8. Measuring Success – Inventory, Monitoring, Research and Adaptive Management

The ultimate measure of success for the Plan is the maintenance or restoration of viable populations of SGCN, whether through manipulation of the animals themselves, management of key habitats, reduction of impacts, or improvements to institutional capacity. Achieving stable numbers of these species will secure the overall health of the State's wildlife. Nonetheless, it would be extremely difficult to measure Plan success by monitoring all – or even most – SGCN individually. Monitoring at the species level is typically time consuming and is complicated by seasonal constraints, cryptic habits and other factors. Also, the lag between the implementation of most conservation actions and the responses of species populations is sometimes years, often decades, and may occasionally even be centuries. Such extended delays would impair timely adaptive management.

Monitoring of some SGCN may be required by law or regulation (e.g. endangered species or harvested wildlife), while monitoring of certain indicator species may serve as a surrogate for direct monitoring of habitat condition. However, ultimately it is not necessary to monitor every single SGCN. Most of these species are closely tied to one or several Key Wildlife Habitats, so that habitat viability is usually associated with species viability. Habitat monitoring, characteristically accomplished by measuring community structure and function, is almost always less complex than monitoring large numbers of species belonging to multiple diverse taxa. Lag times between actions and responses at the habitat level are highly variable – ranging from immediate for land acquisition, to one or two years for control of some invasive plants, to decades or more for restoration of certain habitats – but are commonly shorter than those at the species level. These time frames allow for more expedient adaptive management.

Plan success can also be measured by monitoring the abatement of impacts from "direct threat" conservation issues, such as a decrease in the rate of forest habitat loss or a reduction in instances of disturbance of beach-nesting birds. This type of monitoring is usually simpler than biological monitoring, and often has the advantage of being an essentially instantaneous measure. However, it is frequently difficult to strongly correlate this with trends in species or habitat viability.

In addition, success can be measured in terms of actions taken to address impacts of "indirect threats" such as institutional capacity issues. Even though such actions may have significant, long lasting benefit, they are routinely very difficult to relate to changes in species populations or habitat conditions. These issues and actions are therefore most easily monitored with qualitative, as opposed to quantitative, criteria.

Finally, the most timely measures of success are those that directly monitor the rate of Plan implementation. The value of these measures lies not only in their immediacy but in their simplicity, which makes them readily accessible to decision-makers, the general public and other lay people who may not be interested in the intricacies of resource- or issue-based measures.

Adequately measuring success requires a strategic approach to inventory, monitoring, research and adaptive management. The role of these is described in the sections that follow, with each one introduced by a summary chart of relevant Conservation Issues and Actions from Section 6.4.

8.1. Inventory

Definition

Inventory is the itemization of the abundance and distribution of species or habitats. For the purposes of this definition, inventory is considered synonymous with "survey," although technically the later is a subset of the former.

Conservation Issues and Actions

Conservation Issue	Conservation Action
Baseline information	Establish Natural Heritage ranks for all SGCN and key habitats not currently tracked by the Natural Heritage program, and use the results to update SGCN and key habitat lists as necessary. Develop protocols for timely review and revision of all Natural Heritage ranks to maintain currency of SGCN and key habitat lists.
	Conduct surveys to more fully document the current distribution and status of SGCN, especially in Key Wildlife Habitats.
	Conduct surveys to more fully document the current distribution and condition of key habitats.

Strategies

- The selection of SGCN was based largely on data from the Delaware Natural Heritage Program, which uses an internationally accepted methodology for determining the conservation status of animals, plants and natural communities. The value of this protocol is that it allows for comparison of status across all taxa, which can greatly simplify decisions about conservation priorities. However, some Delaware species are currently not tracked by the Natural Heritage Program. All non-tracked species should be evaluated and assigned a conservation status rank in order to provide a uniform basis for determining SGCN. Also, the rationale for all species ranks should be documented in the Natural Heritage database to facilitate review and revision.
- There was insufficient information in the Natural Heritage database about natural communities, from which Key Wildlife Habitats were developed, to allow use of status ranks in evaluating habitat condition. Natural community information should be strengthened to allow its use in rating the conditions of key habitats. As with species, communities that do not have status ranks should be assigned them and all ranking decisions should be documented.
- A standard protocol for review and revision of Natural Heritage ranks and SGCN designations should be developed. At a minimum, comprehensive reviews should be conducted every 10 years in keeping with the time frame of the Plan. However,

given the rapid pace of land use changes in Delaware, more frequent reviews are probably warranted, possibly as often as every other year for the most sensitive species. Consideration should be given to a protocol that calls for revisions whenever new information becomes available, as opposed to operating on a fixed schedule.

- Comparison of "Known SGCN Species" with "Associated SGCN Species" from the Vital Statistics tables in Section 6.1 shows that only a small portion of potential SGCN have been documented for many key habitats. This may indicate the need to concentrate SGCN inventories in those key habitats. It is especially important that species-habitat associations be validated by observation since most monitoring will probably focus on habitat condition – as opposed to species viability – for reasons of efficiency and effectiveness (see Section 8.2 for further discussion).
- Some key habitats were mapped partly by use of simple models based on topography (Ancient Sand Ridge Forest), aerial photograph interpretation (Coastal Plain Seasonal Pond and Spartina High Salt Marsh), or species-habitat associations (Early Successional Habitat). This mapping needs to be validated by field surveys.

8.2. Monitoring

Definition

Monitoring is the repeated measurement of a conservation parameter – species population, habitat extent, discharge rate of a pollutant, number of participants in a program – using appropriate, consistent methodology that is adequate for detecting significant change over useful periods of time.

Conservation Issues and Actions

Conservation Issue	Conservation Action
Monitoring of SGCN, key habitats, impacts from conservation issues and outcomes of conservation actions	Monitor SGCN and key habitats to determine trends in the distribution and status of SGCN and the distribution and condition of key habitats.
	Monitor abatement of impacts to both SGCN and key habitats from "direct threat" conservation issues.
	Monitor outcomes of conservation actions for SGCN and key habitats.
	Develop standardized monitoring protocols that incorporate existing state, regional and national monitoring schemes where they exist, and include these protocols in all conservation programs and projects.

Strategies

- Biological monitoring for DEWAP should focus on the extent, distribution and condition of Key Wildlife Habitats – as opposed to the population and status of SGCN – for reasons of efficiency and effectiveness. Since key habitats were designated based on known or expected associations with SGCN, the majority of species should be covered by this approach. Generally, individual

SGCN will be monitored only if required by regulation, or if the species is especially rare or sensitive to disturbance, or if the species functions as an indicator or keystone for a particular habitat.

- Monitoring should concentrate on permanently protected public and private conservation lands (GAP Stewardship Status 2 or 3). In most cases, these lands form core areas that presently contain, or could be managed for, a great many SGCN and key habitats. The status of resources on these lands is therefore critical to the long term success of the Plan. The spatial distribution of many existing/planned monitoring efforts reflects specific regulatory objectives or statistical considerations without regard for land management status. Whenever possible, existing/planned efforts should be modified to focus on conservation lands, and new monitoring should be directed to these areas as well.
- Existing/planned monitoring, whether it is done by the state, key conservation partners or others, should be incorporated as much as possible into measures of success for DEWAP. Appendix H lists many of the monitoring activities planned or presently underway in the state, generally those that target SGCN and key habitats, or those that monitor multiple species, habitats, issues and/or locations. Additional monitoring occurs on many individual sites, particularly public and private conservation lands. For example, The Nature Conservancy monitors invasive plants on several of its preserves. Also, the outcomes of specific conservation actions are currently being measured for a number of projects. Although not listed in Appendix H for reasons of brevity, these existing site- and action-specific monitoring activities should also be incorporated into measurements of Plan success when appropriate.
- Some existing/planned monitoring is local in origin (e.g., contaminant sampling of osprey nestlings), some is regional (e.g., much fish monitoring is directed by interstate management plans), and some is national (e.g., Forest Health Monitoring). Although certain local monitoring efforts, and much of the regional and national monitoring, are not designed specifically for the Plan's SGCN, key habitats or conservation issues, they nonetheless may collect data on these items or could be modified to do so.
- There is little coverage of SGCN or key upland habitats in existing/planned monitoring efforts, which are biased towards harvested species and aquatic and wetland habitats. Existing/planned monitoring programs should be modified to increase coverage of under-represented resources where it is possible to do so.
- When new biological monitoring is needed, it should utilize standard protocols for specific taxa and habitats where those exist, and follow accepted scientific methods where they do not. Some large-scale conservation plans, such as the *U.S. Shorebird Conservation Plan*, contain guidance on monitoring, and there are many published and online resources about protocols and methods. Proposed monitoring programs should also be subjected to peer review by recognized experts. Standardization of protocols allows monitoring in Delaware to be rolled up with other states for use in regional and national conservation initiatives, such as Partners in Amphibian and Reptile Conservation, the North American Bat Conservation Partnership Strategic Plan and the Atlantic Coast Joint Venture.
- Biological monitoring should be implemented at the minimum frequency and sample size that allows detection of biologically or ecologically significant change. Sensitive, indicator or keystone species may call for monitoring every few years, or even

annually. Many habitats, on the other hand, could be monitored at longer intervals, although not exceeding every 10 years in keeping with the timeframe of the Plan.

- Biological monitoring should be coordinated both spatially and temporally to maximize efficiency. Key habitats are best monitored by use of permanent plots in representative locations. SGCN monitoring should typically take place at the same locations, although this often may be impossible for aquatic habitats and species. In order to provide coverage of SGCN and key habitats statewide, monitoring should be organized by watershed, such that all resources are checked at least once every 10 years. This would require that anywhere from one to several adjacent watersheds be monitored each year, depending on the number of SGCN and key habitats targeted in each watershed.
- In addition to monitoring species and habitats, programs must be developed to measure the success of conservation actions that are designed to abate impacts from "direct threat" conservation issues. This monitoring should also seek to substantiate cause-and-effect relationships between conservation issues and actions when these are not known. See Section 8.3 for further discussion of this strategy.

8.3. Research

Definition

Research is the investigation of causal factors that underlie the responses of species to their environments and the structure and function of natural systems.

Conservation Issues and Actions

Conservation Issue	Conservation Action
Baseline information	Conduct research to better characterize the biology of SGCN and the ecology of key habitats as necessary to support adaptive management.
Conservation planning process	Conduct research on the extent and severity of impacts from "direct threat" conservation issues to key habitats and SGCN as needed to support adaptive management.

Strategies

- In the context of the Plan, research should always be designed to provide direct answers to specific management questions, or at least provide the basis for more informed management decisions. Research on the biology of SGCN and the ecology of key habitats should be dictated by the results of monitoring the status and trends of those resources.
- In many cases, cause-and-effect relationships between conservation issues and actions can be reasonably presumed from circumstantial evidence. However, monitoring the abatement of impacts from "direct threat" conservation issues should seek to substantiate these relationships when they are not conclusively known. Typically this requires the sampling of both experimental

and control areas – or pre- and post-treatment sampling of a single area – in order to isolate a particular conservation action as the sole cause for abatement of a "direct threat."

8.4. Adaptive Management

Definition

Adaptive management is the cyclical process of adopting, modifying or discarding conservation actions, based on the results of monitoring and research, in order to more effectively and efficiently achieve conservation goals.

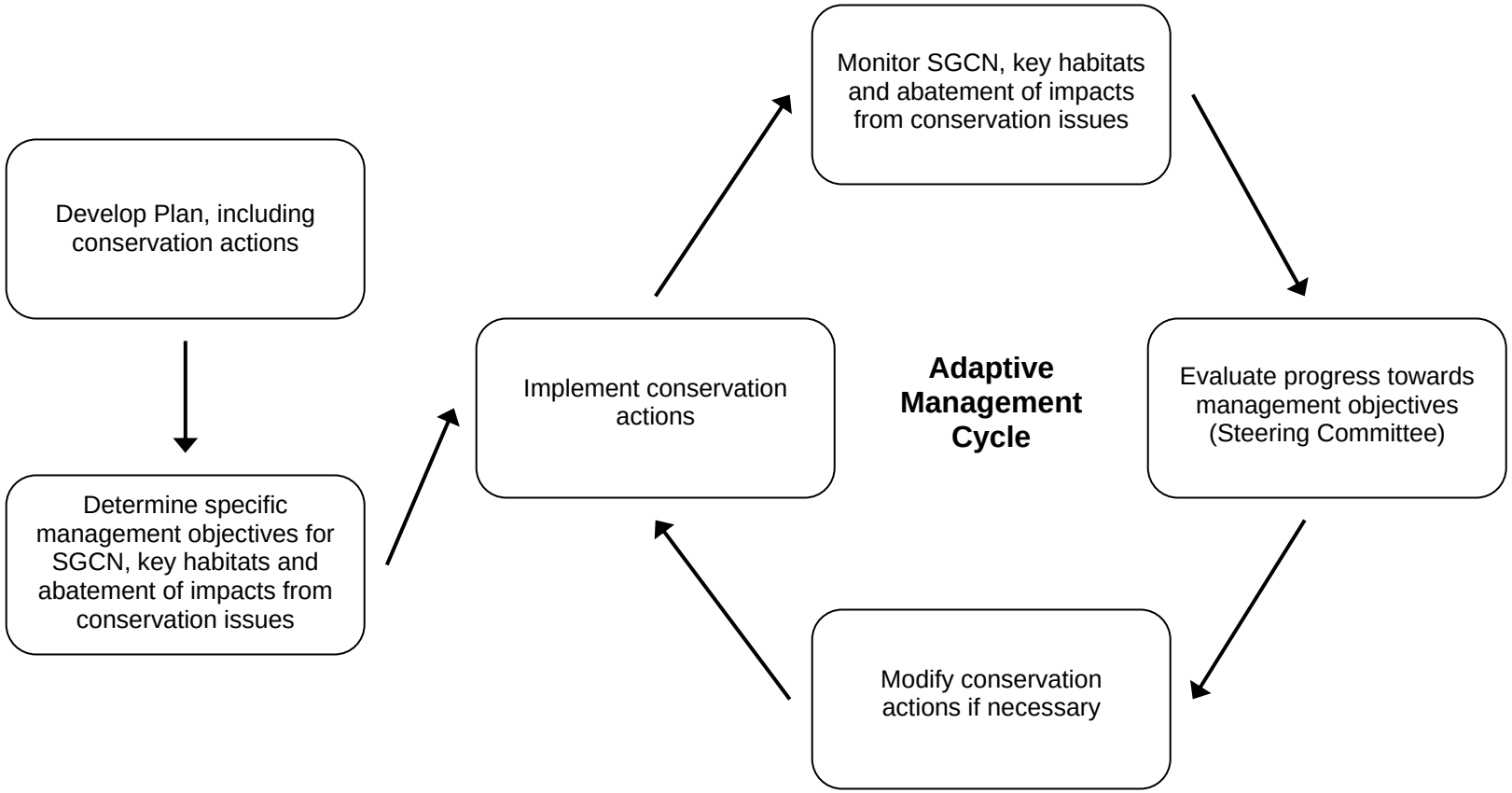
Conservation Issues and Actions

Conservation Issue	Conservation Action
Adaptive management framework for modifying conservation actions	Create an adaptive management framework that utilizes monitoring results to adapt planning and implementation of conservation actions to account for unsatisfactory results, changing conditions and new information.
Conservation planning process	Develop standardized classifications systems (species, habitats, issues, actions) and data formats, or at least compatible systems and formats, that will facilitate cooperative planning among DFW and conservation partners.
	Refine the DEWAP wildlife habitat maps to better inform resource management planning, and develop a protocol for periodic updates. This should include incorporating new information such as the recently completed Gap Analysis Project mapping, and updating existing resource maps such as wetlands, forests and land use/land cover.
	Develop quantitative or semi-quantitative risk assessment protocols for all "direct threat" conservation issues where they do not already exist, and utilize risk assessment results to prioritize conservation issues.
	Develop a strategic planning process to "step down" DEWAP into prioritized management prescriptions for SGCN, key habitats, and resolution of "direct threat" conservation issues on public and private lands. Include all relevant conservation actions from existing national, regional, state and site plans. Incorporate information and actions from these prescriptions into resource management plans as appropriate.
Information management for SGCN, key habitat, conservation issue and conservation action data to support adaptive management	Create, implement and/or update spatial computer applications for data management and decision support – e.g. Biotics, Vista, Delaware Invasive Species Tracking System – throughout DFW and other agencies/organizations as appropriate.
Quantitative measures of success for	Develop a quantitative or semi-quantitative scoring system for representing key habitat condition.

Conservation Issue	Conservation Action
assessing DEWAP implementation status and effectiveness	Develop performance indicators that measure the success of SGCN and key habitat management by monitoring trends in distribution and status of SGCN, and distribution and condition of key habitats.
	Develop performance indicators that measure the success of conservation actions for abatement of "direct threat" conservation issues by monitoring changes in the extent and severity of impacts from these issues.
	Develop performance indicators that measure the success of conservation actions that resolve "indirect threat" conservation issues by monitoring appropriate metrics.
	Develop performance indicators that measure the success of DEWAP by monitoring the rate of implementation of conservation actions.
	Combine performance indicators into an annual "scorecard" of DEWAP implementation. Provide this scorecard to conservation partners, stakeholders, elected officials, media and the general public in order to enhance accountability.

Strategies

- Adaptive management of SGCN, key habitats and conservation issues will be facilitated primarily through regular progress reviews by the Steering Committee (see Section 10 for more information). This process can be visualized as follows:



- The Plan itself will also be adapted to reflect changes in SGCN, key habitats, conservation issues and conservation actions during periodic Plan updates (see Section 10 for more information).

- A key part of adaptive management is the determination of specific management objectives for SGCN, key habitats and abatement of threats from conservation issues. These would take the form of population levels for SGCN, areal extent and dispersion for key habitats, and maximum limits for impacts from "direct threat" conservation issues. Such objectives are often difficult to determine given the complexity of most natural systems, and they are beyond the scope of this Plan. However, population objectives are available for some species in regional and national conservation initiatives (e.g., Partners in Flight and endangered species recovery plans), and there is extensive literature on population viability analysis that can be applied to other species. Habitat objectives are less well developed, although there is a growing body of knowledge about patch size and isolation, connectivity, edge effects and similar factors that influence habitat viability. Some thresholds for impacts are well established, while others are poorly understood and require additional research.
- Standardized schemes for categorizing SGCN, key habitats, conservation issues and conservation actions are necessary to take full advantage of cooperative planning among key partners, which is crucial to the success of the Plan. To this end, the existing habitat classification scheme, based on the National Vegetation Classification System, should be revised using NatureServe's Ecological Systems scheme, which more accurately depicts habitats from a faunal perspective. Conservation partners should be strongly encouraged to adopt this scheme also. Likewise, partners should consider utilizing the "taxonomies" of conservation issues and actions that were developed for this Plan (Section 5), or new schemes should be developed that are acceptable to all partners.
- The habitat maps prepared for this plan require revision to validate modeling assumptions (Section 8.1) and bring them into conformance with the Ecological Systems classification (above). They also must be updated whenever new baseline information becomes available, particularly aerial photographs, land use/land cover data and wetland mapping. Consideration should be given to updating this baseline information more often and/or synchronizing the updates with DEWAP and other planning processes as appropriate.
- Given that this Plan identifies about 90 different conservation issues that impact SGCN and key habitats, there is an obvious need to prioritize these issues utilizing a consistent risk assessment process. Such a methodology has been developed for assessing the risk posed by invasive plants to natural communities and native species in Delaware. This approach should be generalized to allow its application to all "direct threat" conservation issues.
- A strategic planning process must be developed to facilitate accomplishment of the more than 230 conservation actions in this Plan. Staff, funds and other logistical resources will always be in short supply, and political shifts and public reactions will sporadically exert pressure for inappropriate actions. A systematic approach is needed to establish – and periodically adjust – priorities for conservation actions and to allocate resources so as to best accomplish the most important tasks first.
- Similar to SGCN, key habitats and abatement of threats from conservation issues, the success of conservation actions should be measured relative to management targets, as opposed to absolute numbers of actions taken, whenever possible.
- Adaptive management necessitates tracking all aspects of monitoring, whether it is the status and trends of SGCN and key habitats, the abatement of impacts from conservation issues, or the evaluation of conservation actions. Existing data management and decision support computer applications should be fully implemented and updated, or additional ones developed, to meet this

need. Of special concern is the documentation of conservation actions, some of which are already being implemented by a variety of public and private providers. Coordination of these actions is essential for successful adaptive management.

- The habitat condition ratings in Section 6.1 are based for the most part on expert knowledge in the absence of quantitative data. Ideally, these ratings would eventually be based on quantitative data, such as the analysis done for Coastal Plain ponds (Section 6.1.7) and forest blocks (Section 6.1.19), and would incorporate Natural Heritage conservation ranks (see Section 8.1 for more information on this issue). Until that time, a more systematic approach using qualitative information is needed to better document habitat condition and facilitate periodic review and revision. An approach similar to that pioneered by The Nature Conservancy, for using the best available knowledge in conservation planning, should be developed. This would entail dividing habitat condition into components, such as number, extent and distribution of protected *vs*. unprotected occurrences; viability and connectivity of individual patches; short and long term trends in number, extent or viability; severity, scope and immediacy of impacts from conservation issues; and sensitivity to disturbance. Each of these would be rated good, fair or poor based on defined criteria, and the component ranks would be combined into an aggregate rating.
- Performance indicators may take several forms, based on the type of monitoring that they seek to measure:
  - *Implementation monitoring* measures the degree to which conservation actions in the plan have been initiated or completed, e.g., the number of "profile brochures," "citizens guides" and wildlife viewing guides implemented.
  - *Effectiveness monitoring* measures whether or not conservation actions are achieving their desired outcome, e.g., if working with hunters to increase deer harvest on state lands is effective in reducing herbivory impacts to key habitats.
  - *Validation monitoring* measures the assumption of linkage between conservation action outcomes and SGCN status or key habitat condition, e.g., does successfully adapting dune stabilization projects to allow for overwash habitat actually result in increases of beach-nesting birds.

  Implementation and validation performance indicators for measuring success are shown in the following table, organized by the Plan's Guiding Principles for Conservation Actions as outlined in Section 1.1.2. Once a decision support application is in place, information on all of these indicators may be collected initially. However, it is anticipated that, with experience, a subset will be selected that best measures the effectiveness of the Plan as a whole. Implementation indicators are measures of overall Plan success, and validation indicators are applied across all conservation actions. On the other hand, effectiveness indicators are specific to individual actions, and will be developed as actions are employed; a few examples of these are detailed in Section 8.5. Also, any indicator may require modification over time, or additional indicators may need development if entirely new conservation actions arise as part of an adaptive management approach.

Guiding Principle for Conservation Actions	Implementation Performance Indicators
Management on Conservation Lands – Direct management in state wildlife areas – and state parks and state forests in keeping with their primary missions – towards key habitats and SGCN in the Green Infrastructure Natural Resources Focus Area, in order to protect and restore habitats and species, and to abate the impacts of conservation issues. Encourage Federal and NGO land managers to focus on this same objective.	• # of acres/miles of viable key habitats protected or restored in managed areas in GI Natural Resources Focus Area • # of managed area plans incorporating conservation actions in GI Natural Resources Focus Area
Management on Private Lands – Direct private lands management towards buffering and connecting conservation lands in the Green Infrastructure Natural Resources Focus Area, and towards protecting outlying small patch habitats and SGCN.	• # of landowners enrolled in conservation programs in GI Natural Resources Focus Area • # of acres/miles of key habitats protected or restored in GI Natural Resources Focus Area • # of dollars appropriated or spent for incentive programs in GI Natural Resources Focus Area • # of turnkey services developed
Measures of Success, Monitoring, Research and Adaptive Management – Establish performance indicators to measure the success of conservation actions and plan implementation. Monitor species, habitats and impacts of conservation issues, and conduct applied research, so as to facilitate adaptive management.	• % of conservation actions initiated or completed by DFW • # of standardized monitoring protocols developed • # of specific performance indicators developed • # of management plans incorporating adaptive management framework • Scorecard developed or updated
Data Collection and Information Management – Collect, manage and analyze data to support wildlife diversity conservation efforts with sound science.	• # of spatial database applications for decision support installed or updated • # of users of decision support applications • # of agencies and organizations incorporating SGCN and key habitat data into decision making

Guiding Principle for Conservation Actions	Implementation Performance Indicators
Division Operations – Reorganize, revise and/or enhance DFW administrative structure, staffing, budgeting, procedures and practices as necessary to facilitate implementation of the DEWAP.	• % of known species with current Natural Heritage ranks • % of SGCN and key habitats with current distribution and status/condition information • # of standardized or compatible ecological classification systems developed • # of risk assessments initiated or completed for "direct threat" conservation issues • # of management plans initiated or completed for SGCN, key habitat and "direct threat" conservation issues • # of research projects initiated or completed • # of hours of DFW staff time devoted to SGCN and key habitat conservation • # of dollars of State and Federal funding appropriated or spent for SGCN and key habitat conservation
Partnership Development – Strengthen partnerships with other conservation agencies and organizations to link landscapes, tie together complementary approaches, and leverage investments of time, staff and money.	• # of hours of partner staff time devoted to SGCN and key habitat conservation • # of dollars of partner funding appropriated or spent for SGCN and key habitat conservation • # of conservation actions initiated or completed by partners
Education, Outreach and Enforcement – Increase public knowledge of wildlife conservation issues to develop an understanding of habitats, SGCN, and conservation issues and actions; foster a sense of responsibility for personal choices; actively engage citizens in conserving natural resources; and otherwise cultivate support for wildlife diversity conservation. Enforce regulations to promote responsible behavior in interactions with wildlife.	• # of State staff trained on key habitat ecology, SGCN biology, and conservation issues and actions • # of "profile brochures," "citizens guides" and wildlife viewing guides initiated or completed • # of Adopt-a-Wetland and Backyard Habitat participants • # of Certified Citizen Naturalists • # of schoolyard habitats initiated or completed • # of enforcement actions pertaining to SGCN and key habitats • # of hours of DFW staff time devoted to enforcement of regulations protecting SGCN and key habitats

Guiding Principle for Conservation Actions	Validation Performance Indicators
Conservation of Species *vs*. Habitats – Target the preservation or restoration of SGCN, but emphasize the management of ecological structure and function of key habitats over management of individual species.	• # of viable SGCN occurrences, or SGCN population levels • # of species added to or removed from SGCN list or State endangered list, or with changed Heritage rank • # of acres/miles of viable key habitats

8.5. Examples

The following examples show how the Plan would measure success for SGCN and key habitats. Issues and actions are drawn from Sections 6.1-6.4, and inventory, monitoring and research are taken from Sections 8.1-8.3. For purposes of illustration, only selected issues, actions, inventory, monitoring, research and indicators are shown.

Red Knot			
Conservation Issue	**Conservation Action**	**Inventory, Monitoring, Research**	**Effectiveness Indicator**
Residential and Commercial Structures	Improve federal/state/local coordination of environmental review to ensure that potential impacts to key habitats and SGCN are minimized for all major projects.	Monitor # of major projects receiving coordinated federal/state/local review for impacts to red knots	Change in red knot population level attributable to coordinated review
Recreational Use with Off-Road Vehicles	Strengthen enforcement of regulations for off-road vehicles on managed areas to protect key habitats and SGCN	Monitor # of enforcement actions taken for protection of beach and dune habitats and red knots	Quantity of beach and dune habitat degradation and # of red knot disturbances from off-road vehicles
Overflights	Continue/expand studies of disturbance of red knots from overflights	Research relationship of red knot disturbance to noise level, distance and timing of overflights	# of research projects initiated or completed on disturbance of red knots from overflights
Pets and Subsidized Predators	Work with conservation partners to control subsidized predators in public and NGO conservation lands by reducing subsidies (refuges, food sources), erecting exclosures, or by removal of individuals.	Monitor # of conservation actions taken by partners to control subsidized predators	# of subsidized predators in beach and dune habitats on conservation lands
Validation indicator = red knot population level as determined by monitoring with spring banding and aerial surveys			

Coastal Plain Seasonal Ponds			
Conservation Issue	**Conservation Action**	**Inventory, Monitoring, Research**	**Effectiveness Indicator**
Residential and Commercial Structures	Coordinate with partners to acquire title to, or easements on, sites that are critical to the conservation of key habitats within the Green Infrastructure Natural Resources Focus Area, for management by public agencies or NGOs	Monitor # of Coastal Plain pond sites acquired or eased in coordination with key partners	Change in acreage of Coastal Plain pond habitat attributable to coordinated acquisition or easement
Groundwater Withdrawals	Work with the Division of Water Resources to integrate key habitat conservation into long-range water supply planning.	Research impacts of groundwater withdrawals on Coastal Plain pond habitat	# of research projects initiated or completed on impacts of groundwater withdrawals on Coastal Plain pond habitat
Ditching and Draining	Work with the Division of Soil and Water Conservation to provide incentives to tax ditch associations to implement BMPs that minimize impacts to key habitats.	Monitor # of tax ditch associations implementing BMPs	Change in Coastal Plain pond habitat viability from implementation of BMPs
Baseline information	Conduct surveys to more fully document the current distribution and condition of key habitats.	Inventory Coastal Plain ponds mapped with habitat modeling	# of Coastal Plain ponds verified extant
Validation indicator = acres of viable Coastal Plain pond habitat as determined by monitoring habitat distribution and extent			