Model calibration methods to improve local watershed results
- Reviewing and updating historical implementation data to confirm BMPs are still in place

# GAPS

- Financial capacity to oversee and implement MS4 and other stormwater programs
- Financial, technical, and regulatory capacity to deliver priority conservation practices to priority watersheds
- BMP tracking, verification, and reporting programs

- Implementation of Bay watershed jurisdictions' WIPs and two-year milestone commitments
  - Identify capacity for additional incentives, new or enhanced state or local regulatory programs; market-based tools; technical or financial assistance; and new legislative authorities
- Oversight of the Bay TMDL's accountability framework
  - Annually improve tracking, reporting, and assessing the effectiveness of implementation actions
- Enhancing Monitoring
  - Measure and explain progress toward water quality improvements and reduce uncertainty in decision support tools
- Addressing priorities under the Bay TMDL's 2017 midpoint assessment
  - Optimize and streamline implementation of management actions

# DRAFT MANAGEMENT STRATEGY HEALTHY WATERSHEDS

Estimated Percent Complete: 95%

**OUTCOME:** 100 percent of state-identified currently healthy waters and watersheds remain healthy.

#### FACTORS INFLUENCING

# Information about the status of healthy waters/watersheds

- Where are the healthy watersheds?
- How do their status change over time?
- Which are most vulnerable to degradation?
- How effective are our management Interventions?
- Cumulative action, with a focus on local engagement
  - Actions include an array of regulatory and non-regulatory tools (anti-degradation, permit programs, easement purchases, education).

#### GAPS

- Inventory, assessment, and other information on healthy watersheds is often unavailable. The bulk of activity regarding collection and use of watershed condition information has been used to characterize impaired waters for restoration.
- Protective measures vary in their application across the Bay region, and can vary in their effectiveness.
- Widespread assessments of healthy watershed vulnerability to risk(s) are not available.
- Some level of prioritization within agencies/organizations may exist, but details are not clear and information may not be readily accessible to external parties.
- Enhancements are needed for the array of scientific, technical and policy tools to identify/characterize/protect healthy watersheds. Usage of tools is not universal.
- There is often a disconnect between local proponents and supporters of healthy waters and the public and private sector tools that can establish and maintain protective measures. Outreach, awareness building, education will be needed to inform local communities.

# MANAGEMENT APPROACHES

1)Tracking— where are healthy watersheds and how are they doing?

- Inventory of Healthy Watersheds
- Assessment Information
- Vulnerability Information
- Prioritization for Protection
- 2) Local Leadership strengthen local commitment and capacity to protect their healthy watersheds
- 3) Federal Leadership—increase communication within the federal family, so that federal programs and agency decision-making are more protective of state-identified healthy watersheds
- 4) Support state-based efforts—encourage and recognize important activities within states

# DRAFT MANAGEMENT STRATEGY LAND USE METHODS AND METRICS

Estimated Percent Complete: 95%

**OUTCOME:** Continually improve the knowledge of land conversion and the associated impacts throughout the watershed. By 2016, develop a Chesapeake Bay watershed-wide methodology and local level metrics for characterizing the rate of farmland, forest and wetland conversion, measuring the extent and rate of change in impervious surface coverage and quantifying the potential impacts of land conversion to water quality, healthy watersheds and communities. Launch a public awareness campaign to share this information with citizens, local governments, elected officials and stakeholders.

### FACTORS INFLUENCING

- High-resolution land cover and elevation data availability
- High-resolution land cover and elevation data costs
- Sustainability of long-term monitoring
- Methodology for assessing landscape change with high-resolution data with sufficient precision to inform county-level decisions
- Methodology to quantify impacts to communities and the environment
- Agreement on the temporal and spatial scale at which to assess change

# GAPS

- Complete or partial land cover information derived from classifying high-resolution imagery is currently available for select counties in the Bay watershed.
- The Management Strategy will require monitoring land change, not just mapping it once.
   Changes in spectral surface properties over multi-date images can present a challenge when doing high-resolution change analysis.

#### MANAGEMENT APPROACHES

CBP Partners will coordinate and solicit input on user requirements and technical specifications for this outcome. Potential technical approaches include:

- 1. Coarse, 30 m-resolution wall-to-wall mapping from Landsat satellite imagery
- 2. High-resolution (<5m) wall-to-wall mapping from aerial or satellite imagery
- 3. High-resolution (<5m) stratified random sampling

Local participation will be sought to help identify and describe impacts to communities, to ensure the data are useful for informing local-level decisions and to develop and implement the communication strategy. The Healthy Watersheds GIT, Citizen Advisory Committee, and Local Government Advisory Committee will work with the Land Use Workgroup and Communications Office to develop this communication strategy.

# DRAFT MANAGEMENT STRATEGY LAND USE OPTIONS EVALUATION

Estimated Percent Complete: 95%

**OUTCOME:** By the end of 2017, with the direct involvement of local governments or their representatives, evaluate policy options, incentives and planning tools that could assist them in continually improving their capacity to reduce the rate of conversion of agricultural lands, forests and wetlands as well as the rate of changing landscapes from more natural lands that soak up pollutants to those that are paved over, hardscaped or otherwise impervious. Strategies should be developed for supporting local governments' and others' efforts in reducing these rates by 2025 and beyond.

# FACTORS INFLUENCING

- Completing the evaluation component presents a technical and administrative challenge.
- Ability to engage local governments in conducting the evaluation.
- Reducing land conversion rates presents a political and educational challenge.
- Baseline for local level metrics for characterizing land conversion rates are dependent on the Land Use Methods and Metrics Outcome.
- Future change overlooked in the face of present land impacts and water quality related goals (i.e., TMDL).
- Level and type of land conversion reduction policy and implementation efforts is highly varied across the watershed.

### GAPS

- Waiting until 2017 to investigate the development of strategies to support local governments' and others' efforts to reduce land conversion rates.
- The MS highlights additional needs outside the scope of this outcome, including additional support needed for
  - "crediting" natural land protection in the bay TMDL
  - Information related to the economic justification for implementation of land use policies related to reducing the rate of land change conversion.
  - Ensuring ongoing support for education as local government representatives change.

- Conduct a comprehensive review/study of existing land use "policy options, incentives and planning tools" currently being implemented at the local/state scale.
- Create an online repository of such examples to serve as a user-friendly knowledge base, including studies and reports of the costs, benefits and effectiveness of such examples.
- Conduct a professional survey of local government and related groups to identify which "policy options, incentives and planning tools" have been most effective at reducing land conversion rates, and to determine additional information and tools needed to achieve a reduction in land conversion rates.

# DRAFT MANAGEMENT STRATEGY CITIZEN STEWARDSHIP

Estimated Percent Complete: 50%

**OUTCOME:** Increase the number and diversity of trained and mobilized citizen volunteers with the knowledge and skills needed to enhance the health of their local watersheds.

# FACTORS INFLUENCING

#### **Capacity Factors**

- Many existing programs not designed for maximum impact
- Lack of financial and regulatory incentives for effective stewardship programs
- Need additional capacity to recruit and train volunteers and leaders
- Lack ability to measure impact and track progress of stewardship programs
- Lack strategic coordination of the many programs implemented at the local level
- Need region wide stewardship programs to help build a more robust and diverse movement for clean water

#### **External Factors**

- Public opinion, perception and attitude about Bay clean up varies and poses both challenges and opportunities
- Lack of Social norms that encourage adoption of helpful individual actions and behaviors
- Need to increase use of existing and expand access to water resources for all citizens
- Existing markets are the major drivers of consumer choices and often create disincentives for stewardship actions

### GAPS

- Systematic support and coordination between NGO's and local governments to develop and cooperatively implement effective stormwater outreach programs
- Common measures to evaluate stewardship program success
- Greater understanding of how to develop strategic behavior change programs that are audience oriented
- Creation a behavior change group or case study repository where NGOs can share outcomes of work categorized by specific behaviors

#### MANAGEMENT APPROACHES

#### Establish mechanisms to measure impact and track progress of citizen stewardship programs

• The Chesapeake Bay Program will develop a practical and value-added method to track changes in public attitudes, behaviors, and actions related to stewardship and use the results to guide future management strategies.

#### Provide assistance to help develop and implement programs for maximum impact on citizen stewardship

- Increase program effectiveness to achieve results from citizen stewardship programs targeting individual behaviors.
- Share best practices and successful models of citizen stewardship programs.
- Increase the communications capacity of the Bay community.
- Increase strategic coordination and collaboration among programs at the local level.
- Increase direct engagement of diverse organizations and communities.
- Increase local public access to natural resources.

#### Increase capacity to expand the number and diversity of citizen volunteers

- Invest in successful volunteer recruitment and engagement programs.
- Expand citizen participation in science and monitoring.

#### Recruit, Train, and Support more Citizen Leaders and local Champions

- Increase opportunities for training and empowerment of local champions.
- Provide financial investment for local leadership training and education in all States.
- Increase organizational capacity and effectiveness to build citizen leaders.
- Build capacity of organizations to cultivate leaders and build the movement.

# DRAFT MANAGEMENT STRATEGY

# Student, Environmental Literacy Planning, Sustainable Schools

Estimated Percent Complete: 60%

#### **OUTCOMES**:

**Student Outcome:** Continually increase students' age-appropriate understanding of the watershed through participation in teacher-supported, meaningful watershed educational experiences and rigorous, inquiry-based instruction, with a target of at least one meaningful watershed educational experience in elementary, middle and high school depending on available resources.

Sustainable Schools Outcome: Continually increase the number of schools in the region that reduce the impact of their buildings and grounds on their local watershed, environment and human health through best practices, including student-led protection and restoration projects.

**Environmental Literacy Planning Outcome:** Each participating Bay jurisdiction should develop a comprehensive and systemic approach to environmental literacy for all students in the region that includes policies, practices and voluntary metrics that support the environmental literacy Goals and Outcomes of this Agreement.

#### FACTORS INFLUENCING

- State-level advocacy for environmental literacy- States often lack an organized base of support to advance important policy initiatives as well as high level agency support for environmental literacy
- **Support of Local Education Agencies-** Education priorities are largely determined at the local level and may not mirror state priorities. MWEEs and sustainable school practices are often not included in established accountability mechanisms between state and local education agencies.
- **Education Reform-** Efforts to support shifts in teaching required by education reforms (ex. STEM common core, NGSS) pose on-going challenges to systemic approaches to environmental education.
- **Funding to support student experiences and school projects-** Funding is limited for support for sustainable school initiatives, student projects, teacher professional development, and transportation.
- Culture Disconnected from Nature- Budget cuts and testing mandates can result in schools perpetuating the disconnect from nature by limiting recess, scaling back off-site field experiences, and restricting the use of school grounds for teaching.

#### Sustainable School Specific Factors Influencing

- **Decision making authority-** many facets of school sustainability rest with disparate departments and individuals within a school division or individual school. These different groups often not coordinated within a jurisdiction.
- Underrepresented stakeholders- architects, school nurses, building managers, and others are traditionally underrepresented in discussions about "Green" schools.

### GAPS

- Several states conducted formal needs assessments to help guide the work on the State level
- The results of a 2014-2015 survey will help the states and Chesapeake Bay Program to better understand the current status of local environmental literacy efforts across the watershed, including the geographic distribution of MWEE and sustainable school implementation by local education agencies. This will inform the priorities of the Workgroup and revisions to the management strategy.

### MANAGEMENT APPROACHES

#### <u>Students</u>

- Promote sustained professional development
- Promote, develop, and implement MWEEs with educators, local education agencies, school administrators, and third party providers
- Communicate information about educational resources and funding opportunities
- Support a network of environmental education providers, including PD opportunities, on research-based practices and scientific & environmental information
- Work with state and local education and natural resource agencies to ensure that rigorous science and environment-related content is effectively represented in the Standards of Learning and the Curriculum Frameworks, and that agency and provider educational-support materials are fully aligned with the intent of the standards
- Develop and promote student opportunities to pursue leadership & enrichment programs hat support understanding of environmental issues and solutions
- Support programs that provide authentic experiences to support STEM, Next Generation Science Standards or other rigorous science standards, and related disciplines to improve career and college readiness

#### Sustainable Schools

- Promote and strengthen "sustainable school" certification and recognition programs consistent with high-quality, objective, and agreed-upon criteria such as the U.S. Department of Education Green Ribbon School program
- Broaden stakeholder engagement to include focus on health and nutrition, indoor air quality, chemicals, pest management, and other issues that might adversely affect health at schools
- Promote, develop, and/or disseminate needs assessments, training, technical resources, and promotional materials for "sustainable school" stakeholders
- Identify and promote the use of best management practices at school sites

#### Environmental Literacy Planning

- Identify and advocate for the local and state resources necessary for all graduates to achieve science, citizenship, and environmental literacy
- Support the development and implementation of clearly-defined, attainable objectives necessary for all students to achieve science, citizenship, and environmental literacy by graduation
- Promote the implementation of the Environmental Literacy Indicator Tool (ELIT) and related data visualization tools to assess progress
- Disseminate information to state formal and informal education stakeholders on the policies, programs, and practices that promote science, citizenship, and environmental literacy
- Maintain an up-to-date suite of definitions and best practices documents
- Maintain the Chesapeake Bay Program Education Workgroup and related state workgroups to oversee implementation of the Environmental Literacy Management Strategy
- Ensure the implementation of Environmental Literacy outcomes include a focus on diverse and underserved students with an emphasis on career and college readiness and STEM

# DRAFT MANAGEMENT STRATEGY LAND CONSERVATION

Estimated Percent Complete: 98%

**OUTCOME:** By 2025, protect an additional two million acres of lands throughout the watershed—currently identified as high-conservation priorities at the federal, state or local level—including 225,000 acres of wetlands and 695,000 acres of forest land of highest value for maintaining water quality.

#### FACTORS INFLUENCING

- Changes in Land Use- New development pressures, including transportation and energy infrastructure as well as new housing and commercial development, are dramatically changing the landscape in some areas.
- **Public Support for Conservation-** Land conservation faces a lack of understanding of the value of protected land to improved water quality, outdoor recreation, and economic development.
- **Funding and Incentives for Conservation** Competition for limited federal and state funding for land conservation has increased in recent years.
- **Private Ownership and Fragmentation** As competition for economically viable use of the land intensifies, the incentives and pressures to develop compete with the values that support conservation.
- Managing Protected Areas- As land is conserved managers and funders must address strategies for supporting long-term land management. Funding for maintenance of existing publicly owned lands is often limited.
- Climate Change- Climate change impacts land conservation by changing the viability of some shoreline or low elevation parcels for protection and development.

### GAPS

- Quantity and Accessibility of Conservation Priority Data
- Alignment of Land Conservation Priorities with Funding Opportunities
- Need for a Land Conservation Community
- Capacity and Tools for Restoring, Protecting and Managing Landscapes
- Federal, State and Local Funding and Incentives for Conservation
- Public Support for Land Conservation including Youth Engagement and Citizen Stewardship

- Collaboratively identify and align strategic conservation priorities.
  - Identify broad geographic conservation priorities and focal areas.
  - Prioritize areas with multiple high resource values
  - Align priorities in a way that supports collaboration across jurisdictional boundaries.
- Identify, fund, and implement creative and inclusive ways to acquire data and connect systems.
  - Identify and fill data gaps and connect LandScope Chesapeake and other separate data and priority systems to provide optimal cross-integration.
  - Expand cultural resource documentation and the availability of high-resolution data.
  - ♦ Ensure that land protection data is included in Bay Program modeling.
- Increase funding, incentives, and mechanisms for protecting conservation priorities.
  - Use GIS prioritization tools to maximize investments by aligning multiple conservation values and funding sources.
  - ♦ Explore options to create a dedicated mitigation fund.
  - ⋄ Strengthen and expand existing financial incentives for conservation and work to credit land conservation in the Bay Model.
  - Sustain and enhance dedicated funding mechanisms. (appropriations for existing local, state and federal land conservation funding programs.
  - Pursue new funding opportunities, specifically for local and state ballot measures that dedicate funding to specific conservation initiatives.
- Increase public support for and engagement in land conservation.
  - ⋄ Conduct research or survey stakeholders to understand how diverse populations value conserved lands.
  - Develop communications strategy to communicate value of conservation to a broader and more diverse local audience, including urban residents, youth, and diverse ethnic and racial communities.
  - Provide consistent outreach to legislators and local government officials and social and economic benefits of conservation.
- Build an active community of practice around land conservation in the Chesapeake.
  - Build capacity of the Chesapeake Conservation Partnership and its network of partnerships to advocate for and leverage funds and support for land conservation.
  - Highlight success stories from around the watershed to bring in new participants.
  - ♦ Through dedicated work groups, focus efforts to meet targets for protecting forest land (695,000 acres) and wetlands (225,000 acres).
- Increase the capacity and effectiveness of land trusts.
  - Complete a capacity needs assessment.
  - Invest in land trust capacity building, such as training, networking, and creative solutions

# DRAFT MANAGEMENT STRATEGY PUBLIC ACCESS

Estimated Percent Complete: 95%

**OUTCOME:** By 2025, add 300 new public access sites, with a strong emphasis on providing opportunities for boating, swimming and fishing, where feasible.

# FACTORS INFLUENCING

- Limited Public Sector funding for public access- hampers the development of new sites and creates a backlog of major maintenance projects
- Land use / ownership- available land for access is limited by commercially developed waterfronts, residential uses, restrictions from Military installations and hydro-electric power facilities, as well as privacy and liability concerns from private land owners
- **Public Lands** In some cases access on public lands is limited due to resource management concerns, insufficient staffing levels, or restrictions imposed by the type of funding used in the property's acquisition or development
- **Permitting Requirements** permitting for sites can be a lengthy and complicated process, that can hinder new site development
- Universal Accessibility- further and earlier planning is necessary to insure sites comply with federal and state guidelines for ensuring access by a population with diverse physical capabilities
- Local government capacity- Many local governments face challenges when trying to create or enhance public access such as, lack of funding for land acquisition, capital improvements or ongoing maintenance, as well as concerns over liability and limited staff.
- Conflicts among users- conflict can develop when a site is designated or perceived to be designated for one use but is used in other ways, when use of an access site impacts or may be perceived to impact adjacent landowners and community (ex. parking issues, litter, noise), it can also arise among users based on who is perceived to have paid for the access site (ex. ramps paid for by taxes / fees on power boat owner, but heavily used by paddlers)
- **Railroads** Railroad companies are generally opposed to granting at-grade crossings of rail lines for either vehicles or pedestrians, stating liability as their primary concern.
- Climate Change- The transition zone between water and land is where public water access sites are located and it is also where the first impacts of sea level rise will become evident. While most marine or water-related facilities are designed to be able to survive the frequent storm events and to a degree hurricanes, less emphasis is given to designs which address sea level change.

#### GAPS

- Lack of public access in urban centers that could provide increased public access for a large, diverse population
- Several specific stretches of waterways and bay shoreline were identified in the Access Plan where there are significant gaps in public access.
- Lack of paddle-in camping sites make a multi-day trip down one of the Bay's rivers difficult without a place to go ashore and camp for the night

- Make funding for public access a priority
- Carry out and support more detailed assessments and project design for potential sites
- Fill strategic gaps in access along water trails
- Incorporate identified proposed public access sites and actions in key plans
- Further examine urban public access issues and needs
- Work with private sector funders to develop access
- Engage in hydropower relicensing processes to expand public access
- Explore options for resolving railroad crossing liability
- Establish a process that ensures public access is considered in the planning of all appropriate transportation projects
- Explore potential for additional access on public lands
- Managing land control for water access using various instruments
- Fully address accessibility at public access sites
- Incorporate identified proposed public access sites and actions in key plans
- Enhance Public Access for a Diverse Population
- Build opportunities for citizen stewardship
- Managing Land Control for water access using various instruments
- Track Progress towards 300 site goal
- Enhance Public Access for a Diverse Population
- Address climate change and sea level rise projections when planning and developing new access sites

# DRAFT MANAGEMENT STRATEGY LOCAL LEADERSHIP

**OUTCOME:** Continually increase the knowledge and capacity of local officials on issues related to water resources and in the implementation of economic and policy incentives that will support local conservation actions.

### FACTORS INFLUENCING

- Competing interests for resources (people and money) and attention of local officials.
- Effective messaging and public relations—Ability to accurately measure and clearly communicate positive change in the watershed from a natural resource, economic, and cultural perspective.
- Size, geography and (civic) complexity of the watershed causing different regional needs..
- Community support for protection and restoration activities.
- Wide disparity in level of existing knowledge and capacity among local officials.
- Easy access to actionable and reliable information.
- Political will.
- Consistent and focused state and federal program implementation at the local level.
- An historical lack of focus on conservation and natural resource issues.
- Increased awareness of changing environmental conditions (e.g. climate change and flooding)
- Local culture and societal norms relating to conservation actions.
- Creating a culture of excellence.
- Available opportunities to increase knowledge at all levels of understanding..
- Turnover rates of local elected and appointed officials.

### GAPS

- Funding for training to increase capacity and knowledge of local officials.
- Knowledge and assistance on how to access training funding.
- Knowledge about resources and a path for specific communication of natural resource issues.
- Dissemination of knowledge and information between jurisdictional agencies and local officials.
- Consistent and effective training opportunities.
- Lack of knowledge or access to training opportunities (capacity and knowledge).
- No Bay-oriented baseline curriculum for current training efforts.
- Lack of natural resource focus in municipal association trainings.
- Existing organizations, like planning commissions, are not being used to deliver natural resources-based training and information.
- A need to expand training in environmental financing options.
- Sufficient, regionally accessible, consistent, formal peer to peer exchanges (e.g., mayor to mayor, watershed organizations, municipal managers, county farm organizations).
- Expanded peer to peer networking opportunities.
- Inclusion of local nonprofits in education and training of local officials.
- Identification of local champions to mentor and lead less informed but willing neighbors.
- Inter-jurisdictional cooperation within watersheds.
- Identification of incentives, drivers, and linkages/connections (i.e., economic, cultural, emotional, community voice leaders).
- Fully integrated and institutionalized asset management approach in watershed protection.
- Bay-wide natural resources-based certification program for officials and citizens.

- Increase the frequency and consistency of training programs for locally elected officials and citizen stewards.
- Increase opportunities for peer-to-peer networking for local elected officials to enhance engagement and mentoring.
- Expand the availability of online resources.
- Improve knowledge management and transfer across the watershed.
- Identify and improve key knowledge and information sources.
- Establish best practices information for interaction with less engaged municipalities and local audiences..
- Regularly coordinate across related goal implementation teams and workgroups to assure that biennial work plans reflect commitments approaches for transferring desired information and knowledge to local government officials.

# DRAFT MANAGEMENT STRATEGY CLIMATE RESILIENCY

Estimated Percent Complete: 75%

#### **OUTCOMES**

**Monitoring and Assessment:** Continually monitor and assess the trends and likely impacts of changing climatic and sea level conditions on the Chesapeake Bay ecosystem, including the effectiveness of restoration and protection policies, programs and projects.

**Adaptation:** Continually pursue, design and construct restoration and protection projects to enhance the resiliency of Bay and aquatic ecosystems from the impacts of coastal erosion, coastal flooding, more intense and more frequent storms and sea level rise.

#### FACTORS INFLUENCING SUCCESS

#### Science

- Lack of sufficient scientific capabilities to fully understand climate change effects and ecosystem responses
- Data inconsistency and incomparability among regions and sectors within the Chesapeake Bay watershed
- Development and budgetary challenges of an acceptable long-term monitoring approach

# • Institutional Capacity, Regulatory Constraints, and Stakeholder Response

- Lack of understanding or agreement of stakeholders on what it means to be resilient or what constitutes resiliency
- Ability to incorporate meaningful change into plans and programs
- Institutional constraints to integrate climate change considerations into Bay restoration efforts
- Increase collaboration efforts between diverse stakeholders and organizations

#### GAPS

#### Coordination of Modeling

Missing a coordinated and concerted effort to integrate modeling within the Bay assessments

#### Climate Science

- Need continued assessment and analysis, as well as new approaches to fill critical science gaps
- Develop a comprehensive understanding of current science and management actions relevant to the goals of the Bay program

#### Adaptation

- Improve institutional capacity to collaborate data, communications, policy, programs, and implementation
- Revise or reconsider current plans to anticipate climate-related impacts
- Link science to implementation of climate resiliency projects and policy Engage stakeholders earlier to discuss implementation and planning
- Improve assessments based on indicators

#### MANAGEMENT APPROACHES

Develop a framework for engaging one-on-one with CB Partnership Goal Implementation Teams on climate related management needs through:

#### 1. Monitoring & Assessment

- Define goals and establish baselines
- Develop conceptual monitoring, modeling, and assessment model
- Prioritize climate impacts
- Design monitoring and monitoring plans for climate adaptation assessments and plans
  - Determine whether available data and tools are sufficient Identify necessary forecast projection models
  - Outline an integrated monitoring and assessment agenda
- Assess trends and conduct assessments
- Develop a research agenda
- Reassess priorities and revise goals
- Jundertake public, stakeholder and local engagement

### 2. Adaptation

- Compile and assess current efforts and lessons-learned
- Assess climate impacts and vulnerabilities
- Review and revise conservation, restoration and protection goals and objectives
- Establish adaptation outcome priorities
- Increase the institutional capacity of the Chesapeake Bay Program to prepare for and respond to climate change
- Implement priority adaptation actions

gional collaboration, education and outreach

Track adaptation action effectiveness and ecological response Increase local engagement by conducting targeted conversations, fostering discussions between climate change and the Bay, and increasing re-

# DRAFT MANAGEMENT STRATEGY DIVERSITY

Estimated Percent Complete: 60%

#### OUTCOME

Identify minority stakeholder groups that are not currently represented in the leadership, decision-making and implementation of conservation and restoration activities and create meaningful opportunities and programs to recruit and engage them in the Partnership's efforts.

# FACTORS INFLUENCING

- Lack of effective communication and outreach strategies
- Limited information flow to diverse communities about environmental challenges
- Need to demonstration that addressing these challenges can improve life for diverse communities (e.g. public health, safety, economic, social, recreational impacts and benefits to families)
- Need for more diverse hiring practices across watershed
- Genuine engagement and input e.g. seat at the decision-making table
- Capacity building to better participate in environmental opportunities (.e.g. timely information on grant opportunities)
- Creating linkages with the values of non-engaged communities connect with historical and cultural traditions of diverse communities
- Climate Change impacts, especially sea level rise and flooding concerns
- Level of local government engagement and capacity to consider equity in environmental work
- Comprehensive and regionally representative baseline information and tracking processes

### GAPS

- Lack of information exchange to include diverse populations (e.g. poor scheduling to exclude working families, lack of multi-lingual outreach efforts, nonstrategic advertising, highly technical and acronym filled messages, lack of outreach to youth)
- Lack of outreach and targeting diverse media sources
- Delayed engagement when policy makers need buy-in
- Lack of multilingual outreach efforts
- Lack of diversity in leadership roles and in Bay Program partnership
- Lack of diverse hiring practices in government and nongovernmental organizations
- Capacity of community groups in diverse communities to get engaged (ability to complete sophisticated grant application processes, small budgets and reliance on volunteers, training and relevant skill sets)
- Lack of awareness of environmental justice issues among most current Bay Program partners
- Few restoration projects and programs funded in diverse and EJ communities
- Lack of tracking tools and baseline
- Need to include diversity objectives in other key management strategies

# MANAGEMENT APPROACHES

- Strategy built around four focus areas: Communication and Outreach; Employment and Professional Engagement; Environmental Justice; and Tracking and Assessment.
- Outreach and Communication:
- Making appearances and engaging in one on one relationship building with key members of under-represented communities.
- Explore and implement a variety of communication approaches and vehicles to reach diverse populations
- Key Potential Activities:
  - Work with communications workgroup to identify diverse communities for distribution and input on draft management strategy. (Spring 2015)
  - Work with communications workgroup and CBP partnership to develop CBP communications strategy that encompasses various outreach approaches to diverse communities in watershed (e.g. workshops, forums, radio, TV, print media, etc.
  - Develop social marketing initiative and campaign to engage diverse populations
  - Create forum of diverse groups to share successes, challenges and available resources
- Employment and Professional Engagement:
- Educate and engage diverse populations and communities to foster interest in and access to environmental careers
- Key Potential Activities:
  - Add specific language to environmental literacy strategy to reflect including diverse populations.
  - Add specific language to Public Access Management Strategy targeting a percentage of new public access sites in diverse communities.
  - Each CBP jurisdiction to explore designating diversity engagement coordinator.
  - Each CBP partner (including federal agencies) to evaluate all existing diversity programs. **(Fall 2015)**
  - Each CBP jurisdiction to create internship for individuals from diverse communities.
- Environmental Justice:
- Explore how CBP partnership can assist local decision makers in maximizing benefits from restoration planning and siting.
- Improve mechanisms for directing restoration project grant funding to diverse communities (e,g, revised grant guidance, awareness of grant availability, training, etc)
- Key Potential Activities:
  - EPA, other federal agencies, jurisdiction to review and revise respective grant guidance to target restoration resources to EJ and non-traditional areas.
  - CBP to work with Bay partner funding organizations to assist in awareness and competition in bay wide grants.
  - EPA to provide EJSCREEN and other databases to assist the Bay jurisdictions and federal agencies in targeting resources and determining restoration priorities. (2015)
  - Conduct needs assessment to further community driven and participatory studies in diverse communities
- Tracking and Assessment:
- Develop and adopt appropriate assessment and tracking tools and metrics for evaluating the success of the Diversity Management Strategy.

### •Key Potential Activities:

- Identify trackable metrics as well as explore qualitative and anecdotal ways of tracking information related to potential actions in the diversity management strategy. Use resources such as **Green 2.0 report**, and data collected at NGO's that currently capture diversity information (TNC, CBT).
- Gather baseline information from partners in first 6 months
- Explore the creation of a Diversity Dashboard similar to the one EPA uses to track Partnership efforts.
- Create satisfaction surveys Work with EPA and partners to develop questions related to diversity and perceptions of diversity throughout the watershed. This may be an online and paper survey.
- Track internships leading to employment in organizations.