EXECUTIVE SUMMARY

Background:

The South Dakota Wildlife Action Plan uses a science-based approach to assess the health of South Dakota's fish and wildlife and associated habitats, evaluate the problems they face, and outline actions to help conserve them for the long term. This plan encourages voluntary partnerships among governmental entities, tribes, organizations, and private citizens to help prevent fish and wildlife from becoming endangered and to provide for the needs of the full array of fish and wildlife and habitat diversity for the future sustained enjoyment and use by South Dakota's residents and visitors. The Plan provides a strategic framework to allow cooperators to identify and implement priorities at various scales, whether linked to habitats or fish and wildlife species.

The South Dakota Wildlife Action Plan was revised to maintain eligibility for certain federal funding sources and to make use of new information on species and habitats in South Dakota. The revision process presented an opportunity for a comprehensive evaluation of fish and wildlife and associated habitats. Because availability of data differs for different ecosystems, discussions in this plan are separately presented for aquatic ecosystems and terrestrial and riparian-wetland ecosystems. The emphasis of the described approach for terrestrial and riparian-wetland ecosystems is to encourage voluntary actions among conservation partners, agencies, tribes, and individuals to provide habitats that occurred prior to European settlement of South Dakota, with the expectation that this approach will accommodate the needs of the majority of species. The concept of using an historical reference is based on the fact that the array and distribution of ecosystems across South Dakota shaped and sustained the region's biological diversity and that most fish and wildlife species in South Dakota today resulted from historical ecosystems on the Great Plains. Aquatic species are proposed to be accommodated through conservation opportunity areas that consider known and expected species occurrences and other important facets of aquatic ecosystems.

Changes from 2006 Plan:

Significant changes in the revision include:

- new information on species and habitats incorporated;
- terrestrial ecosystem boundaries shifted to Major Land Resource Areas (MLRAs), a classification developed by the Natural Resources Conservation Service (NRCS) and consistent with the ecosystem-based approach of the plan;
- a separate ecological framework, adapted from the aquatic National Aquatic Gap Analysis Program of the Missouri River (MOGAP) project, used in the aquatic portion of the plan;
- climate change impacts considered;

- terrestrial and aquatic Conservation Opportunity Areas (COAs) proposed to encourage voluntary ecosystem restoration with an emphasis on the occurrence of species of greatest conservation need and intact native habitats;
- the most relevant information, particularly related to methodology, streamlined, with background information placed in appendices; and
- Web tools developed that use the plan's biological information as building blocks for broader uses and continued engagement of the public and conservation partners.

Species of greatest conservation need:

One-hundred and one animal species were identified as species of greatest conservation need to help assess the successful implementation of the plan. Criteria included species that are state or federal listed or under consideration for federal listing as threatened or endangered species; species for which South Dakota represents an important part of the remaining species' range; and a variety of characteristics that may make a species vulnerable.

Unless the information is irrelevant or unavailable, SGCN profiles include a distribution map based on the best available information, and descriptions of protection status, distribution, key habitat, conservation challenges, habitat and non-habitat conservation actions, relevant current monitoring programs, relevant State Wildlife Grant projects, research and monitoring priorities, and pertinent recovery or conservation plans. Three species previously listed as SGCN; the Bear Lodge jumping mouse, Blanding's turtle, and paddlefish; were not included on the revised list. Additional species were selected based on input and justification from species and taxa experts.

This section includes a discussion of conservation goals for SGCN and two examples (case studies) to assist the reader in understanding where to find information about each SGCN within the Plan.

Planning approach for terrestrial and riparian-wetland habitats:

The overall planning approach is a coarse filter/fine filter strategy to assure that terrestrial and riparian-wetland habitat needs are met. The terrestrial/riparian-wetland approach establishes a baseline condition (historical reference) at a time prior to European settlement. This represents the coarse filter. Additional, species-specific actions (fine filter) supplement the ecosystem-based approaches. The terrestrial approach identifies native ecosystem diversity components that provide for the needs of plant and animal species that evolved and are adapted to these environmental, climatic, and disturbance patterns. Such an approach is preferable to single-species management and recovery actions that require significant funding and staff time. A critical consideration in the terrestrial approach is an understanding of natural disturbance regimes, such as fire, flooding, and grazing patterns, which acted upon habitats.

MLRAs are defined by characterizing underlying soil and topography in landscape patterns, using information on soils, water, climate, vegetation, and land use. Within the terrestrial ecological systems in South Dakota, grass-shrub systems make up 82% of the state, and much of the plan's methodology evaluates these predominant systems.

Climate, fire, grazing, black-tailed prairie dogs, beaver, and flood events are the primary natural disturbance processes that influenced ecosystem diversity prior to European settlement. The plan describes two drivers of ecosystem diversity – ecological sites and disturbance states. The plan adopts the NRCS definition of an ecological site, which is a potential-based landscape classification system that identifies abiotic conditions that influence disturbance patterns and the potential plant communities at a site.

The riparian-wetland ecological site classification combined several existing classification systems. Four hydrogeomorphic (HGM) classes and 7 hydrology sub-classes are identified. The framework for describing the range of disturbance states for an ecological site is a state and transition model. For grass-shrub ecological sites in South Dakota, the primary disturbance mechanisms were fire and grazing by bison and black-tailed prairie dogs. Eight disturbance states are identified in the plan.

Plant community descriptions provide a framework for developing appropriate ecosystem restoration activities. Ecosystem restoration is promoted to return habitats to historical conditions and disturbance regimes as the benchmarks for comparison to current conditions. Projected climate change effects by 2099 to individual plant species are considered, because of the likelihood that plant species distributions will shift in response to changing climate. A sample plant community description is provided to demonstrate this Web tool, which was developed as part of the revision process and will be hosted on SDGFP's website.

Planning approach for aquatic habitats:

For aquatic species, a variety of data sources helped identify COAs to meet the needs of aquatic species. The aquatic approach also used a coarse and fine filter approach. The aquatic approach included identifying aquatic species of greatest conservation need (SGCN) and identifying areas with the highest known and probable SGCN occurrences. This information was combined with selection of areas with the highest probability of conservation success and areas that represented unique watershed types for aquatic COA consideration.

The MOGAP hierarchical framework was adapted for the South Dakota Wildlife Action Plan from several sources, resulting in the classification and mapping of riverine ecosystems at 8 levels. Four of these levels – subregions, ecological drainage units, aquatic ecological system-types (AES-types), and valley segment types, were used in the COA selection process. AES-types were chosen as the mapping level at which COAs were assigned.

Conservation challenges overview for terrestrial and riparian-wetland habitats:

Major conservation challenges to terrestrial ecosystem diversity are direct habitat conservation and indirect habitat alteration through the spread of nonnative species and the suppression of natural disturbance processes. Climate change projections were combined with an understanding of ecosystem processes and species needs to evaluate potential impacts. An analysis of land conversion by ecological sites within MLRAs is presented. The impact of altered disturbance regimes, including fire suppression and interaction of fire and grazing animals, is described, within the added context of projected climate change. The current tendency toward moderate-level grazing and the reduction of prairie dog acreage has

impacted grass-shrub systems in South Dakota. Forest systems have been impacted by grazing, logging, and fire suppression.

Climate change impacts to terrestrial and riparian-wetland systems:

For terrestrial and riparian-wetland habitats, a downscaled global climate model was used to create a regional dataset of monthly average precipitation and temperature values for each of South Dakota 18 MLRAs for 2 future periods – 2021 to 2050 and 2070 to 2099. The climate change assessment was conducted for grass-shrub ecosystems. Forest ecosystem impacts were not evaluated. In South Dakota, warm-season grasses (C_4 species) generally occur in warmer locations, and cool-season grasses (C_3 species) generally occur at cooler locations. A series of figures displays predicted climate change compared to recent conditions in South Dakota's MLRAs for the following: mean annual temperature, mean annual precipitation, mean winter and spring precipitations, mean growing season precipitation, and mean summer precipitation. In general, the data indicate greater winter precipitation for most MLRAs, variable precipitation during the growing season, and significant temperature increases. Weather events are also anticipated to be more extreme.

Of particular interest from the climate change projections for terrestrial and riparian-wetland habitats is the potential impact of July temperature on the balance of C_3/C_4 plant species. One analysis of Great Plains grasslands indicates a shift from C_3 to C_4 dominance at the projected July temperatures for all but one of South Dakota's MLRAs. Projected climate change impacts to individual plant species are added considerations in native ecosystem restoration projects, which may result in a change in recommended plant species to those more likely to be successful under shifting climate change conditions.

Impacts of direct and indirect alteration of riparian-wetland habitats are discussed, including conversion for agriculture and disruption of natural disturbance process through dams, channelization, diversion and related stream flow reductions, beaver population reduction, and invasive nonnative species impacts.

Climate change impacts to wetlands are discussed in the context of speculation that a 10% increase in spring precipitation will be needed to offset impacts of a 2°C temperature increase. Impacts of projected higher levels of evaporation/evapotranspiration during summer months will vary with HGM class and hydrology sub-class. Climate change impacts to wetlands are expected to be more severe in western South Dakota, although impacts to eastern South Dakota wetlands will vary with basin capability of holding water and whether wetlands are fed by groundwater or other sources.

Conservation challenges overview for aquatic systems:

As with terrestrial and riparian-wetland habitats, direct and indirect habitat conversion and alteration are considered the most significant threats to aquatic systems. Interactions between land practices and aquatic systems must also be considered for influences on stream temperature and flow, aquatic vegetation impacts, altered nutrient loads, and sedimentation. Indirect impacts include flood control, channelization, removal of beaver, and introduction of nonnative species.

Climate change and human stressor impacts to aquatic species:

Predicted climate change impacts to aquatic species were determined using NatureServe's vulnerability assessment tool. Six aquatic SGCN fit the most serious category, extremely vulnerable to climate change impacts. They were Finescale Dace, Lake Chub, Mountain Sucker, Northern Pearl Dace, Northern Redbelly Dace, and Southern Redbelly Dace. Two aquatic SGCN, Longnose Sucker and Sturgeon Chub, were considered highly vulnerable to climate change impacts, the second most serious category. Not all aquatic SGCN were analyzed, due to lack of information. The predictive value of this exercise is expected to improve with additional information.

Nine data layers related to stressors to aquatic habitats were analyzed and ranked for use in the human stressor index (HSI), which was a large component of the aquatic conservation opportunity area identification. These data included impervious surfaces, percent land cover in cropland, confined animal feeding operations, road stream crossings, major hydrologic modifications, dams, permitted discharges, active oil and gas wells, and gravel mining locations.

Conservation challenges summary:

In addition to challenges linked to habitats, a variety of challenges pertaining to terrestrial or aquatic habitats or species, or both, are described. Major categories include land use practices, movement barriers, nonnative species, recreational disturbance, and diseases.

Conservation actions overview:

The complexity of designing strategies to address impacts of habitat loss by direct and indirect means and the poor understanding of habitat juxtaposition and quality are described. The many unknowns in this area support the selection of the ecosystem representation approach as the coarse filter to accommodate the needs of the majority of species.

Representation goals:

As with the original plan, representation goals for terrestrial and riparian-wetland systems are set at 10% of the primary historical ecosystem for each ecological site within each MLRA. This figure has been suggested, but it is not a scientifically-proven number to assure sustainability of all species and habitats. Habitat types most likely to be underrepresented today are areas with frequent fire regimes and light grazing. A list of actions to help achieve representation goals is presented and organized by categories of management, research, and education.

Terrestrial COA identification:

Prior to proposing an approach, SDGFP contacted other natural resource agencies and tribes and visited with internal habitat staff for input. Terrestrial COAs were designed to attempt to provide for the 10% representation goals previously described. Data sources/layers included lands protected because of public ownership or permanent easement, large intact habitat blocks with relatively low levels of human impacts, buffers around major rivers, and wildlife species data points combined as a species richness

category. Proposed terrestrial COAs are considered a first step in a process that should include consideration of existing conservation initiatives and logical land management planning boundaries.

Aquatic COA identification:

Aquatic COA selection criteria included highest confirmed/probable species richness for aquatic SGCN, lowest human stressor index value, and highest percentage of public land ownership. Additional COAs were selected to accommodate underrepresented SGCN with limited ranges. Forty-nine aquatic COAs were selected to assist in identifying high-quality examples of habitat types in South Dakota that will help maintain aquatic diversity.

Conservation actions summary:

In addition to providing for the 10% representation goals for terrestrial and riparian-wetland systems and for testing the utility of the terrestrial and aquatic COAs, a number of conservation actions to assist in meeting ecosystem diversity goals are described. They are organized into coordination, management, research, and education categories.

Public involvement:

A public attitude survey conducted during the revision process indicated continued strong support among South Dakotans for wildlife and efforts to maintain quality habitat. Eighty percent of South Dakota residents reported that they believe fish and wildlife contribute to a high quality of life. Results on specific issues or species conflicts can help SDGFP and its partners formulate educational strategies to best address misunderstandings or lack of public support for critical conservation initiatives. The survey also indicated that more than 91% of South Dakota residents have participated in hunting, fishing, or wildlife viewing at some point in their lifetime.

Public involvement strategies included outreach to government agencies, tribes, and the general public using the SDGFP website for sharing general information and for gathering specific input, such as comments on the draft SGCN list. Specific, targeted requests for input were also sent to government agencies and tribes throughout the revision process. Open houses were held at the agency's 2 outdoor campuses/regional offices, in Sioux Falls and Rapid City. Internal staff were regularly updated on the revision's progress. All input was carefully considered during all phases of the plan revision.

A 5-week public comment period resulted in responses from 6 entities. All comments were reviewed and discussed by the Wildlife Action Plan Science and Outreach teams and responses prepared for those that related to the Plan. In addition, the SDGFP Commission was briefed at various points during the Plan's preparation, resulting in an official endorsement of the Plan by the Commission at their June 2014 meeting.

Monitoring, research, and adaptive management:

Monitoring strategies and information needs are described to evaluate ecosystem diversity goals and to determine whether representation goals are met. Goals can be met with public land acreage and through Farm Bill programs that target ecosystem restoration. Data gathering will help address the need to

monitor ecosystem goals at the landscape level for comparison to historical amounts. Ecosystem- and community-level monitoring should evaluate composition, structure, and function to determine if areas are representative of historical plant communities or are, for instance, degraded with invasive species to the point that they no longer function appropriately as representative ecosystems.

A variety of potential monitoring activities at the species, ecosystem, community, and landscape levels are described. These lists can be prioritized and matched to available funding. Research and monitoring need lists were drafted by SDGFP staff for terrestrial and aquatic animal groups, by habitat type or geographical areas, and to meet conservation challenges and restoration needs. Lists reflect input received from government agencies, tribes, and species experts.

The adaptive management philosophy is described, as well as the anticipated influence of the upcoming shift to a new accountability system within the U.S. Fish and Wildlife Service's Federal Assistance Program.

Plan review:

SDGFP intends to review the plan at 10-year intervals, unless there are compelling reasons to revise the plan sooner. To assure use of the appropriate methods of engaging conservation partners, SDGFP will contact them early in the revision process to determine how they recommend that SDGFP solicit input.