CHAPTER 8 MONITORING AND INVENTORY, RESEARCH, AND ADAPTIVE MANAGEMENT

Monitoring and inventory are different but related activities. The purpose of monitoring is to check on the status of specific resources and progress toward stated goals or objectives. Inventory has a more basic purpose of determining the occurrence or abundance of specific resources, not necessarily regarding stated goals or objectives. Monitoring is a key component of the SDWAP as it is the process for checking on progress towards the goals and objectives of the plan, as well as the basis for setting up adaptive management programs. Inventory can be a stated objective of the plan, primarily to determine more information on species that lack good information on their status or distribution.

For terrestrial systems, the SDWAP emphasizes maintaining or restoring native ecosystem diversity as the primary means to address habitat needs for the State's biodiversity, with a secondary focus on non-habitat concerns of SGCN. The proposed monitoring follows this same approach. Monitoring of native ecosystem diversity addresses objectives at both ecoregion and community levels of biological organization. The aquatic approach in the SDWAP is to accommodate the needs of SGCN through identification of conservation opportunity areas that consider a variety of stressors to both aquatic ecosystems and related landuses. Monitoring at the species level is primarily directed at addressing more specific conservation actions for a particular species. Inventory can be incorporated at any level to address more basic information needs.

8.1 Monitoring and Research Needs for Terrestrial Native Ecosystem Diversity

As discussed previously, the goal of the coarse filter developed for the SDWAP is to maintain or increase levels of representation of native ecosystems that occurred in South Dakota based on an historical reference. Monitoring of this objective should occur at both the ecoregion or landscape level as well as the ecosystem or community level (Haufler et al. 2002).

Ecoregion or Landscape Level Monitoring and Research

Monitoring ecosystem diversity at the ecoregion level involves tracking the amount of existing acres of each specific ecosystem that can contribute to representation goals identified in Section 6.1. That section identified a framework for setting goals and priorities for desired conditions in terms of amounts of each ecosystem. For monitoring, the relevant measures are the amounts, sizes, and distributions of representative areas for each ecosystem. For the purpose of the SDWAP, a level of 10% of historical amounts was used for determining desired levels of representation, but this amount could be too low for a specific ecosystem when considering other variables such as the sizes and distribution of the ecosystems, etc. For forest and riparian-wetland ecosystems, historical references are limited or entirely lacking and this is an important research goal for the implementation of the SDWAP across the full range of ecosystems within the state. Additional efforts at quantifying amounts of each identified ecosystem occurring under natural disturbance regimes (i.e. historical range of variability) are also needed.

Information for tracking representation levels of ecosystems can come from a variety of sources, and better cooperation and information sharing may result once these needs are identified. Potential cooperators who deal directly with land protection or enhancement include both private and public entities. Where public lands are being managed, such as state or national wildlife lands, grasslands or parks, information on amounts of each ecosystem type that meets representation criteria may be directly available and the acres of representation tallied. For Game Production Areas, South Dakota continues to evaluate native habitat occurrence and condition. These data can be interpreted relative to the ecosystem diversity framework, and amounts and sizes of each ecosystem present on these areas documented. Similarly, where Farm Bill or other conservation programs can provide direct incentives to private landowners to maintain or produce specific desired ecosystem conditions, acres qualifying for these programs can be directly tracked. Other acres occurring on lands not currently involved in either of the above may be more difficult to track for purposes of ecosystem representation. Remote sensing provides some capabilities for tracking the status of many ecosystems, particularly for forested and some riparian ecosystems. Determining the disturbance state and the appropriate compositions and structures of grass and shrub ecosystems is currently less effective using remote sensing information, but this could change as these technologies advance.

The goal of ecoregion monitoring is to track the amounts of each identified ecosystem from the ecosystem diversity descriptions that are present today relative to historical amounts and the stated representation goals. Current monitoring capabilities will be conservative in their estimates of representation for some ecosystems because of the challenges identified with remote sensing, but a consistent tracking of amounts, sizes, and known distributions will indicate trends as well as a minimum level of representation that is known to be present.

Monitoring and research to support the ecosystem diversity component of the SDWAP at the landscape level represent a new evaluation framework and process for SDGFP. Developing the specifics of these programs will be an important operational component for implementing the goals of the Plan. To facilitate this need, one or more workshops should be provided as needed to develop a coordinated and consistent understanding of the conservation strategy used in the SDWAP and the implications for existing and future monitoring and research programs in the state. The workshop will be made available to SDGFP employees as well as land management and research partners to help ensure consistency of monitoring and research methods to support implementation of the SDWAP. Table 8-1 presents the recommended monitoring and research priorities to support implementation of the ecosystem diversity component of the SDWAP at the landscape level.

Table 8-1. Priority monitoring and research needs identified for the landscape level of the ecosystem diversity component of the South Dakota Wildlife Action Plan.

MONITORING	RESEARCH
• Present a workshop to facilitate a consistent understanding of the SDWAP conservation strategy by SDGFP and partners to ensure monitoring and research efforts at the landscape level support implementation of the SDWAP.	
• Quantify the amount of each ecosystem by ecoregion using the ecosystem diversity framework, beginning with state lands. • Work with federal partners to quantify ecosystem diversity on federal lands. • Work with state, federal, and NGOs to quantify ecosystem diversity on private lands where conservation program participation provides an opportunity.	• Work with research partners to develop better tools and methodologies to use remotely sensed data or other data sources to map disturbance states identified in the ecosystem diversity framework. • Work with research partners to develop tools and methodologies to quantify historical range of variability using the ecosystem diversity framework, by ecoregion.

Ecosystem or Community Level Monitoring and Research

As discussed in the previous section, achieving the representation goals identified in the SDWAP requires monitoring the amounts, sizes, and distributions of ecosystems within an ecoregion. First, however, a determination of whether a specific site meets the requirements for representation will need to be made at the ecosystem level. A specific site will need to meet specific criteria for ecosystem composition, structure, function, and processes sufficiently similar to those that occurred historically to be considered representative of those conditions. For example, a particular site may have historically supported a plant community dominated by western wheatgrass and needle-and-thread grass. If that site still contains western wheatgrass and needle-and-thread grass but is also currently composed of 50% smooth brome, it would not be reasonable to consider it representative of historical plant community composition.

Monitoring of sites at the ecosystem level will track progress in addressing specific problems such as species composition, structures, functions, or processes. Typically, the plant composition of the ecosystem will be the primary monitoring criterion. However, structural characteristics may also be important criteria for some sites. Ecosystem functions such as nutrient cycling, while a critical characteristic of ecosystems and their dynamics, would not be commonly used as a monitoring measure, but could be important in some instances. A range of compositions, structures or functions may be acceptable for a site to be considered representative, but sideboards on acceptable levels, particularly for compositions and structures, should be identified. Processes are typically drivers of a site's composition and structure, but may also be used as criteria for appropriate representation. For example, fire return intervals for most areas that historically occurred on a particular ecological site may have averaged 7 years, and areas within the ecological site may be considered within an acceptable range of

fire return for fire-dependent conditions if they have had a fire within the last 15 years. If an area within the ecological site has not burned within the last 15 years, the site might be classified as being representative of a long-term fire return interval, if it had an acceptable composition of species for that specific ecosystem. However, such an area would be considered representative of a long-interval fire return condition, not the short-fire return interval that may have occurred across a majority of areas historically.

Research is needed at the ecosystem level to identify and describe the historical disturbance states for forest and riparian-wetland ecosystems relative to the ecosystem diversity framework of the SDWAP. Restoration programs will be conducted at the ecosystem level and will require new and better tools and methodologies to re-establish sustainable plant communities to meet the objectives of the SDWAP, while also evaluating their effectiveness and cost relative to budgets and personnel.

As with the landscape level, monitoring and research to support the ecosystem diversity component of the SDWAP at the ecosystem or community level represent a new evaluation framework and process for SDGFP. Developing the specifics of these programs will be an important operational component for implementing the goals of the Plan. To facilitate this need, one or more workshops should be provided as needed to develop a coordinated and consistent understanding of the conservation strategy used in the SDWAP and the implications for existing and future monitoring and research programs in the state. The workshop should be made available to SDGFP employees as well as land management and research partners to ensure consistency of monitoring and research methods to support implementation of the SDWAP at the ecosystem level. Table 8-2 presents the recommended monitoring and research priorities to support implementation of the ecosystem diversity component of the SDWAP at the ecosystem level.

Table 8-2. Priority monitoring and research needs identified for the ecosystem level of the ecosystem diversity component of the South Dakota Wildlife Action Plan.

MONITORING	RESEARCH
• Present a workshop to facilitate a consistent understanding of the SDWAP conservation strategy by SDGFP and partners to ensure monitoring and research efforts at the ecosystem level support implementation of the SDWAP.	
• Work with partners to develop the monitoring criteria for determining whether conditions at a site meet the requirements for native ecosystem conditions to qualify toward representation goals. • Work with partners to develop monitoring methods to help prioritize restoration opportunities relative to Conservation Opportunity Areas.	• Work with research partners to describe historical disturbance states for forest and riparian-wetland ecological sites. • Work with research partners to improve existing and develop new tools and methodologies to restore native ecosystem diversity on all ecological sites. • Work with research partners to evaluate restoration effectiveness and identify opportunities for improvement.

Additional examples of landscape- and ecosystem-level needs are presented in Table 8-3.

Table 8-3. Landscape- and ecosystem-level needs identified during the South Dakota Wildlife Action Plan revision.

Identified Need	Related Projects
Landscape Level	
• Monitor sagebrush habitats	• Wright, P. and D. Wegner. 2007. Mapping sagebrush for sage grouse habitat in Butte and Harding Counties, South Dakota. Bureau of Reclamation Technical Service Center Remote Sensing and GIS Group Technical Memorandum No. 86-68260-08-01. 35 pp.
• Survey remaining native prairie on a recurring basis	• Higgins, K. F., V. J. Smith, J. A. Jenks, J. J. Higgins, and G. A. Wolbrink. 2000. A provisional inventory of relict tallgrass prairie tracts remaining in eastern South Dakota. SD Agricultural Experiment Station Extension Circular EC912. South Dakota State University, Brookings.
Ecosystem Level	
• Map sagebrush habitat on private lands • Map sagebrush habitat in Fall River County • Determine quality of sagebrush • Monitor sagebrush habitats	• Wright, P. and D. Wegner. 2007. Mapping sagebrush for sage grouse habitat in Butte and Harding Counties, South Dakota. Bureau of Reclamation Technical Service Center Remote Sensing and GIS Group Technical Memorandum No. 86-68260-08-01. 35 pp. • Mergen, D. E., C. J. Corley, and S. Deisch. 2013. Past and recent vegetation conditions of sagebrush habitat and habitat of the greater sage-grouse (*Centrocercus urophasianus*) in western South Dakota. Final report to South Dakota Game, Fish and Parks. 110 pp.
• Update National Wetlands Inventory maps • Determine locations of springs • Map lakes and streams	• Lakes and streams mapped for SDWAP Revision
• Map riparian corridor habitats • Monitor riparian hardwood habitats • Survey woody habitat layer, including tree type, density, and average tree height • Outline and survey pine-juniper-mahogany habitat in the southern Black Hills • Survey Black Hills meadows, aspens, and conifers for associated wildlife species	• Swanson, D. L., J. S. Palmer, E. T. Liknes, and K. L. Dean. 2000. A breeding population of Virginia's Warblers in the southwestern Black Hills of South Dakota. Southwestern Naturalist 45:39-44. • Ervin, A. E. 2011. Habitat selection, nesting success and genetic structure of the American Three-toed Woodpecker in the Black Hills of South Dakota. Ph.D. dissertation, Univ. of South Dakota, Vermillion. 156 pp. • Rota, C. T., M. A. Rumble, J. J. Millspaugh, C. P. Lehman, and D. C. Kesler. 2014. Space-use and habitat associations of Black-backed Woodpeckers (*Picoides arcticus*) occupying recently disturbed forests in the Black Hills, South Dakota. Forest Ecology and Management 313:161-168. • South Dakota Department of Game, Fish and Parks. 2008. Private Lands Habitat & Access Programs Strategic Plan. South Dakota Department of Game, Fish and Parks, Wildlife Division – Habitat Section, Pierre. • Ley, M. J. 2012. Riparian forest vegetation patterns and historic channel dynamics of the Big Sioux River, South Dakota. M. S. Thesis, University of South Dakota, Vermillion. 185 pp. • Classification and mapping of riparian forest along the White River in South Dakota. SD State Wildlife Grant project T-50-R-1 (in progress).

Table 8-3 (continued). Landscape- and ecosystem-level needs identified during the South Dakota Wildlife Action Plan revision.

Ecosystem Level (continued)	
• Assess grassland habitats throughout the state during grassland bird migration and breeding seasons • Determine quality of untilled prairie • Determine minimum size of a "large" intact grassland habitat block for wildlife species in South Dakota	• Higgins, K. F., V. J. Smith, J. A. Jenks, J. J. Higgins, and G. A. Wolbrink. 2000. A provisional inventory of relict tallgrass prairie tracts remaining in eastern South Dakota. SD Agricultural Experiment Station Extension Circular EC912. South Dakota State University, Brookings. • Ryba, A. 2013. Catalog of map and spatial data products available from the Habitat and Population Evaluation Team (HAPET) Office to support conservation planning and management in the Northern Great Plains Joint Venture. U.S. Fish and Wildlife Service, HAPET, Bismarck, ND. • Mehl, C. A., J. B. Haufler, and S. Yeats. 2009. Native ecosystem diversity of the South Dakota Missouri Coteau. Ecosystem Management Research Institute, Seeley Lake, MT. • Stephens, S. E., J. A. Walker, A. J. Smith, and D. R. Blunck. 2007. Prioritizing grassland conservation on the Missouri Coteau of South Dakota. Final report to the South Dakota Department of Game, Fish and Parks. Ducks Unlimited, Bismarck, ND. • Marriott, H. 2012. Survey and mapping of Black Hills montane grasslands. Prepared for the South Dakota Department of Game, Fish and Parks. State Wildlife Grant T-45-R-1, CFDA #15-634. • Mapping and characterization of native grassland habitats in South Dakota's Prairie Coteau. SD State Wildlife Grant Project T-54-R-1 (in progress).

Adaptive Management

Adaptive management is a structured decision-making tool. Figure 8-1 illustrates the overall process. Figure 8-2 shows the iterative nature of adaptive management (Williams et al. 2009).

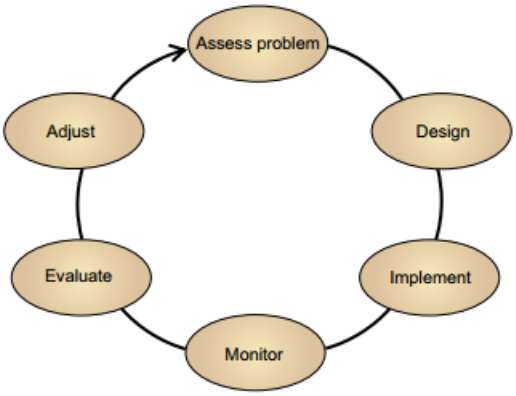

Figure 8-1. Adaptive management process (Williams et al. 2009).

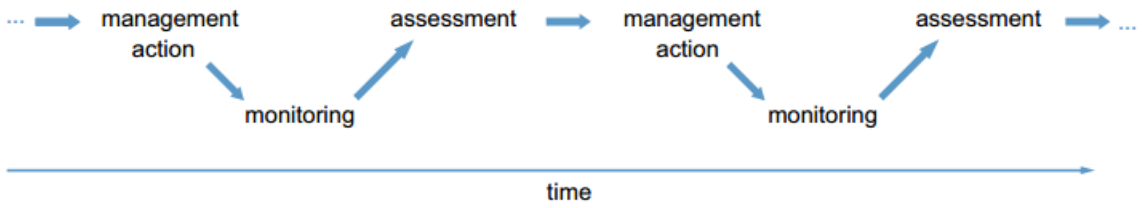

Figure 8-2. Iterative cycle of adaptive management process (Williams et al. 2009).

In short, adaptive management is not simply learning by doing or using trial and error. This tool incorporates stakeholder involvement, careful and specific objective setting, and testing models or hypotheses in a framework of learning and adapting. Key to the successful use of adaptive management is a commitment and capacity to implement the process through its possibly multiple cycles of taking a management action, monitoring the correct variables, reassessing the situation, and starting again with the next management action. This tool also depends on an agency's or institution's ability to deal with uncertainty and to cede some measure of control to the appropriate stakeholders. Not all natural resource issues lend themselves to this decision support tool. However, the development and imminent use of the Wildlife Tracking and Reporting Actions for the Conservation of Species (TRACS) system by the USFWS' Division of Wildlife and Sport Fish Program will elevate this issue within state fish and wildlife agencies. To date, the majority of South Dakota's State Wildlife Grant-funded projects have addressed information gaps at the species level, with limited numbers of projects that implemented and tested

specific management actions. It is anticipated that future projects will more closely follow a more formal adaptive management framework.

Adaptive Management for Native Ecosystem Diversity

Because the dynamics of many ecosystems are not well understood, ecosystem level monitoring should be established in an adaptive management framework. Where possible, management actions selected to maintain or restore desired ecosystem conditions should be implemented in a planned, replicated design. For example, to obtain desired grassland community compositions and structures, treatments such as prescribed burning, seeding of native species, control of exotic species, and use of various grazing regimes might be utilized. If these can be applied in a replicated manner across different ecological sites, they can be monitored to determine if desired ecosystem conditions are achieved. Treatment combinations that are most effective can then be identified and prioritized for increased use in future treatments. State Game Production Areas and federal Waterfowl Production Areas are potential study sites for these treatment evaluations. Adaptive management helps address uncertainties by continually checking and evaluating the results of actions relative to the goals of the SDWAP and making the appropriate adjustments.

8.2 Monitoring and Research Needs for Aquatic Ecosystems

During the development of the Aquatic portion of the SDWAP, a lack of resources did not allow the development of a detailed monitoring, inventory, and research needs plan at the aquatic ecosystem level. Listed below are some future needs and a general framework for developing such a plan for future implementation. Due to limitations of both human and financial resources, there is a need for long-term monitoring systems that are strategically designed to evaluate responses of individual species as well as habitats and natural communities in response to impacts of conservation challenges (i.e. climate change and land conversion). As the framework described in this Plan is shared with and adopted by conservation partners and additional needed funding becomes available, these long-term monitoring needs at the aquatic ecosystem level can begin to be addressed.

High quality habitat is essential for healthy and productive fisheries and aquatic ecosystems. Degraded aquatic habitats, with associated problems such as low dissolved oxygen levels, extreme temperature fluctuations, high turbidity, undesirable substrate, and a lack of desirable aquatic vegetation negatively impact native species diversity and jeopardize the ability to provide quality fisheries.

Monitoring landscapes and natural communities occurs at two main levels: monitoring trends in distribution, abundance, status, and condition of individual communities and monitoring the response of communities to conservation actions (i.e. restoration and reintroduction efforts).

Monitoring trends within and among different habitat types can be used to detect impacts of landuse changes and help direct conservation actions within areas that show the largest declines and are in need of restoration, as well as areas that are most intact and in need of preservation.

The Great Plains Fish Habitat Partnership (GPFHP) began in 2007 as a coalition of interests concerned with the future of the rivers and streams of the northcentral United States and the species that rely on

those habitats. This partnership addresses the loss of aquatic habitats and focuses on the conservation, restoration, and enhancement of quality and degraded habitats. SDGFP is a member of the GPFHP and plans to build on this partnership with future conservation, restoration, and enhancement needs to assimilate the best management practices to benefit various fish habitats and communities.

Ecoregion or Landscape Level Monitoring and Research

Monitoring ecosystem diversity at the landscape level involves tracking the amount of existing acres of high quality natural communities. There is a need to inventory priority landscapes and quality check COAs for quality examples of habitats for SGCN and natural communities. Identifying other occurrences of high quality habitats at the COA level (i.e. Aquatic Ecological System (AES-Level) and among existing COA sites will increase the efficiency of the efforts of the aquatic conservation strategy.

Ecosystem or Community Level Monitoring and Research

Monitoring documented occurrences of ecosystem diversity at the community level is currently incomplete. Future monitoring, inventory, and research efforts within aquatic ecosystems should:

- Develop partnerships with other governmental entities, NGOs and private citizens in future monitoring, inventory, and research efforts to maximize limited resources.
- Develop a classification system for identifying high-quality examples of various ecosystem diversity types (i.e. lakes, rivers, and streams).
- Work with partners to increase the understanding of ecological processes (i.e. grazing regimes, prescribed burning, and hydrology) and the ways best management practices on the landscape impact aquatic communities.
- Work with partners to identify ecosystem function thresholds and the ways impairment affects aquatic communities.
- Work with partners to develop habitat restoration strategies for communities and habitats for which there is the greatest need for restoration.

8.3. Monitoring, Inventory, and Research Programs and Needs for Wildlife

All potential wildlife habitats for the State of South Dakota have been mapped using the ecosystem diversity framework developed for the SDWAP. To meet the objectives of the SDWAP conservation strategy, future monitoring and research efforts related to individual wildlife species or groups conducted in the State should be reviewed for potential links to the ecosystem diversity framework identified. This includes studies to determine the habitat needs of any species. Specifically, this means identifying the ecological sites and disturbance states most likely to provide the beneficial habitat conditions for a targeted species. Developing this important link between ecosystem diversity and species diversity will be critical to determining whether the ecosystem diversity framework is adequate to ensure the needs of the vast majority of species in South Dakota as well as evaluating the adequacy of the representation goals identified. As with the landscape and ecosystem level, monitoring and research to link the ecosystem and species components of the SDWAP represent a new evaluation framework and process for SDGFP. Developing the specifics of these programs will be an important operational component for implementing the goals of the Plan. To facilitate this need, one or more

workshops should be provided as needed to develop a coordinated and consistent understanding of the conservation strategy used in the SDWAP and the implications for existing and future monitoring and research programs in the State. The workshop should be made available to SDGFP employees as well as land management and research partners to ensure consistency of monitoring and research methods to support implementation of the SDWAP at the species level.

Various monitoring programs currently exist and will continue to be tracked for the information they provide on the status and population trends of species. For example, the annual North American Breeding Bird Survey provides standardized, long-term trend information for many species of birds. Other efforts are conducted at periodic intervals. A summary of current primarily species-level monitoring programs and additional pertinent monitoring efforts reported by cooperators is listed in Appendix E. Continuing to communicate and share results of these various monitoring and inventory efforts will enhance the understanding and documentation of the distribution and status of many of South Dakota's SGCN.

SWG funding has allowed SDGFP and its cooperators to conduct many needed studies and inventories on species, species groups, and wildlife habitats. SWG projects conducted or in progress to date are listed in Appendix F. Pertinent research and monitoring projects are listed in individual SGCN species profiles. Because of the unpredictable nature of SWG matching funds, these priorities will be evaluated regularly to prioritize future needs.

Many of the species included on the list of SGCN are also species monitored by the South Dakota Natural Heritage Program, which maintains a Natural Heritage Database as part of an international network coordinated by NatureServe. The database is a dynamic system of data and maps that is regularly revised and improved. South Dakota Natural Heritage Program staff periodically review the state heritage statuses of the plant and animal species monitored by the Natural Heritage Program. Such reviews provide additional priorities for future monitoring of SGCN.

A related task is the periodic review of the statuses of state threatened and endangered species, all of which are listed as SGCN. These related tasks, in addition to the conservation actions identified in the SDWAP's species accounts, will allow SDGFP to evaluate which specific inventory, monitoring, or conservation action items have been attempted. Since the majority of projects are likely to be conducted under the auspices of Federal Assistance (Wildlife and Sport Fish Restoration Programs and State Wildlife Grant Program) accountability will be directly related to whether project objectives have been met. SDGFP will regularly assess progress toward meeting the high-priority inventory needs and conservation actions lists at the species level.

A variety of research and monitoring needs identified at the species level are described in Appendices G-K. Common themes from the species-level needs assessments are listed below:

Inventories and Monitoring:

- Monitor species and ecosystems for exposure to exotic diseases and contaminants.

- Collect baseline data on aquatic and terrestrial species, associated habitat needs, and ecosystem diversity variables.
- Determine and implement survey protocols at various monitoring levels (ecosystem, habitat type and terrestrial or aquatic species group).
- Monitor typical land-use practices to determine impacts on plant composition, structure, and quality.
- Implement long-term monitoring at various levels, where possible, rather than more typical short-term efforts.
- Determine ways to address the lack of species or taxonomic experts for many invertebrate groups and understudied vertebrate groups.

Research:

- Determine limiting habitats for rare or isolated populations.
- Determine impacts of new land uses, such as wind energy facilities and associated infrastructure.
- Monitor impacts of habitat loss or encroachment due to conversion for various uses.
- Determine habitats needed for migrating birds.
- Define high-quality habitat types for species with similar requirements.
- For the rarest species, determine the season with the most limiting conditions that may affect expansion or recovery.
- Genetic variation studies on a variety of rare or marginal species.

Coordination:

- Raise public awareness about specific conservation challenges to take advantage of residents' demonstrated support for the importance of wildlife and habitat diversity to quality of life.
- Need for better coordination among agencies, tribes, NGOs, and individuals for work on shared priorities.
- Use captive propagation and release of terrestrial and aquatic species when and where appropriate.
- Periodic public opinion surveys needed to gauge support or concerns about emerging topics or long-standing conservation issues.
- Need for informational materials on nongame species to inform and educate cooperators and the general public.

Policy:

- Need for protection for nongame species that currently lack protection from unlimited exploitation.

Adaptive Management for Species Diversity

Management actions directed towards species, where feasible, should continue to be designed using an adaptive management framework. For many species, information on responses to many management actions remains largely unknown. How species respond to many practices designed to maintain or restore ecosystem diversity are often poorly documented. Monitoring, included as a component of overall conservation actions, will provide documentation of these responses. When treatments are designed with adaptive management in mind, new knowledge will be gained in a credible, scientific manner.

Adaptive Management for Wildlife Action Plan Revision

Since the initial sets of state and territorial Wildlife Action Plans were produced, several entities, particularly the Association of Fish and Wildlife Agencies, have attempted to provide guidance for making revisions as useful and consistent as possible. One such effort was mentioned earlier in this document (AFWA 2012). Appendix B describes how this Plan incorporated the voluntary guidance described in that publication.

A related effort by AFWA provided guidance to help evaluate the effectiveness of State Wildlife Grants in general, including Wildlife Action Plans (Figure 8-3; AFWA 2011). Although specific effectiveness measurements are still in development for this evaluation, the following summary touches on key Wildlife Action Plan elements.

- Wildlife Action Plan updated: South Dakota Wildlife Action Plan was updated during 2012 – 2014 with clearer priorities and more specific lists of habitat and species research and monitoring needs identified than in the original plan.
- Increased funding: All State Wildlife Grant funds allocated to South Dakota have been spent, with a large percentage of the nonfederal match provided by SDGFP Wildlife Division. This represents a significant amount of increased funding available for conservation in South Dakota.
- Direct agency action is more strategic. SDGFP Wildlife Diversity/Natural Heritage Program staff priorities are closely tied to Wildlife Action Plan implementation, particularly related to SGCN priorities.
- Improved federal and state policy environment for wildlife: There is improved leadership buy-in for wildlife diversity issues within SDGFP. Policy changes are more difficult to measure, although the SDGFP Commission has been more engaged with the SDWAP Revision than with the original plan.
- Other federal, state and private actions coordinated with wildlife needs: There is better recognition of the role of SGCN in state priorities and overall knowledge of the existence and purpose of the South Dakota Wildlife Action Plan.
- Development of more effective coalitions: South Dakota has experienced continued growth of the state Teaming with Wildlife Coalition and increased NGO interactions because of the availability of State Wildlife Grant funding to implement the state Wildlife Action Plan.
- Improved conservation capacity: The majority of South Dakota's State Wildlife Grant allocation has helped address threat reduction, restoration needs, and wildlife conservation. Less attention has been paid to habitat conservation and restoration to this point, although partnerships with universities and other agencies have increased and improved because of the availability of State Wildlife Grant funds and the opportunity to involve partners who

can provide the nonfederal match. We anticipate that these partnerships will continue to improve with implementation of the revised plan.

SDGFP will continue to monitor the development of effectiveness measurement tools related to specific State Wildlife Grant projects and the overall planning effort represented by the Wildlife Action Plan.

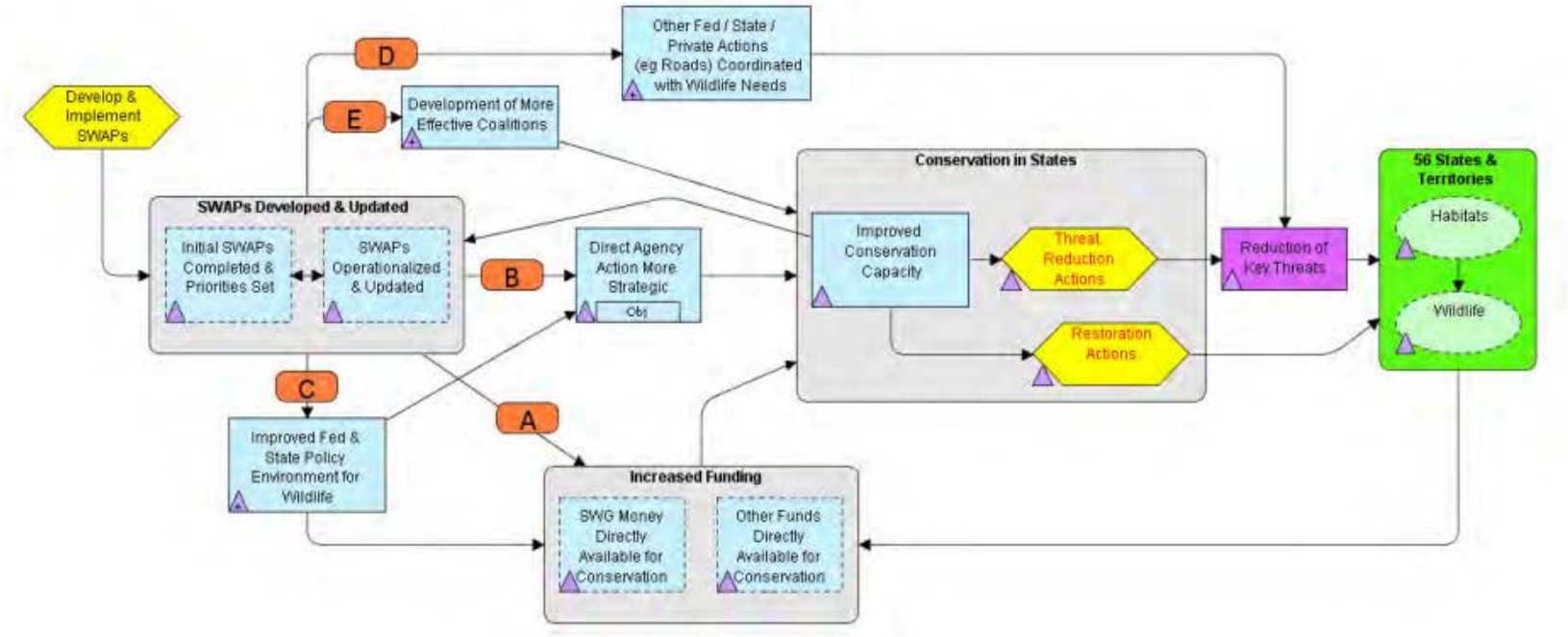

Figure 8-3. Overall results chain and indicators for State Wildlife Action Plan effectiveness (AFWA 2011).