

# Florida's Approach to Meeting the Eight Required Elements

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The Florida Fish and Wildlife Conservation Commission (FWC) adopted a theme of partnership and public cooperation in the development of this Strategy. The wide array of partners, stakeholders, and the public who participated, as well as the conservation planning resources used to develop this Strategy, represent the best professional resources and knowledge available on Florida's wildlife and habitats, threats and conservation actions (see Chapter Acknowledgments; Chapter References/Literature Cited; Appendix D. GIS Data Table).

## **Timeline and Development Process**

In 2001, under the Wildlife Conservation and Restoration Program (WCRP) Congress challenged each state wildlife agency with the task of creating a Comprehensive Wildlife Conservation Strategy by October 1, 2005 (see Chapter Introduction). The FWC as the steward of the Strategy for Florida committed to the development of a Strategy in a March 2002 letter to the U.S. Fish and Wildlife Service (USFWS) (Florida Fish and Wildlife Conservation Commission 2002).

The task of developing Florida's Strategy was assigned to the FWC State Wildlife Grants Issue Team, which is comprised of representatives from multiple units of the agency. This approach allows all the FWC staff to play a role in the overall guidance of the Strategy's development and implementation. Although the FWC exhibits a typical organizational structure, it strives to operate with a high level of teamwork across divisional lines.

Early in the process the FWC hired the consulting firm Dynamic Solutions Group (DSG) which specializes in issue resolution to: facilitate collection of public input, coordinate compilation of the Strategy, and ensure the FWC meet the federal submission deadline. Florida initiated its planning and development efforts in July 2004 (See Figure 1. Timeline of Florida's Strategy Development Process). The entire Strategy development process was performed over a 14-month period from July 2004 to September 2005. The development timeline and process is summarized as follows:

In August, the eight required elements were e-mailed to stakeholders in a letter of introduction and background. Also in August, DSG developed and e-mailed a Questionnaire to help refine a proposed list developed by FWC and other experts of Species of Greatest Conservation Need (SGCN), and habitat categories within the state.

After a series of Regional Staff and Public Meetings in October, the Science Workshop I was held in Gainesville in November. A multitude of experts, organizations, public and other stakeholders examined results of the Questionnaire and synthesized the best available information on species and habitats into conclusions and recommendations for the Strategy. The FWC assessed

these recommendations, and as a result the list of habitats, habitat conditions, SGCN, and SGCN assigned to habitats ultimately began to stabilize in early January 2005 (See Required Element 1 and 2 below).

In February and March 2005 The Nature Conservancy (TNC) further refined and built upon these results by convening a series of six conservation Threats Workshops, and in April another series of six conservation Actions Workshops. The FWC partnered and contracted with TNC in order to ascertain and prioritize the most important conservation actions needed to abate the greatest threats to Florida's SGCN and habitats (See Required Elements 3 and 4 below).

On June 3, 2005, the first draft of the Strategy was posted on the web for public and stakeholder review. To assist public understanding and commenting, on June 9 the FWC offered the agency's first ever online Virtual Workshop. This interactive online presentation provided an opportunity for people around the country and across the state to participate by computer and learn about Florida's Strategy. The FWC opened its five regional offices and a Tallahassee venue for the public to participate in the Virtual Workshop and to meet and ask questions of the FWC staff.

On June 18 and 19, in addition to the website and Virtual Workshop, the FWC hosted the Science Workshop II and public Open House in Tampa to receive further feedback and recommendations on the first draft. Taking into consideration the stakeholder recommendations and internal review, the FWC and DSG revised the second draft of the Strategy which was posted to the web on July 18.

A similar process was followed for the review of the second draft. A recommendation and general comment period for stakeholders and the public ran from July 18 through August 1. Recommendations were collated by DSG and then passed on for review to the FWC. On August 8 and 9 decisions were made and DSG integrated these into the third draft and the Strategy.

On August 24 a third draft was released for internal review by the FWC. Following a 10-day review period, the FWC staff again made final decisions on the received recommendations. Finally, on September 15 the Strategy was submitted to the USFWS.

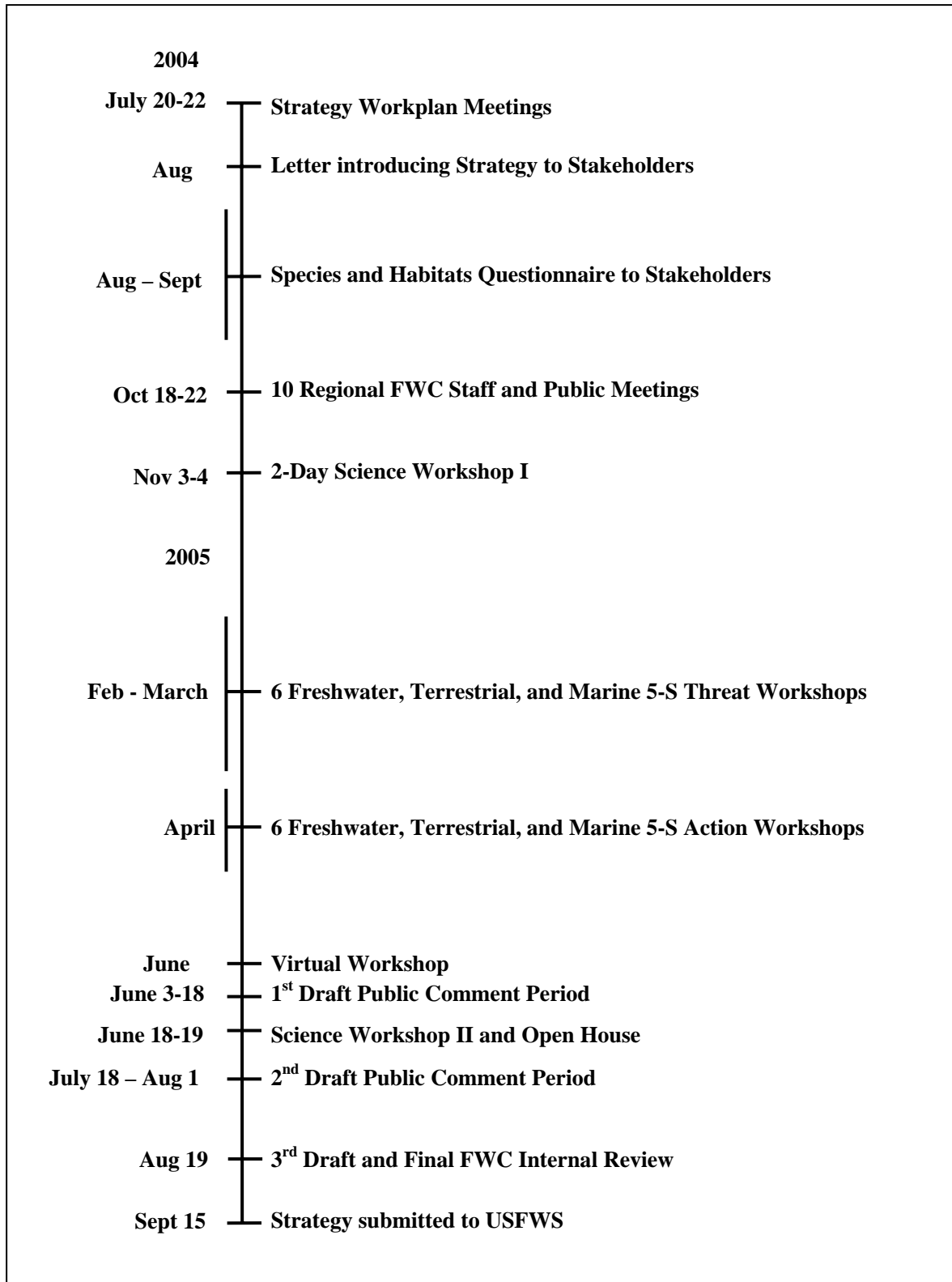


Figure 1. Timeline of Florida's Strategy development process.

The following are the federally required eight elements for developing the Strategy and the approach taken by Florida to meet each:

## Required Element 1

*Information on the distribution and abundance of species of wildlife, including low and declining populations as the state deems appropriate, that are indicative of the diversity and health of the state's wildlife.*

### **General Process**

All native wildlife species in Florida were considered in the selection of SGCN (i.e., freshwater, marine, and terrestrial birds, mammals, fish, amphibians, reptiles, and invertebrates). The FWC's experts and key species experts outside of the agency developed taxa-specific criteria to propose an initial list of SGCN and habitat categories with descriptions (see criteria below). Using the SGCN lists, a Questionnaire addressing species and habitats was e-mailed out to approximately 900 individuals known to be knowledgeable about habitats and taxa throughout the State of Florida. The objective was to receive the best available information about Florida's natural resources. The result of this Questionnaire was a further refined list of SGCN, information about species population status and trends, species associations with habitats and the condition of the identified habitats.

Approximately 250 stakeholders attended a November 2004, Science Workshop I in Gainesville to review and refine the results of the Questionnaire. Participants helped identify and refine the list of proposed SGCN. Participants provided recommendations on species' additions, deletions, abundance (population status and trends) and distribution data by habitat. They also identified and prioritized conservation threats and conservation actions for the habitat categories.

A finalized list of 974 SGCN (See Chapter Species of Greatest Conservation Need) was developed from the FWC and other experts using their professional judgment and knowledge to accept or reject the recommendations.

### **Criteria**

The criteria used to identify Florida's SGCN varied by taxon - mammals, birds, reptiles, and amphibians; freshwater fish; marine fish; and invertebrates.

#### *Mammals, Birds, Reptiles, and Amphibians*

To generate the SGCN list for mammals, birds, reptiles, and amphibians, the Florida Natural Areas Inventory (FNAI) and the FWC's Species Ranking (Florida Fish and Wildlife Conservation

Commission unpublished data; Millsap et al. 1990) lists were combined. Fish species were removed and considered using alternate criteria (see *Freshwater Fish* below).

Mammals, birds, reptiles, and amphibians were proposed as SGCN if they met any of the following criteria:

1. A species' FNAI score was above S3. 'S3' means that a species is either very rare or local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.
2. A species was listed as protected by the U.S. Fish and Wildlife Service (USFWS), or listed by Florida as Endangered, Threatened, or Species of Special Concern.
3. The FWC's Species Ranking biological score was greater than or equal to 22. The boundary of 22 was based upon the mean ranking score of all taxa in the FNAI's S3 category.

Note: If a conflict was identified for a species ranked in both the FNAI and the FWC's Species Ranking System, preference was given to the FNAI rank.

A species was removed from the SGCN list if it met either of the following criteria:

1. The species is known or believed to be extinct (except the Ivory-billed woodpecker, recently rediscovered in Arkansas).
2. The species is known or believed to be extirpated from the wild in Florida (e.g., red wolf and Bachman's warbler).

### *Freshwater Fish*

Freshwater fish SGCN were derived from the FWC list of freshwater fishes that occur in Florida. The master list was further refined using (1) a checklist of native freshwater fish, (2) a list of exotic species, (3) all locatable university museum records (e.g., Florida State Museum, Tulane University, etc.), (4) records obtained in the field by the FWC staff, and (5) records from the published literature. The freshwater fish list included state and federally listed species, rare species (Gilbert, 1992), species included in the FWC's Species Ranking System (Millsap et al. 1990), and FNAI rankings of G1, G2 and/or S3 and above. Fish species were removed if they were determined to be more common than previously thought based upon a statewide survey of rivers (Bass et al. 2004).

### *Marine Fish*

To develop the list of marine fish SGCN, existing lists were compiled from the USFWS, FWC, FNAI, International Union for the Conservation of Nature and Natural Resources (IUCN), Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora (July 2002), the American Fisheries Society (Musick et al. 2000), species identified as conservation

targets by The Nature Conservancy (Laura Geselbracht, personal communication), and those species identified by the Florida Committee on Rare and Endangered Plants and Animals (FCREPA).

### *Invertebrates*

Estuarine/marine, freshwater, and terrestrial invertebrates were proposed as SGCN if a species met the following criteria:

1. A FNAI State Rank of S3 or higher, regardless of Global Rank.
2. If no FNAI State Rank was assigned or if the species was assigned by FNAI as State Not Ranked (SNR), then it was identified by FCREPA, Taylor et al. 1996, Moler 2004, or Bick 2003 as endangered or threatened.
3. Listed as protected by the USFWS or state.

Note: Due to the lack of considerable information on invertebrates, the best professional judgment was used when finalizing the list of invertebrate SGCN. In addition, these guidelines were followed: (1) if the FNAI State Rank was State Historic (SH) or State Extinct (SX); or (2) if the species was considered Accidental (A) in Florida (i.e., not part of the established biota), the species was excluded from the list, and (3) when a species was recognized as needing further taxonomic study (e.g., Bahama swallowtail); or (4) when a species was recognized as requiring further surveys to determine whether the species is extinct (e.g., certain caddisfly species), the species was considered for the list.

## Required Element 2

*Descriptions of locations and relative condition of key habitats and community types essential to conservation of species identified in Required Element 1.*

### **General Process**

Maps representing the State of Florida for terrestrial, freshwater, and marine ecosystems were developed to identify the locations of 45 habitats categories (See Habitat Approach below). The technical Questionnaire (described above) was used to initially assign SGCN to habitat categories and to determine the relative condition and trend of the habitat categories. The Questionnaire results were then reviewed and habitat categories refined by participants of the November 2004 Science Workshop I. Further review of this information was provided by contacting species and habitat experts and the Strategy draft review process described above (See Timeline and Development Process) The descriptions of locations and relative condition of habitats was further refined in the Threat and Action Workshops (See Required Elements 3 and 4 below).

## Habitat Approach

The Strategy lists 974 species with great conservation needs. Taking a species-based approach would not be economically, logistically, or scientifically feasible in this comprehensive statewide effort. Since many of the factors that threaten these species are connected to their habitat, it is practical and advantageous to take a habitat-based approach within the Strategy. Florida has chosen to develop and implement a conservation Strategy based upon 45 habitat categories to represent the breadth of the state's communities with the goal of addressing the needs and concerns of the entire landscape of Florida. The 974 SGCN are associated with each (See Chapter Habitats).

One goal of the Strategy is to represent Florida's diverse habitats in a spatially-explicit manner; therefore, habitats have been categorized to represent Florida's terrestrial, freshwater, and marine ecosystems. Several state and private organizations have developed classification systems to describe the diverse landscapes that occur in Florida. Some of the systems have incorporated Geographic Information System (GIS) data. The classification systems use different perspectives: natural plant and animal communities, existing land cover, and land use. However, there is no single, accepted statewide comprehensive habitat classification system for Florida. As a result, several different map data layers and classification systems were used to represent and describe all of the habitat categories for the Strategy, including FNAI, Water Management District Land Use Land Cover, the FWC's Florida Vegetation and Land Cover 2003, as well as numerous other individual GIS data layers (See Appendix D. GIS Data Tables). The following is a brief description of these various classification systems and how they were used to develop Florida's Strategy.

One widely used classification system is the FNAI Natural Communities of Florida (See <http://www.fnai.org/descriptions.cfm>). Beginning in 1981, TNC helped Florida establish the FNAI to identify the state's natural communities, to single out noteworthy examples of each, and to locate populations of rare and endangered plant and animal species (Whitney et al. 2004). The FNAI system recognizes 82 natural community types in Florida, contained within six categories: Terrestrial communities, Palustrine communities, Lacustrine communities, Riverine communities, Subterranean communities, and Marine/estuarine communities. Although GIS land cover and point data themes of FNAI's system are available for many of Florida's public conservation areas, coverage does not yet exist for most private properties (which comprise 70 percent of the state's land area). The FNAI system also does not address human-modified environments. For this Strategy, the FWC determined that the habitat categories need to be mappable for the entire state. The FNAI classification system therefore was incorporated into the Strategy as part of the GIS data layers used to develop the freshwater and terrestrial statewide maps (See Appendix D. GIS Data Tables). The Strategy's habitat categories were also cross referenced with the FNAI system for further clarification and comparison purposes (See Chapter Habitats).

Another very widely used classification system is the Florida Land Use Land Cover Classification System (FLULCCS). This classification system was created by the Florida Department of Transportation, and has been used by Florida's five water management districts to develop the Water Management District Land Use Land Cover. The Water Management District system represents a comprehensive, statewide, detailed polygon coverage based on a large number

of specific land use/land cover classes encompassing urban, rural, and natural land classes (Jue et al. 2001). The degree of detail in this system exceeded the needs of statewide maps for the Strategy; for example, FLULCCS discriminates between low-rise and high-rise multiple dwelling units. Therefore the FLULCCS system was selectively incorporated into the Strategy as part of the GIS data layers used to develop the statewide maps (See Appendix D. GIS Data Tables).

The basis for the Strategy's statewide maps is the FWC's Florida Vegetation and Land Cover 2003, which is based upon the 2003 Landsat Enhanced Thematic Mapper satellite imagery (Stys et al. 2004). This classification system identifies 43 vegetation and land cover types broken down into 26 natural and semi-natural vegetation types, 16 types of disturbed lands, and one water class. This classification system most closely approached the Strategy's needs for a statewide habitat classification system. Elements of other systems were incorporated into the final 45 habitat categories, particularly in the freshwater and marine realms (as described below).

The 45 habitat categories in Florida's Strategy are represented on three statewide maps; Florida Comprehensive Wildlife Conservation Strategy (CWCS) Freshwater Habitat Categories 2005, Florida CWCS Terrestrial Habitat Categories 2005, and Florida CWCS Marine Habitat Categories 2005 (See Chapter Habitats, Figure 7, 8, 9 respectively). Nine habitat categories are presented on the freshwater map, 22 on the terrestrial, and 12 on the marine. These maps represent the most comprehensive GIS data available. However, due to lack of sufficient GIS data, two marine habitat categories (Pelagic and Subtidal Unconsolidated Marine/Estuary Sediment) are not depicted. Due to the expansiveness of the GIS data sets used and resolution in this document, three maps were used instead of a single map to help delineate individual habitat categories.

The terrestrial categories were derived primarily from the FWC 2003 land cover (Stys et al. 2004). The Water Management District data were combined with the FWC layers for the creation of some of the data that incorporated land use as well as vegetation type, such as the Industrial/Commercial Pineland habitat category. The nine freshwater habitat categories were derived from a combination of FNAI descriptions, best available data, and professional scientific recommendations. Freshwater streams and riverine systems as well as sinkhole habitats are addressed on a limited basis by both FNAI and Water Management District codes. Florida's marine ecosystems are not fully addressed by the FWC, the FNAI or Water Management District classification systems. Eleven of the Strategy's 14 marine habitat categories were derived from *The System for Classification of Habitats in Estuarine and Marine Environments for Florida* (Madley et al. 2004). Three other habitat categories (i.e., Artificial Structure, Inlets, and Pelagic) were added to more completely represent all marine areas in Florida.

Despite the fact that the marine, terrestrial, and freshwater categories are separated for mapping purposes, the Strategy recognizes the ecological nexus between terrestrial and aquatic resources. Many species of Florida's wildlife (e.g., the five sea turtles) depend upon a variety of habitat categories to satisfy their life history requirements. These suites of habitats do not always stay within the bounds of our broader groupings (terrestrial, freshwater, and marine). For example, the habitat categories Beach/Surf Zone and Coastal Tidal River or Stream are represented on more than one statewide map. Threats and conservation actions were determined with consideration given to both the marine and terrestrial ecosystems for the habitat category Beach/Surf Zone.



## Required Elements 3 and 4

*Descriptions of problems which may adversely affect species identified in Required Element 1 or their habitats, and priority research and survey efforts needed to identify factors which may assist in restoration and improved conservation of these species and habitats.*

*Descriptions of conservation actions determined to be necessary to conserve the identified species and habitats and priorities for implementing such actions.*

The FWC initially assessed the current status of Florida wildlife by utilizing the species and habitat Questionnaire (See Timeline and Development Process and Required Element 1 above). The Questionnaire provided a baseline from which to evaluate the status and trend of SGCN and condition and trend of habitat categories in the Strategy. By utilizing this information, the FWC was able to organize and focus planning of the Science Workshop I in November (See Figure 1.). At the workshop, participants were grouped by expertise in marine, freshwater and terrestrial ecosystems. Throughout the two day workshop the experts worked to develop and prioritize the most important habitat-specific problems and corresponding actions. The Science Workshop I was the primary platform from which the conservation threats and actions section of the Strategy expanded (see Chapter Habitats and Chapter Multiple Habitat Threats and Conservation Actions).

Following the Science Workshop I, the FWC staff conducted an intense plan review of existing habitat and species-specific management plans to evaluate what threats and actions were already being addressed throughout the state (See Required Element 5 below). When the FWC contracted with TNC in early 2005 to further develop the threats and actions portion of the Strategy, this plan review information along with the Science Workshop I results were utilized by TNC in their planning process and Threat and Action Workshops.

### **Identification of Conservation Threats and Actions**

The FWC contracted and partnered with TNC due to their long history of conservation and cooperation within the state. TNC has a dedicated and qualified staff knowledgeable of the diverse land management, ecological issues and problems facing Florida today. Furthermore, TNC was a natural fit for the threats/actions task considering that their established 5-S conservation planning process has a history of producing meaningful and useful results that are applicable to natural resource conservation internationally (See <http://www.nature.org/wherewework/>).

#### *Threat Analysis and Identification Using TNC's 5-S Process*

Workshops were conducted by TNC across the state (See Figure 1). Threats to each habitat were addressed separately in a two-day workshop in north, central, and south Florida. Workshop participants had expertise in certain taxa or habitats in the region covered by that workshop. Workshop participants were introduced to TNC's planning process with respect to threats (Low 2003). Each group conducted the threats analysis process on the habitats present in that region (regardless of threat origins—local, state, regional, national, or international).

Two of the “S’s” in TNC’s 5-S conservation planning process are directly applicable to articulation of threats to Florida’s wildlife habitats. This process divides “threat” into two parts:

1. Stress—the factor that destroys, degrades, or impairs habitats by impacting habitat size, condition, or configuration in the landscape, and
2. Source—the proximate cause of the stress.

For example, altered water quality is a stress to many aquatic systems. This may be divided into stressors caused by contaminants or toxins, and those caused by excess nutrients. Excess nutrients in the water can lead to higher demands for dissolved oxygen and support high densities of certain plant species. Both can result in “Stresses” to the habitat, including die-off of aquatic species, contributing to changes in species composition, changes in primary production, and changes to the physical structure of the aquatic habitats. However, the nutrients altering water quality might be from several different “Sources”, such as fertilizers from lawns or agricultural operations, wastes from animal feed lots, septic systems, sewage treatment facilities, or suburban runoff. Understanding the sources that contribute to the greatest proportion of the particular stress helps to focus and prioritize actions that should be undertaken to abate the threat (Low 2003).

In the workshop setting, participants identified the major stresses to the Strategy’s habitat categories and ranked them. Stresses considered in this process are in Appendix C. Stress and Sources of Stress Categories. Workshop participants considered stresses that are either current (including current legacies of past stresses; e.g., the continuing stress produced by drainage ditches constructed many years ago) or those likely to occur in Florida over the next 10 years under current circumstances and management. Participants ranked the stresses relative to the potential severity of damage to the habitat and the geographic scope of that damage. A combination of the two rankings was used to determine an Overall stress rank. Only those stresses that had an Overall rank of “Very High” or “High” were further addressed in the source of stress analysis. The prioritization of stresses provides critical information and allows managers to focus available resources on the most threatening stresses. However, for completeness, all the stresses and rankings identified in the workshops are presented in the habitat categories (See Chapter Habitats).

When highly ranked stresses were identified for a habitat, the experts explored the sources of those stresses and selected from a list of potential sources developed prior to the workshops. Several additional stresses were added based on input from workshop participants. Use of consistent terminology for stresses and sources allowed the results to be summarized across habitats and regions, thereby easing the development of both a multiple-habitat and a single-habitat assessment of threats. Subsequent to TNC workshops and prior to inclusion in the Strategy, some stresses and sources were added and ranked by the FWC, based on public input.

Sources of stress were ranked in terms of the degree to which they contribute to the stress and the irreversibility of the stress caused by the source. Multiple sources often contribute to a particular stress, and because a single source may contribute to several stresses, examination and ranking of sources helps to further focus attention to the most critical conservation actions. Actions should be focused on sources that (1) are most responsible for particular stresses and (2) will have long-term impacts on the habitat if allowed to progress (Low 2003).

The final step in the assessment of stresses and sources is a synthesis of the individual stress and source analyses. Overall stress and source of stress rankings are combined to derive an Overall Threat Rank. TNC has developed an Excel workbook that automatically calculates the rankings of individual stresses and sources and overall threat ranking. The Overall Threat Rankings of sources of stress across habitats (Tables 2-4 in Chapter. Florida's Strategic Vision) were determined by integrating regional data on sources of stress within and among habitats. This integration is accomplished automatically using an Excel-based consolidation tool developed by TNC (see CAP Toolkit in the "Library" section at <http://www.conserveonline.org>).

The threats sections for each individual habitat category presented in the Chapter. Habitats, includes a table of the stresses identified, with the Overall stress ranking developed by experts, followed by a sources of stress table with rankings and the stress(es) to which the sources contributed. Those sources that were ranked as Overall Threat Rank "Very High" or "High" (Tables 2-3 in the Chapter Florida's Strategic Vision) were used to develop the conservation actions component of the Strategy for the terrestrial and freshwater habitats. Only those sources that were ranked as Overall Threat Rank "Very High" (Table 4 in Chapter. Florida's Strategic Vision) were used to develop the conservation actions component of the Strategy for the marine habitats. As a result, only the most critical threats were evaluated for potential action.

#### *Strategic Action Identification and Ranking Using the 5-S Process*

The actions component of the Strategy corresponds to the fourth "S" in TNC's 5-S conservation planning process: strategic actions. TNC addressed action identification similarly to the process for threat identification. Again, six two-day workshops were convened and distributed across Florida to facilitate attendance (See Figure 1.). Rather than divide workshops geographically, as was done for threats, for actions TNC divided workshops by sources of stress (threats) and invited participants with expertise in the appropriate threat. Overall Threat Rank "Very High" and "High" ranked threats were identified at the statewide scale (for multiple habitats), and also at the habitat-scale (for up to five habitats).

The participants covered several multiple-habitat and habitat-specific threats at each workshop. Workshop participants were introduced to the Strategy and TNC's planning process with respect to strategic actions. Each action was linked to a desired outcome generated either from the threats discussion in previous workshops, or from the experts in the actions workshops. Information from the plans that had been reviewed by the FWC staff prior to the workshops and from the Science Workshop I was introduced to the discussion where relevant.

Each highly ranked source of stress resulted in the generation of as many as 40 actions. The actions were ranked by workshop participants for feasibility, and for benefits likely to improve habitat conditions for Florida's SGCN. First, the workshop participants ranked feasibility in terms of the availability of a likely individual and/or institution to lead implementation of the action, and the relative ease and constituency support for that implementation. Standardized rules giving equal weight to both components were used to generate an Overall feasibility rank. Second, participants ranked benefits in terms of both the contribution a particular action would make in abating the threat under discussion, and the degree to which the action would improve the institutional environment for threat abatement or catalyze implementation of complementary actions. Again,

both components were combined with equal weight to develop an Overall benefit rank. Finally, an order of magnitude estimate was obtained from the participants for the cost of implementing the action (start-up and application for five years). Because the participants were unable to complete ranking during some of the workshops, participants were asked to provide ranks individually. TNC used those ranks to assist with completion of the rankings.

Feasibility and benefit ranks were combined to generate an Overall Rank of priority for each of the actions. In the Chapter. Multiple Habitat Threats and Conservation Actions and individual habitat chapters in the Chapter. Habitats, actions are presented for each threat by category and ranking, from highest to lowest Overall Rank of priority with redundancy minimized. Estimated cost-level is presented, along with the benefit and feasibility rankings that generated the Overall Rank of priority order.

While these rankings have been developed to identify the most effective conservation actions, they do not identify the optimal sequence for implementation. Further, some types of action (e.g., research) often received lower prioritization than actions that more immediately and directly addressed the threat (e.g., active management). As a result, the rankings presented provide a useful initial analysis of the actions, but may be modified based on additional criteria.

Over 140 experts participated statewide in identifying threats and actions (Gordon et al. 2005). Workshop participants operated under the FWC's recommendation that the Strategy be developed in such a manner that it could serve to guide and help coordinate natural resource conservation statewide and be implemented cooperatively and voluntarily across state, federal, or municipal agencies and private organizations. It was made clear to workshop participants that the Strategy is not intended to be a regulatory document. However, some workshop participants regularly recommended actions addressing regulations or policy as being necessary to meet the goals of the Strategy (Gordon et al. 2005). After the workshops TNC edited the actions that had been recorded to improve their clarity and conciseness, and minimize redundancy, but not to modify the original intent or substance of the actions. TNC also incorporated actions that had been articulated during the Threats Workshops and those that were sent post-workshop by the experts. Subsequent to submitting the Strategy to the USFWS, the FWC has reviewed and edited the conservation actions to meet the non-regulatory, incentive-based actions objective.

Although efforts have been made to fact-check the conservation actions developed for each threat, the FWC acknowledges that errors of fact or omission may still exist and welcomes any feedback regarding such errors. Comments received in this regard will be incorporated into a later version of the Strategy as appropriate (See Element 7 and 8 below; and Chapter. Florida's Strategic Vision).

## Required Element 5

*Proposed plans for monitoring species identified in Required Element 1 and their habitats, for monitoring the effectiveness of the conservation actions proposed in Required Element 4, and for adapting these conservation actions to respond appropriately to new information or changing conditions.*

## **Adaptive Management**

Simply put, adaptive management is “learning by doing” (Aldridge et al. 2004); it is the adjustment or modification of conservation actions to achieve a desired conservation goal. In practice, adaptive management is a rigorous process that should include sound planning and experimental design with a systematic evaluation process that links monitoring to management (Wilhere 2002, Aldridge et al. 2004). Adaptive management requires flexibility for implementation, but should be fitted over a fundamentally sound, well-planned design.

An adaptive management process produces the strongest inference and most reliable results when experimental design components are incorporated into the monitoring process. Adaptive management is most rigorously applied in an active format when components of experimental design (i.e., controls, replication, and randomization) are included in the monitoring process (Walters and Hilborn 1978, Wilhere 2002). Incorporating valid statistical analyses of results will further enhance the value of the adaptive management process. However, in some situations, rigorous experimental design procedures can be relaxed without invalidating monitoring results. In a passive format (Walters and Hilborn 1978, Wilhere 2002), adaptive management can involve applying a conservation action at a site, observing the results and adjusting the action in the future if warranted.

## **Monitoring**

Monitoring and performance measures are important, but often overlooked elements of conservation planning. Monitoring provides the critical link between implementing conservation actions and revising management goals. Monitoring is the systematic, repeated measurement of environmental characteristics to detect changes, and particularly trends, in those characteristics. Monitoring provides essential feedback, the data needed to understand the costs, benefits, and effectiveness of planned conservation actions and the management projects undertaken to address them (Wilhere 2002).

## **Performance Measures**

Performance measures include qualitative or quantitative measures used to provide an estimate or index of the characteristic of interest, and to chart the overall progress of conservation actions towards achieving specific goals. Successful monitoring programs provide natural resource professionals with valuable feedback on the effectiveness of conservation actions that have been undertaken and make it possible to implement a more flexible adaptive management approach. An adaptive management approach ultimately will be more efficient and effective when it tracks inputs, incorporates an effective monitoring program that integrates performance measures, and evaluates results against desired goals.

## **Implementing Adaptive Management, Monitoring and Performance Measures**

The Strategy serves as the guiding framework in this adaptive management process; it serves as the underpinning for the integration of (management) projects conducted to fulfill conservation actions that are planned to resolve conservation threats to the SGCN or the habitats they occupy. Based on evaluations of project results, the conservation actions are revised (if necessary), and the process is repeated.

A well-developed monitoring protocol is also one of the principal, required criteria for the Strategy. The plans for proposed adaptive management, monitoring and performance measures were developed through literature reviews and the FWC staff meetings. Overall, a results-based approach is incorporated into the Strategy, for which effective monitoring is an integral component. Florida will monitor conservation actions, species, habitats, major threats and the Strategy itself. Details can be found in the Chapter Florida's Strategic Vision, Monitoring and Performance Measures section. Florida's monitoring plans are briefly summarized below, and include:

### *Species*

- Track the status and trend of species, as well as monitor the implementation of conservation actions on a species by species basis, and where possible at a statewide level by using and improving upon an existing species ranking system (Millsap et al. 1990). Currently, Florida's species ranking system addresses a total of 668 vertebrate taxa. A high priority monitoring action is to update the ranking system with all SGCN and fill species data gaps to further develop, undertake and assess for success additional practical and effective conservation measures.

### *Habitats*

- Use Geographic Information Systems (GIS) to more effectively plan management actions and to monitor changes to habitats at the landscape scale, regionally and locally throughout the state. Florida can measure the percentage of area protected in terrestrial and freshwater habitat to assess successful implementation of the Strategy and monitor terrestrial habitat conversion. Use of this technology as a performance measures will make it possible to produce reasonably accurate quantitative assessments.
- Improve data layers of Florida's habitats to more adequately identify conservation targets and set or adjust monitoring and performance measures accordingly.
- Take steps to expand the use of GIS to monitor habitats and more effectively integrate and coordinate conservation actions at the landscape level and other levels.
- Develop methods to monitor habitat conditions and quality as statewide performance measures.

### *Threats*

- Develop and improve upon conservation actions that address the most critical multiple-habitat threats to capture habitat category level responses and evaluate and determine whether implementation of high priority conservation actions is successful.

Incorporated into those threats are issues related to the overall success of the Strategy. Monitoring the effectiveness of the Strategy will necessarily entail monitoring the success of conservation actions directed toward abating those threats. As for species and habitats, performance measures are used to quantify and evaluate the success of conservation actions identified to address these statewide threats.

### *Strategy*

- Monitor and evaluate at multiple levels – projects, conservation actions, and threat performance measures. Together with reporting procedures, they will be applied to provide feedback on the effectiveness of the Strategy as it is implemented.

Ultimately, the Strategy serves as a tool that can be used by all conservation partners to guide the development and implementation of habitat management activities by both public and private land managers. Many monitoring mechanisms will be implemented outside the realm and knowledge of the FWC. To ensure that goals for individual conservation actions and statewide conservation goals remain consistent, it will be necessary to maintain effective communication among all those who develop and implement projects, those who set statewide conservation goals, and those who review and evaluate the Strategy. The challenge will be to develop and maintain the communication channels so that the state's citizens and natural resource managers can benefit from the information.

In general, future goals for monitoring within the Strategy will include further development of databases for compiling and tracking data. Compilation of this information in a searchable database form will assist future adaptive management efforts to improve protocols for monitoring projects and revise conservation actions undertaken, as appropriate. Continued stakeholder and partnership involvement in the implementation and revision of this Strategy will help ensure the best application of data gained through all monitoring efforts.

## Required Element 6

*Descriptions of procedures to review the Comprehensive Wildlife Conservation Strategy at intervals not to exceed 10 years.*

The FWC's formal review plan for Florida's Strategy is a recurring five-year cycle of assessment to monitor the effectiveness of the Strategy during implementation. The assessment includes evaluation of the Strategy at multiple levels. Annual project review, with final project reports and evaluations will be based on performance measures appropriate to each project.

Conservation action review will be based on assessment of all projects implemented under each action on an annual basis and on species, habitat, and threat performance measures tracked every five years. Strategy review will be based on assessment of all projects, actions, and performance measures. This cumulative review of contributions to meet the Strategy's performance measures will provide a meaningful report on the Strategy's effectiveness (See Chapter Florida's Strategic Vision, Figure 6.).

Even with the more formal five-year review, the Strategy is intended to be a flexible, living document and will be subject to continual revision and update as data gaps (species, habitats, and mapping) are filled, tracking methods are developed and enhanced, new information arises, and stakeholder and public input is received. Less formal Strategy updates may be produced at intervals shorter than the periods stated above in response to these matters or as newly emerging issues and needs arise. When determined to be necessary, such Strategy updates may be submitted to the U.S. Fish and Wildlife Service (USFWS) for review and comment.

## Required Elements 7 and 8

*Plans for coordinating, to the extent feasible, the development, implementation, review, and revision of the Comprehensive Wildlife Conservation Strategy with Federal, State, and local agencies and Indian tribes that manage significant land and water areas within the state or administer programs that significantly affect the conservation of identified species and habitats.*

*Provisions to ensure public participation in the development, revision, and implementation of projects and programs. Congress has affirmed that broad public participation is an essential element of this process.*

The public and federal, state, and local agencies and Indian tribes were invited to participate throughout the Strategy's development process. Early in the process, the FWC developed a contact list to facilitate awareness and participation in Strategy development. This list was developed from pre-existing databases of statewide and regional stakeholders and partners, and augmented by numerous suggestions from those and other stakeholders, the FWC, other agency's staff, and the public. Significant efforts were made to update the contact information (e-mail and physical addresses, telephone and facsimile numbers, titles and affiliations, etc). The contact list, containing over 1,900 entries, was utilized for all statewide Public Service Announcements, and various Strategy workshops (See Required Element 1, 2 and 3 above). Individuals on the contact list were contacted via e-mail, and press contacts were also notified so announcements could be made by a variety of media around the state.

Efforts were made to reach a broad cross-section of stakeholders with interest or expertise in Florida's natural resources to ensure that stakeholder groups with special interests in wildlife, habitats, recreation and resource management in Florida had the opportunity to provide input to drafts of the Strategy. For example, particular effort was made to contact and inform academic and research interests with specialized knowledge of Florida species and habitats. The contact list also included many large organizations representing both conservation, commercial, and recreational user groups, other state and local agencies (e.g., Water Management Districts, county



governments), private consultants, representatives of building industries, real estate, tourism, agriculture, forestry, marine industries, commercial and recreational fishermen, boaters, and citizen groups. Contact with conservation groups included national organizations with interests and offices in Florida and numerous state and local conservation organizations.

Special attention was given to communicate with tribal leadership and tribal members to encourage participation in the Strategy's development. The FWC's Executive Director sent letters to the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida. Staff made follow-up contact by telephone and e-mail, and also coordinated with the federal tribal liaison but were unsuccessful in appealing to the tribes attentions.

Additional special attention was given to state and federal agencies. A letter from the FWC's Executive Director to 18 agencies (e.g., USFWS, Florida Division of Forestry, Florida Natural Resource Conservation Service, U.S. Army Corp of Engineers, National Forests in Florida, Florida Department of Health and Consumer Services, and Florida Department of Community Affairs, Water Management Districts, Florida Department of Environmental Protection, Florida Department of Transportation, Florida Army National Guard, National Park Service and others). The letter included, from the second draft Strategy, examples of statewide conservation actions that specifically identified an agency or were perceived by the FWC to potentially affect an agency. Agencies were solicited with the intent to further engage participation in Strategy development and as a platform for building partnerships and implementing the Strategy.

Florida's Strategy is largely comprised of the suggestions and comments of those persons and groups who either attended workshops or responded to questionnaires and drafts. Over 500 groups and individuals attended the workshops between November and June 2005, and more than 5,000 written comments were received on the two drafts of the Strategy. The FWC staff was a core resource for information and advice, particularly research staff, regional biologists, designated taxa experts, and wildlife managers. These individuals provided input through their job function in the FWC and in many cases as participants in the workshops. The list of workshop participants and submitted comments indicates the number and diversity of stakeholder inputs integrated into this Strategy (See Chapter Acknowledgements). A summary of the opportunities and results of stakeholder and public participation in the Strategy's development follows:

- The FWC held a kick-off press conference and developed e-mail announcement, news releases for radio, newspaper, and television coverage, and distributed flyers. News releases and e-mail announcements soliciting public input accompanied the start of the comment periods for the two drafts and the submitted Strategy.
- The web site, <http://myfwc.com/wildlifelegacy/> was used to post meeting and workshop notices, drafts of the Strategy, the FWC employee contact information, and to provide a mechanism for public comment on the Strategy.
- A public outreach and an internal outreach strategy document was developed by FWC staff. A lead FWC staff member was identified to focus on stakeholder outreach – proactively communicating via e-mail and phone to solicit questions and input to drafts.

- Seven Commissioners, appointed by Florida's Governor, has oversight of the FWC rules, policies, activities and priorities. As part of the FWC's commitment to develop Florida's Strategy the Commission reviewed and approved the Strategy development process, timeline and submission approach at their February 2005 meeting. At the June 2005 Commission meeting the second draft of the Strategy was presented for their review, and the Commissioners again approved the timeline and procedures for submitting the Strategy to the USFWS. Each of these meetings was open to the public with opportunity to comment.
- By letter, the FWC's Executive Director requested participation of employees of federal, state, and local agencies, and Indian tribes for input into the Questionnaire for development of SGCN and habitats and associated information; and repeated the request to state and federal agencies for input to conservation actions in the second draft of the Strategy.
  - Letters to 18 federal and state agencies resulted in five responses with line-specific comments on the second draft Strategy.
- The FWC contracted with Dynamic Solutions Group to host five Regional Public five FWC Staff Workshops in 2004, two technical Science Workshops (November 2004 and June 2005) for stakeholders, and an Open House event.
  - Approximately 160 people participated in the Regional Public Workshops.
  - The two Science Workshops and Open House resulted in nearly 350 participants.
- The FWC contracted with The Nature Conservancy for 12 expert workshops to develop threats and conservation actions for terrestrial, freshwater and marine ecosystems.
  - Over 140 experts participated in these workshops.
- The FWC hosted an online Virtual Workshop to telecast information about Florida's Wildlife Legacy Initiative and the Strategy development process and opened its five regional offices and a venue in Tallahassee to participants.
  - The Virtual Workshop and associated announcements resulted in over 30,000-hits to the Strategy review and comment web site and in a two-week review period generated a 140-page document of nearly 2,000 line-specific comments on the first draft of the Strategy.
- The FWC conducted another, two-week public review periods on the second draft Strategy emphasizing input to the proposed threats and conservation actions.
  - DSG compiled a 200-page document of over 3,000 general and line-specific comments and recommendations. E-mail and news releases announcements generated over 40,000-hits to one of two review and comment web sites.

- The FWC met with four stakeholder groups to specifically address their concerns and to take recommendations to drafts of the Strategy.

### **Coordinating Implementation**

The future of the Strategy's success will be dependent upon the willingness and ability of partners and stakeholders to continue to update and implement it. As stewards of the Strategy the FWC has followed a rigorous development process based on input from experts, stakeholders, and the public. The FWC is committed to maintaining this approach throughout the Strategy's implementation, review and revision (See Chapter Florida's Strategic Vision). The FWC's new program, Florida's Wildlife Legacy Initiative will provide an opportunity to continue to shape the future of wildlife in Florida. While the FWC is the designated lead for Florida, the Strategy is meant for the entire state. It is too broad and encompassing for any one individual, group, or even agency to develop or implement.

The FWC created Florida's Wildlife Legacy Initiative (See Chapter Introduction) to promote long-term awareness of the Strategy. There are three main components of the Initiative: (1) Strategy development, revision and implementation, (2) partnership development, and (3) Florida's State Wildlife Grants Program. To assure that the Strategy is a "living document" with broad input and up-to-date technical information, the Initiative will facilitate a public review period of the submitted draft Strategy from September 16 through December 16, 2005. Further appropriate steps to revise the Strategy will be determined based upon these recommendations. State Wildlife Grant funds have also been committed to a fall 2006 stakeholder and public conference to develop partnerships and facilitate revision of the Strategy.

The FWC will continue to utilize e-mail announcements and the web site <http://myfwc.com/wildlifelegacy/> to maintain awareness by our partners and stakeholders in the implementation, review and revision process.