Determining the effectiveness of conservation actions and reducing the threats facing the District’s natural resources will be tracked through a monitoring program which focuses on indicators of success for conservation targets (see Table 32). Indicators of success will be used to assess the status of those conservation targets. The monitoring program will also be used to determine if a conservation action was not only successful, but economically efficient. Adaptive management techniques will be implemented as conditions change to improve chances for the long-term conservation of natural resources and achieving SWAP goals.

For our purposes adaptive management is defined as “adjusting the type, frequency or intensity of management techniques based on the observed effects of previously implemented management techniques, based on feedback from monitoring the original and managed state of the target species, habitat or area”. Monitoring, research, and assessment studies of wildlife populations and habitat condition are integral to an adaptive management framework. New information can also be gleaned from credible scientific sources. Conservation strategies must be periodically reevaluated and adjusted to ensure that conservation and management strategies and practices meet long-term goals.

For many SGCN there was insufficient local data to quantitatively and confidently assess their status, monitoring protocols have not yet been developed, or DOEE lacks the expertise or resources to monitor them. DOEE and other partners will strive to inventory and monitor species with data gaps, and assign conservation targets and indicators for success for these species in the future. As these data gaps are filled, more relevant and specific monitoring regimes can be developed.
7.1 Planned Monitoring and Adaptive Management

The District will use multiple tools for information management and tracking conservation efforts, including; the Northeast Regional Monitoring and Performance Reporting Framework (NRMPRF), Northeast Lexicon Project, and USFWS-TRACS. Conservation actions will be monitored and measured throughout the 10-year implementation of SWAP 2015.

The NRMPRF is a collaborative effort of states in the Northeast, federal land management agencies, NGO’s, and academics to assist in the meeting of monitoring and performance reporting requirements for SWAPs. The Northeast Lexicon is a regional conservation lexicon that can be used by the District and other state agencies and partners to define conservation projects. This uniformity will allow for greater communication and synergy across the region. TRACS is a federal reporting tool that tracks project outputs, effectiveness measures, and species and habitat incomes through a USFWS database. TRACS has the ability to track short-term measures and long-term outcomes for species and habitats. TRACS contains classifications for threats and conservation actions that are associated with the IUCN system.

Table 32 Identified Conservation Targets and Indicators of Success

<table>
<thead>
<tr>
<th>Conservation Target Example</th>
<th>Indicators of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invasive Species Management</td>
<td>Number of invasive plants considered established</td>
</tr>
<tr>
<td></td>
<td>Number of established invasive plants removed</td>
</tr>
<tr>
<td></td>
<td>Number of invasive plant surveys conducted</td>
</tr>
<tr>
<td></td>
<td>Number of recreational users contacted</td>
</tr>
<tr>
<td></td>
<td>Number of active volunteers trained</td>
</tr>
<tr>
<td></td>
<td>Acres revegetated with native plants</td>
</tr>
<tr>
<td></td>
<td>Area of insect infestation mapped and inventoried</td>
</tr>
<tr>
<td></td>
<td>Number of infested trees mapped and inventoried</td>
</tr>
<tr>
<td></td>
<td>Number or area of trees and plants treated</td>
</tr>
<tr>
<td></td>
<td>Number of new invasive fish considered established</td>
</tr>
<tr>
<td></td>
<td>Number of established invasive fish removed</td>
</tr>
<tr>
<td></td>
<td>Area of aquatic habitats surveyed for invasive fish</td>
</tr>
<tr>
<td></td>
<td>Number of invasive fish tagged for study</td>
</tr>
<tr>
<td></td>
<td>Habitat quality metrics</td>
</tr>
<tr>
<td>Conservation Target Example</td>
<td>Indicators of Success</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-----------------------</td>
</tr>
</tbody>
</table>
| Water Quality: Urban Wastewater, Sedimentation, and Nutrification | Target species population metrics  
Outreach and education initiatives implemented  
Number of citizens trained to a specified competency  
Number of artificial nesting structures  
Number of acres of impervious surface managed  
Number of gallons of stormwater retained/treated  
Number of CSO events eliminated  
Reduction in floating trash on receiving waters  
Number of feet of streams altered/restored  
Population metrics of SGCN in stream restoration projects  
Acres of critical habitat restored or created in association with stream restoration projects  |
| Problematic Native Species | Percent reduction in density of whitetail deer  
Percent reduction in density of summer resident Canada geese  
Wetland acres revegetated with native plants  
Habitat quality metrics  
Target species population metrics  |
| Recreational Activities and Infrastructure | Enforcement initiatives implemented  
Number of miles of social trails eliminated  
Number of acres of wildlife habitat with increased connectivity  
Outreach and education initiatives implemented  |
| Ecosystem modifications | Acres of groundwater-fed wetlands restored  
Number of vernal pools created/restored  
Target SGCN population metrics  
Acres of critical habitat restored or created in association with stream restoration projects  
Number of feet of streams altered/restored  
Habitat quality metrics  
Forest regeneration  
Number of acres of impervious surface removed in channel removals  |
| Inventory and Monitoring | Number of surveys directed toward SGCN  
Number of research projects directed toward SGCN  |
| Diseases and Pathogens | Number of decontamination protocols implemented District-wide  
Number of monitoring protocols implemented  |
| Endocrine Disruption | Decreases in levels of endocrine disruptors found in species  
Decreases in levels of endocrine disruptors found in water bodies  |
| Light Pollution | Number of buildings participating in light reduction programs  
Number of buildings participating in light-reducing LID strategies  
Percentage of street lights employing light pollution reduction technology  |
<table>
<thead>
<tr>
<th>Conservation Target Example</th>
<th>Indicators of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collisions with Glass and Buildings</td>
<td>Reduction in number of building/window strikes</td>
</tr>
<tr>
<td></td>
<td>Number of buildings participating in bird friendly design programs</td>
</tr>
<tr>
<td></td>
<td>Number of buildings implementing LEED pilot credit PC #55: Bird Collision Deterrence</td>
</tr>
<tr>
<td>Meadow Restoration</td>
<td>Number of acres of meadow restored or created</td>
</tr>
<tr>
<td></td>
<td>Increase in grassland/meadow habitat associated SGCN populations</td>
</tr>
<tr>
<td>Tidal Wetland Restoration</td>
<td>Number of acres of tidal wetlands restored or created</td>
</tr>
<tr>
<td></td>
<td>Increase in tidal wetland associated SGCN populations</td>
</tr>
<tr>
<td>Native Plant Propagation</td>
<td>Number of attendees to native plant propagation training classes</td>
</tr>
<tr>
<td></td>
<td>Number of plants produced by native plant nursery</td>
</tr>
<tr>
<td></td>
<td>Number of habitat restoration projects utilizing plants from native plant nursery</td>
</tr>
<tr>
<td>Vernal Pool Creation</td>
<td>Number of acres of vernal pools restored or created</td>
</tr>
<tr>
<td></td>
<td>Increase in vernal pool habitat associated SGCN populations</td>
</tr>
<tr>
<td>Artificial Nesting Structures</td>
<td>Number and type of nesting structures installed</td>
</tr>
<tr>
<td></td>
<td>Number of nesting structures utilized by target species</td>
</tr>
<tr>
<td></td>
<td>Number of successful nesting attempts by target species in artificial structures</td>
</tr>
<tr>
<td>Trustee for Natural Resources</td>
<td>Introduction and passage of species protections</td>
</tr>
<tr>
<td></td>
<td>Number of acres under management as habitat</td>
</tr>
<tr>
<td>Citizen Science Program</td>
<td>Number of participants in citizen science programs</td>
</tr>
<tr>
<td></td>
<td>Number of species accounts collected through citizen science programs</td>
</tr>
<tr>
<td>Wildlife Corridors</td>
<td>Number of collision records collected</td>
</tr>
<tr>
<td></td>
<td>Number of hotspots identified</td>
</tr>
<tr>
<td></td>
<td>Number of preventative measures taken</td>
</tr>
<tr>
<td></td>
<td>Number of new roads with wildlife crossings</td>
</tr>
<tr>
<td></td>
<td>Number of new roads or other infrastructure in existing habitats</td>
</tr>
</tbody>
</table>

### 7.1.1 Ongoing Species Monitoring Programs

There are numerous monitoring programs in the District with a goal of monitoring individual wildlife species and important taxa such as winter waterbirds or obligate vernal pool species. Existing programs are the primary method that DOEE and other wildlife agencies use to monitor and track SGCN. Data from these programs are collected and reported to wildlife managers at state agencies and nearby federal and nonprofit partners. This information will be used as feedback to inform adaptive management of important wildlife populations.

- Nightjar Survey
- Striped Bass Passive Integrated Transponder Tagging
- Shad Propagation
- Ultrasonic Fish Tag Survey
- Electrofishing and Pushnet Surveys
- Macroinvertebrate Surveys
- American Eel Survey
- Canada Goose Survey
- Whitetail Deer Population Survey
- Christmas Bird Count
- Winter Waterbird Survey
- Bee Surveys
- Breeding Bird Survey
- Brent Elementary Winter Bird Count
- Bat Mist Netting and Acoustical Monitoring
- Box Turtle and Spotted Turtle Radio Telemetry
- Frog Call Surveys
- Cover Board Surveys
- Amphibian Egg Mass Surveys
- Lotic Dipnet Surveys
- Aquatic Turtle Trapping
- Small Mammal Trapping
- Meso-mammal Camera Traps
- Flying Squirrel Nest Boxes
- Osprey Nest Monitoring
- Bald Eagle Nest Monitoring
- Eastern Cottontail Citizen Science Survey
- Lepidoptera Transects
- Odonata Transects

### 7.1.2 Ongoing Habitat Monitoring/Restoration Programs
Chapter 7 Monitoring and Adaptive Management

- SAV Surveys
- Anacostia Watershed Society Rice Ranger Wetland Restoration Project
- Anacostia Watershed Society Phragmites Monitoring
- Anacostia Watershed Society Freshwater mussel Surveys
- Non-Migratory Canada Goose Survey
- Whitetail Deer Population Survey

7.2 Potential New Monitoring/Restoration Programs

- Pre- and post-construction monitoring of stream restoration projects
- Native plant propagation
- Fate of propagated native plants used in habitat restoration in meadows, forests and wetlands
- Meadow creation in currently mowed grassy areas
- Citizen Science Programs
7.3 Important Data Gaps

Through monitoring efforts, data has been gathered for less than 500 species in the District. This includes a small percentage of the number of invertebrates which have been identified. The data gaps for the population status and trends for gastropods, mollusks, crayfish, bees, and sponges will be addressed through the life of SWAP 2015.

Invertebrate survey needs include the following:

- Crayfish
- Mussels
- Freshwater and Terrestrial Snails
- Copepods and Amphipods
- Bees
- Freshwater Sponges
- Arachnids
- Beetles
- Moths

7.3.1 Partner coordination for Data Gaps

- Anacostia Watershed Society (mussels)
- American University (copepods and amphipods)
- NPS, George Washington Memorial Parkway and Howard University (snails)
- NPS, George Washington Memorial Parkway (beetles)
- NPS, USGS, and George Washington University (bees)
- NPS-Center for Urban Ecology (sponges)
7.4 Periodic Plan Review and Revision

By tracking indicators of success and other effectiveness measures, needed information will be gathered to adaptively manage natural resources in the District. If monitoring and adaptive management techniques identified in this SWAP are not adequate to the whole or parts maybe be revised to conserve SGCN and their habitats.

Similarly, in order for the SWAP to remain relevant, periodic review and revisions may be necessary. The emergence of new threats, discovery of extirpated species, or as habitat related changes occur, the plan must be amendable to address these changes. Performance measures should be selected that are realistic and translate to USFWS’s Wildlife TRACS. The current SGCN list will be revisited and, if needed, revised in no more than five years after the submittal of SWAP 2015.