SOUTH DAKOTA WILDLIFE ACTION PLAN

THE BIG PICTURE

Planning is an important part of our lives. It helps us meet personal, financial and professional obligations. A planning system begins with taking stock of where we are, then deciding the direction we want to go and how we'll get there. These planning steps of inventory, direction and action are followed by evaluating whether we successfully completed our task or met our goal.

Several years ago, South Dakota Game, Fish and Parks took on a planning assignment that carried a heavy burden of responsibility. The task was to develop a comprehensive plan to address the needs of all the state's fish and wildlife. This article describes how this requirement originated and how South Dakota took advantage of this assignment to craft a Wildlife Action Plan with the potential to impact South Dakotans and our natural world in the coming years.

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Photo by D.J. Ode

In a Nutshell

South Dakota is blessed with abundant natural resources that contribute greatly to our quality of life. Whether we hunt, fish, watch birds or just enjoy the scenery, fish and wildlife make our lives fuller and more enjoyable. While most of us are familiar with game species, much less attention has been focused on rarer animals and their habitats. State wildlife agencies have recently received new federal funding for rare species work. In exchange, each state drafted a plan to address the needs of all fish and wildlife species, with priority on species of greatest conservation need.

The plans were tailored to each state's needs, but approval by the U.S. Fish and Wildlife Service required that the plans address certain topics, such as wildlife distribution and abundance; key habitats; threats to wildlife and the habitats they need; methods to address these threats; plans for monitoring species and habitats; a procedure to review and update the plan and details about coordination with tribes and other entities with the potential to impact wildlife species and their habitats. The plans are intended to provide frameworks to encourage a more coordinated and proactive approach to wildlife management.

SDGFP worked with wildlife experts in the state and region to identify 90 wildlife species that fit one of three criteria; species that are state or federal listed as threatened or endangered, species for which South Dakota represents a large portion of the species' overall range and species that indicate or depend on a declining or unique habitat in South Dakota. Because it is impractical to write separate plans for each of the 90 species, South Dakota used an ecological planning approach by describing historical conditions (pre-European settlement) and the major processes (disturbances such as fire or grazing) that influenced plant communities.

Using the best information available, we described current habitats. An underlying assumption of this approach is that the needs of most species will be accommodated if South Dakota has a sufficient representation of native habitats.

South Dakota's Comprehensive Wildlife Conservation Plan takes a broad view of landscapes from a fish and wildlife perspective. The plan considers:

- What are South Dakota's essential habitats, and where are they?
- What habitats have changed since South Dakota was settled?
- Which animals need special attention to ensure their long-term survival?
- How can we be more proactive in wildlife and habitat management?

South Dakota's Wildlife Action Plan fulfills a promise made in exchange for new wildlife funding. South Dakota's approach will help avoid future endangered species issues, but just as importantly, it offers an opportunity to energize diverse partners in providing land and resource stewardship to help wildlife and conserve South Dakota's special natural places.

The Funding Story

European settlers in North America found and exploited a wealth of natural resources, including abundant wildlife populations. The American bison, pronghorn, wild turkey, and white-tailed deer were decimated by the early 1900s and others, such as the passenger pigeon, eastern elk, Audubon's bighorn sheep and Carolina parakeet, were lost forever to extinction. Fearing further losses, hunters created and led a new movement of wildlife conservation, which included new hunting ethics, the science of wildlife management and protective laws.

White-tailed Deer
Photo by Doug Backlund

Congress passed the 1937 Wildlife Restoration Act, also known as the Pittman-Robertson (P-R) Act, which imposed a 10% manufacturers' tax on hunting ammunition and firearms, with tax proceeds going to state fish and wildlife agencies for research, habitat protection and species recovery. Anglers followed suit in 1950, promoting passage of the Sport Fish Restoration Act, also known as the Dingell-Johnson (D-J) Act. The D-J Act placed a 10% manufacturers' tax on fishing rods, reels and tackle for use by state fish and wildlife agencies to restore sport fish.

While P-R and D-J funding helps birds, mammals and sport fish, nongame and endangered species have not been linked with a similar funding solution. Endangered Species Act dollars have helped restore some well-known species, such as the bald eagle, peregrine falcon and black-footed ferret. But managing species one at a time without considering impacts to other species is a losing proposition, both for wildlife and those who pay the bills. These efforts are extremely expensive, and most wildlife advocates agree that preventive action is the key to assuring the future of America's fish and wildlife.

Teaming with Wildlife is a legislative effort to identify and secure stable, long-term resources for fish and wildlife species that have fallen through the cracks when it comes to funding. A coordinated approach of inventories, management and related educational efforts can help prevent future endangered species listing and help state wildlife agencies fulfill their trust responsibility to manage for the future of all wildlife.

While the Teaming with Wildlife coalition continues to seek a long-term funding solution, fish and wildlife resources have not been totally left behind. Congress has awarded annual funding through State and Tribal Wildlife Grants since 2002. Tribes around the country compete for Tribal Wildlife Grants, while state wildlife agencies are eligible for an annual allocation tied to population and land area. This annual appropriation is not the long-term solution that we need, but state agencies have made great strides with these dollars.

To learn more about South Dakota's State Wildlife Grants projects, visit: http://www.sdgfp.info/Wildlife/Diversity/wcrp.pdf

The Hook

In exchange for accepting State Wildlife Grants funds, each state and territory agreed to prepare and submit a Comprehensive Wildlife Conservation Plan (called a Strategy by some states) by October 1, 2005. Although encouraged to customize the Plan to its individual needs, each plan had certain required elements. They were:

1. information on the distribution and abundance of species of wildlife that are indicative of the diversity and health of the State's wildlife;
2. locations and relative condition of key habitats and community types essential to conservation of species of concern;
3. problems that may harm species of concern or their habitats, and priority research and survey efforts needed to identify ways to help restore and improve conservation of these species and habitats;
4. conservation actions necessary to conserve the species of concern and habitats and priorities for implementing these actions;
5. proposed plans to monitor species of concern and their habitats, to monitor the effectiveness of the proposed conservation actions, and to adapt these conservation actions to respond appropriately to new information or changing conditions;
6. procedures to review the Plan at least every ten years;
7. plans to coordinate, to the extent feasible, the development, implementation, review, and revision of the Plan 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 species of concern and habitats; and
8. broad public participation is an essential element of developing and implementing these Plans.

The Opportunity

Like many state wildlife agencies, Game, Fish and Parks was established to protect declining game populations. In 1875, the territorial legislature passed the first laws to regulate hunting in Dakota Territory, limiting harvest of Bobwhite Quail, Sharp-tailed Grouse and Greater Prairie-Chickens. Game, Fish and Parks was created in 1909, and in the century since, its responsibilities have become much broader and more comprehensive than game protection alone. The agency's mission is: "…to perpetuate, conserve, manage, protect, and enhance South Dakota's wildlife resources, parks, and outdoor recreational opportunities for the use, benefit, and enjoyment of the people of this state and its visitors; and to give the highest priority to the welfare of this state's wildlife and parks, and their environment, in planning and decisions."

The Sharp-tailed Grouse benefited from early conservation laws.
Photo by Doug Backlund

Because of its broad responsibilities, Game, Fish and Parks saw the planning assignment as both a challenge and an opportunity. Never before had the agency been given the chance to chart a proactive course to impact the full array of fish and wildlife species and their habitats. Such a task was beyond the scope of one agency, and GFP saw the Plan as a blueprint for the State of South Dakota, potentially involving many partners from public, tribal, and private sectors.

From the beginning, GFP had an advantage in tackling this important assignment. South Dakotans are very interested in wildlife, and the majority of South Dakotans highly value fish and wildlife conservation. According to a recent survey, 95% of our state's citizens feel it is important that South Dakota conserve or protect as much fish and wildlife as possible. In addition, 97% of South Dakotans feel that healthy fish and wildlife populations are important to the economy and well-being of South Dakota's residents. (Source: Gigliotti, L.M. 2006. Wildlife values and beliefs of South Dakota residents. South Dakota Game, Fish and Parks Report: HD-2-06.AMS. Division of Wildlife, Pierre, SD)

With such strong support from the public for the needs of fish and wildlife, GFP's challenge was to find an approach that satisfied the legal requirements and that could serve as an effective blueprint, not only for our agency, but for other government agencies, tribal interests, and private citizens.

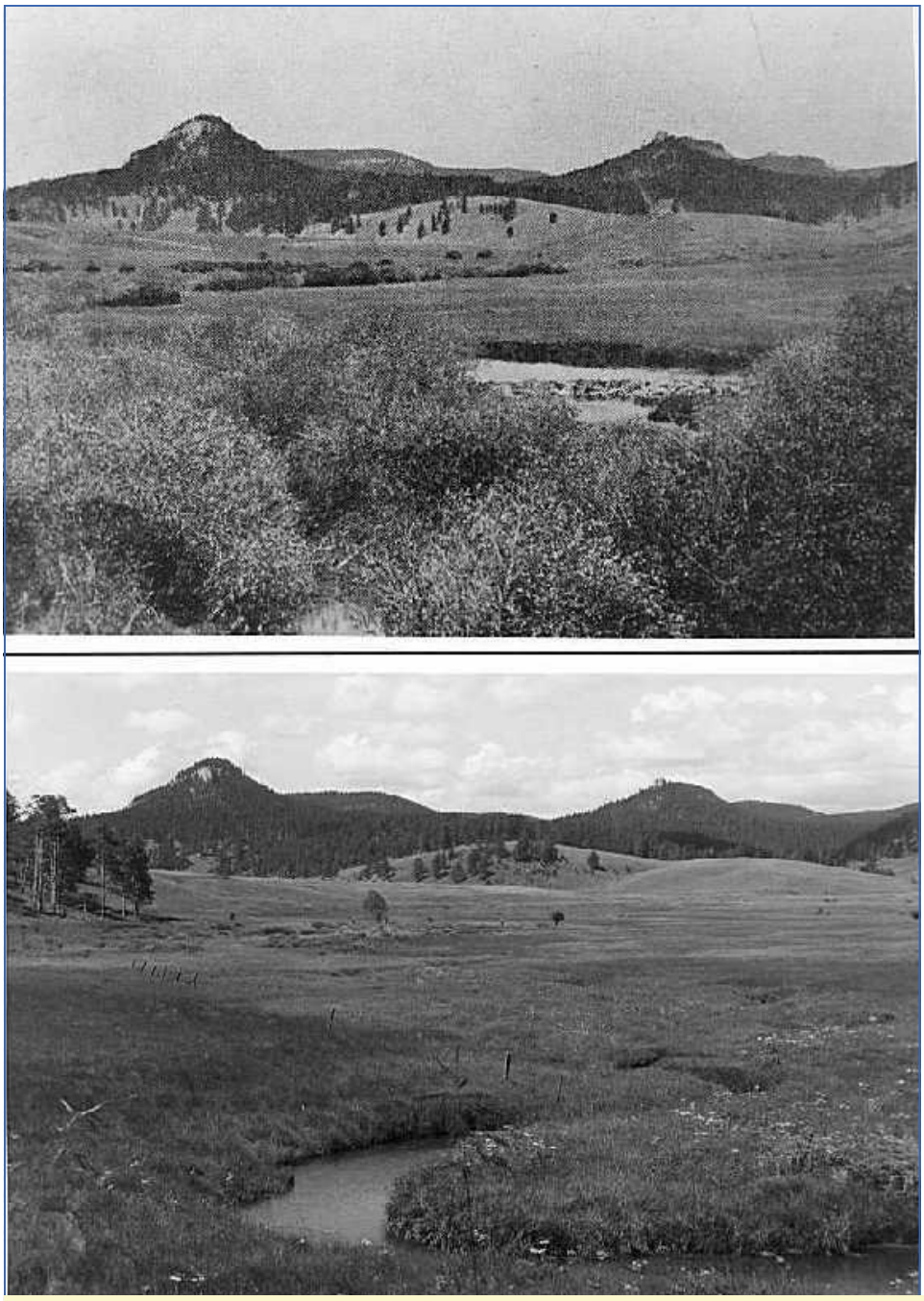
The Philosophy

State wildlife agencies are charged with managing nearly all fish and wildlife species found within a state's borders. South Dakota's Plan addresses that mandate by taking a broad approach and thinking about the future. By planning ahead, we can reduce endangered species conflicts with a nonregulatory approach. Many species are listed as threatened or endangered because little is known about them. By gathering information in a more systematic and proactive way, we can avoid some of the negative impacts of endangered species listings.

South Dakota's Plan is a voluntary guidance document that emphasizes conserving species and habitats through partnerships and cooperation. Only about 10% of South Dakota is owned by state or federal entities. Another 10% of the state is tribal land, leaving 80% in private hands. GFP recognizes the sovereign status of tribes in South Dakota and the importance of partnerships. Engaging private landowners, tribes, environmental and agricultural organizations and government entities is critical to protecting the wildlife and natural places that are so important to our quality of life.

The Plan's approach is to consider what our landscape was like before settlement, but that doesn't mean we want to turn back the clock to a time before agriculture or other land-altering practices arrived. The Plan focuses on native species and habitats, but GFP has no intention of abandoning its commitment to introduced species like the ring-necked pheasant, which is such a key part of our agency's history and our state's hunting legacy. GFP also hopes to build on its traditional strengths and constituents in expanding stewardship to resources that need our attention and care. The Plan is a starting place, not an endpoint. It will be revisited yearly to assess progress and revised every 5 years.

The American Dipper, a state threatened species, needs clean water to survive. Photo by Doug Backlund



Comparative photos of McIntosh Fen in Pennington County, indicating habitat changes through time. Top photo was reproduced from one taken by Arthur McIntosh about 1930. Bottom photo taken in 1985 by D.J. Ode. Photos illustrate the loss of Bebb willow zone and beaver.

The key to healthy people and healthy wildlife is habitat – clean air and water, healthy and diverse landscapes and other features that help fish and wildlife thrive. South Dakota's Plan emphasizes habitats that will benefit all wildlife in the state, while addressing the needs of animal species of conservation concern.

In crafting the Plan, GFP worked with experts at Ecosystem Management Research Institute to identify and locate South Dakota's essential habitats, identify the habitats that have changed since the state was settled, determine which animal species need special attention to ensure their long-term survival, and develop ways to be more proactive in wildlife and habitat management.

The Pieces

PUBLIC INVOLVEMENT

GFP partnered with Dynamic Solutions Group to gather and consider input from as many sources as possible. GFP reached out to state and federal agencies, tribes, universities, private organizations and the general public for help. Outlets and opportunities included news releases, an advisory team, an interactive website, regional public town hall meetings and internal staff and interagency meetings. GFP extended specific invitations to universities, tribes and other government entities to meet early in the process to incorporate mutually beneficial strategies and philosophies. Public involvement has happened before, during and since the Plan's completion and will continue as the Plan is implemented and revised.

SPECIES OF CONCERN LIST

GFP staff consulted with zoologists and other experts in the state to develop the species of concern list. After these consultations, the following criteria were used to identify 90 species of greatest conservation need:

1. State or federal listed species for which the state has a mandate for recovery. South Dakota's endangered species law requires the state to recover state threatened or endangered species. South Dakota also has a legal agreement with the U.S. Fish and Wildlife Service to work cooperatively to restore federal listed species found in the state.
2. Species for which South Dakota represents a significant portion of the species' overall range. If a species exists mainly in South Dakota, we have an obligation to do our best to ensure its long-term survival. Species that are marginal or peripheral to the state will hopefully receive the same consideration in places where they are most abundant or widespread.
3. Species that are indicative of or depend upon a declining or unique habitat in South Dakota. This plan requirement will help us determine whether our habitat approach addresses the needs of species that are closely tied to rare habitats.

South Dakota's list of species of greatest conservation need includes:

- *28 birds*
- *10 mammals*
- *7 freshwater mussels*
- *4 gastropods*
- *9 insects*
- *20 fishes*
- *12 reptiles or amphibians*

ECOREGIONS

An early planning task was to determine how best to divide the state in a biologically meaningful way. South Dakota was divided into 4 ecoregions. An ecoregion is a geographical area with similar climate and landforms. The four ecoregions are:

- Black Hills
- Great Plains Steppe
- Missouri River
- Eastern Prairie, which is subdivided into the mixedgrass and tallgrass subregions

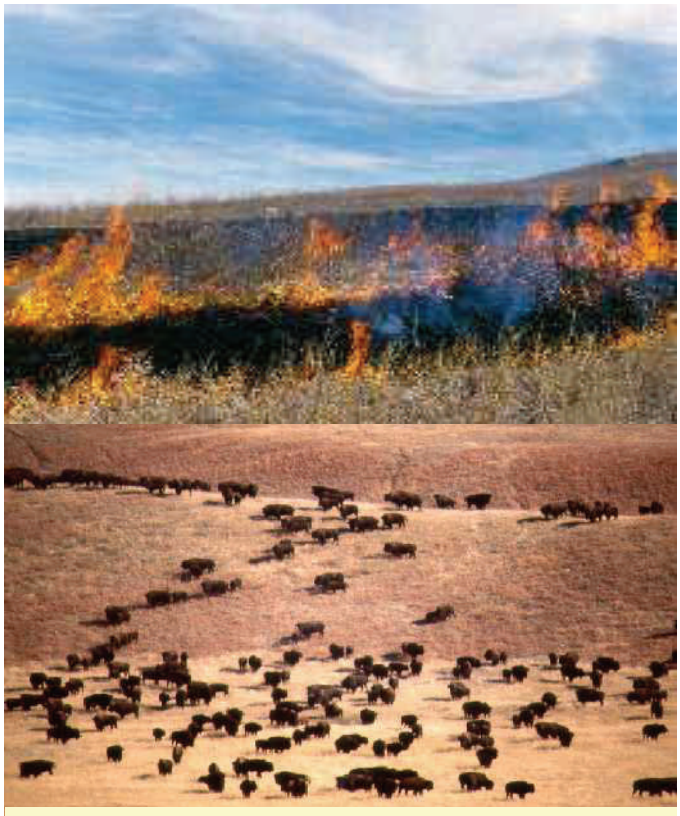
An ecoregion, in turn, contains a number of ecosystems, which are distinctive areas characterized by certain plant and animal communities and associated features, such as soils and topography. For example, four ecosystem types were identified for the Black Hills. They are:

- Grass/shrub ecosystems
- Riparian/wetland ecosystems
- Aquatic ecosystems
- Forested ecosystems

INFORMATION NEEDS

South Dakota has thousands of wildlife species, the vast majority of which have never been counted or studied. In a similar way, very few habitats have been examined to determine their abundance, locations, quality, or associated fish and wildlife species. South Dakota's Plan was prepared with the best information available, but with a recognition that much work remains to be done to gather even the most basic information on many habitats and species.

South Dakota's approach presents information and predictions based on available data and knowledge of ecological processes. Field testing of these concepts may validate these assumptions and predictions or suggest needed refinements. In addition, this approach is likely to fit certain landscapes better than others.



Fire and grazing are important disturbance factors that help maintain grassland health.
Fire photo by D.J. Ode; bison photo by SDGFP

Technical Approach

The following publication is a useful reference about South Dakota's ecosystem approach:

Haufler, J.B. R. K. Baydack, H. Campa, III, B. J. Kernohan, C. Miller, L. J. O'Neil, and L. Waits. 2002. Performance measures for ecosystem management and ecological sustainability. Wildlife Society Technical Review 02-1, 33 pp.

To understand South Dakota's approach, it's necessary to review some key ecological terms.

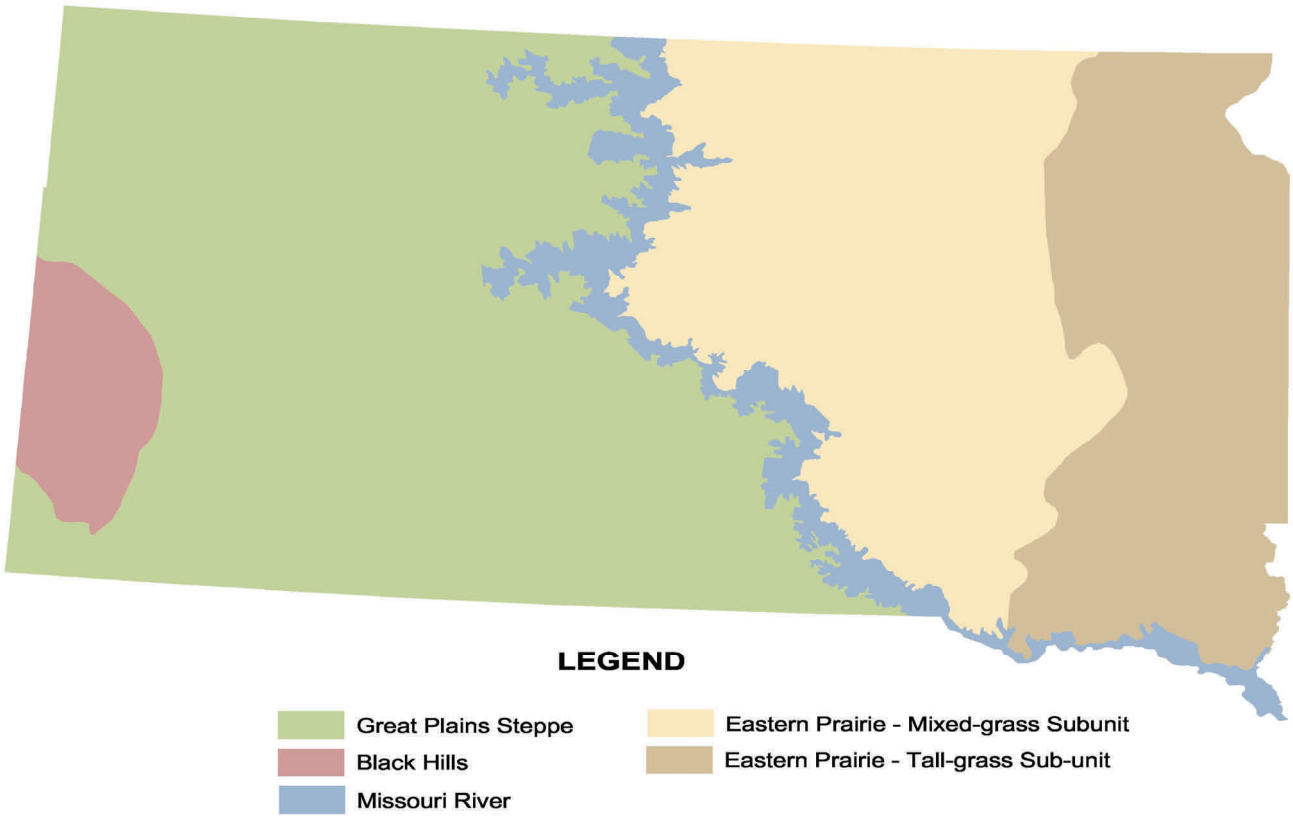
Ecosystem planning approaches are often described as coarse or fine filter or a combination of both. A colander used to drain pasta allows water to pass through drainage holes that are much larger (coarse filter) than the finer mesh of a flour sifter (fine filter). A coarse filter approach to ecosystem diversity captures the needs of most species in an ecosystem. The finer filter approach helps address the needs of individual species that may slip through the coarse filter. South Dakota's Plan uses a

combination coarse/fine filter approach to planning.

An ecoregion is a geographical area with similar climate and landforms. South Dakota's Plan identified 4 ecoregions within the state. An ecoregion contains a variety of ecosystems. An ecosystem is a discrete area characterized by its plant and animal communities and abiotic conditions, such as climate, soils and elevation.

South Dakota's Plan emphasizes the use of historical reference, which describes the ecosystem conditions in a landscape resulting from natural (fire, grazing) and human disturbances. For example, what was a particular Black Hills stream like before settlement? What plant communities occurred there, and what animal species were associated with them? How did beavers influence the flow and condition of this stream? We defined the historical reference timeframe as a period less than 1000 years before European settlement. A historical disturbance regime is the pattern and distribution of disturbance that occurred within a particular landscape before European settlement.

In South Dakota's Plan, ecosystem diversity is based on the historical references for plant communities and related disturbance regimes. If most of the historical plant communities still exist in the state in sufficient acreage and quality, the needs of the majority of wildlife species should be met. We identified 90 animal species of conservation concern. The needs of these species will help test the effectiveness of the ecosystem diversity approach. These species may have additional conservation needs besides habitat; these needs are also described in the Plan.



South Dakota's approach differs from a more traditional species planning effort, perhaps dealing with a game or endangered species. A bald eagle management plan might contain provisions for nesting and wintering habitat, a population monitoring scheme and a list of information efforts to encourage appreciation of this species and compliance with laws and guidelines. Some recommendations favoring bald eagles may conflict with the needs of other

species, revealing a pitfall of single-species planning. In addition, relatively few species have been studied as much as such species as the bald eagle, ring-necked pheasant or white-tailed deer, and intensive study of each individual species simply will never happen. South Dakota's approach is an alternative process of evaluating how the landscape has changed since settlement and determining how to address the habitat needs of most wildlife species.

ECOSYSTEM CLASSIFICATION SYSTEM

Following the decision to use an ecosystem approach to planning came the step of classifying South Dakota's landscapes. The classification system had two requirements: it had to describe the full range of ecosystem conditions that resulted from historical disturbance regimes, and the system needed to allow evaluation and comparison of historical ecosystem diversity to existing landscape conditions.

Ecologists have spent considerable time developing and refining plant classification systems, but these do not necessarily reflect historical conditions. A better potential classification encompasses ecological site conditions, which include abiotic attributes, such as soils, climate, elevation, and moisture regimes. These site conditions do not change rapidly, and they help determine the plant communities and disturbance patterns at that site during both current and historical times. Site condition descriptions alone don't adequately reflect all the successional states that can occur in response to disturbance events and other ecological processes, so ecological site classification was combined with a classification of successional stages. These successional stages result from historical disturbance. They are also called alternative states or state and transitional models.

South Dakota's Plan used a tool called the Ecosystem Diversity Matrix (EDM) to provide the framework to combine the two classification components – the ecosystem classification and the successional stages classification. The EDM is a way of organizing a massive amount of information in a way that describes historical conditions and disturbance regimes and allows comparison with today's landscapes.

EDMs were developed for the following ecosystems, organized within each of South Dakota four ecoregions:

- Great Plains Steppe Ecoregion
  - Grass/shrub ecosystems
  - Riparian/wetland ecosystems
  - Aquatic ecosystems
  - Forested Ecosystems
- Black Hills Ecoregion
  - Grass/shrub ecosystems
  - Riparian/wetland ecosystems
  - Aquatic ecosystems
  - Forested Ecosystems
- Missouri River Ecoregion
  - Riparian/wetland ecosystems
  - Aquatic ecosystems
- Eastern Prairie Ecoregion
  - Mixedgrass Subregion
    - Grass/shrub ecosystems
    - Riparian/wetland ecosystems
    - Aquatic ecosystems
  - Tallgrass Subregion
    - Grass/shrub ecosystems
    - Riparian/wetland ecosystems
    - Aquatic ecosystems

BUILDING THE EDMs

Grass/shrub ecosystems

EDMs for these ecosystems are based on the Natural Resources Conservation Service's (NRCS) ecological site (formerly called range site) classification, which uses soils as the primary mapping unit. Therefore, the ecological sites found along the X-axis of a grass/shrub EDM relate to soil types. An ecological site is defined by NRCS as "a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation."

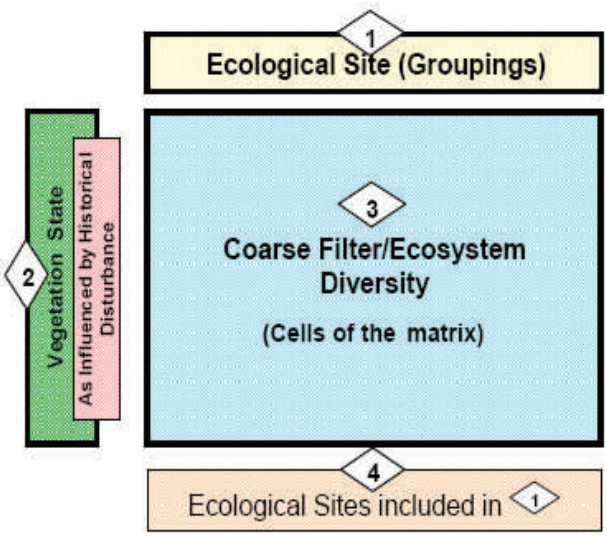


Figure 3.2. Primary components of the ecosystem diversity matrix.

Disturbance mechanisms are the second essential component of an EDM. For grass/shrub ecosystems, these include fire, grazing and prairie dog colonies. These are found along the Y-axes of the grass/shrub EDMs. Prairie dog colonies were less relevant in eastern South Dakota, so this disturbance factor is not included in grass/shrub EDMs for the Tallgrass Subregion of the Eastern Prairie Ecoregion, for example.

An EDM's actual content (cell) is a prediction of how certain plant communities will respond to each of the disturbance factors. Within the EDM, a cell describes the dominant vegetation for an ecological site, although many more plant and associated wildlife species characterize that cell. Throughout the Plan, some EDMs are blank or have limited information, indicating that more data are needed to meet this baseline information void.

The Burrowing Owl depends on grass/shrub ecosystems.
Owl photo by Doug Backlund; grassland photo by D.J. Ode

Riparian/wetland ecosystems

EDMs for these ecosystems are defined by a classification based on geomorphic or landform features. The geomorphic components comprise the X-axis, and they are lake, depressional, riverine and slope systems. Lake systems represent naturally occurring lakes with a surrounding zone of vegetation that is influenced by the presence of water and related wave action. A depressional system includes wetlands within a depression that are influenced by surface runoff and/or groundwater. Prairie pothole wetlands are an example. Riverine systems include the zones adjacent to rivers, streams and other drainages influenced by surface runoff and/or floodwaters. The water within a river channel is addressed in aquatic ecosystems. Slope systems are influenced by groundwater that seeps to the soil surface. Examples are fens and seeps. Additional EDM subclasses for these ecosystems include water regime and slope.

Disturbance mechanisms are found along the Y-axis, and they include flooding, fire, beaver and grazing. The riparian-wetland EDMs reflect a lack of baseline information, indicated by the blank cells within many of the EDMs.

Riparian/wetland ecosystems provide habitat for the river otter, a state threatened species.

River otter photo from USFWS images website; habitat photo by D.J. Ode

Aquatic ecosystems

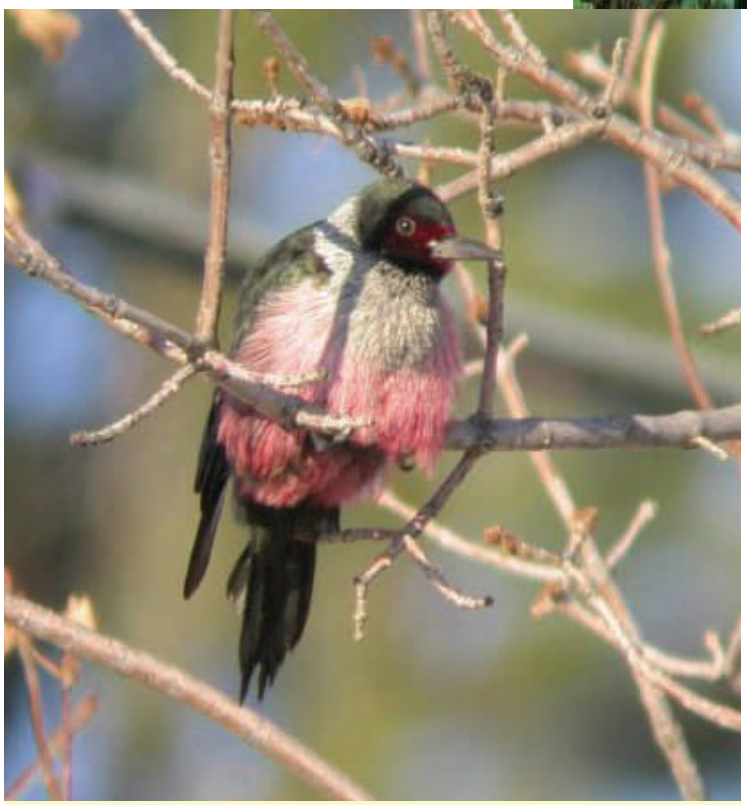
These ecosystems are also based on geomorphic features, with three systems identified – lake systems, depressional systems and riverine systems. Lake systems represent the water within naturally occurring lakes. Depressional systems represent the water environment of wetlands such as ponds and potholes. Riverine systems include the in-channel water of rivers, streams, creeks and headwaters. EDMs also include subclasses based on gradient and water regime.

The primary disturbance factors operating within the aquatic ecosystems relate to the disturbances within the watershed and may include flooding and beaver. In addition to disturbance pathways, the Y-axis includes habitat descriptors, which are classified as streambed, unconsolidated bottom or aquatic bed. Similar to the riparian/wetland EDMs, many of the cells of the aquatic ecosystem EDMs are blank, reflecting a lack of available information.

Higgins eye, a federal endangered freshwater mussel, is a species of greatest conservation need associated with aquatic ecosystems of the lower Missouri River in South Dakota.
Photo by Kevin S. Cummings, Illinois Natural History Survey

Forested ecosystems

EDMs for these ecosystems are based on NRCS ecological site descriptions combined with a forest vegetation classification developed for Black Hills National Forest. The variability of these ecosystems and the transitions between ecological sites required judgments in some cases to arrive at the content of EDM cells. For example, some bur oak habitats occur in a transition zone between grass/shrub and forested ecosystems, and some may be included in grass/shrub ecological sites. This example illustrates the complexity of categorizing natural habitats into discrete categories and the importance of understanding how habitats function under various conditions. Fire was the primary disturbance factor for Black Hills forested ecosystems.



Forested ecosystems in the Black Hills provide habitat for such species as Lewis's Woodpecker.
Photo of Lost Gulch in the Black Hills illustrates a warm, moist ponderosa pine habitat with a long fire interval.
Habitat photo by D.J. Ode; Lewis's Woodpecker photo by Doug Backlund

FOUR ECOREGIONS

Great Plains Steppe

This ecoregion is approximately 25 million acres and is characterized by grasslands maintained historically by fire, grazing and prairie dogs. The grass/shrub ecosystem comprises nearly 90% of the acreage, and much of the native grass is currently used for livestock grazing.

Annual precipitation ranges from 12 to 23 inches. Soils vary from shallow to deep and are primarily fine textured, with areas in the southern part of the ecoregion having medium- and coarse-textured soils. Topography is gently sloping to rolling with generally well-drained shale plains. Mean annual temperature ranges from 39-52°F, and the average freeze-free period is 110-160 days. Elevation ranges from 1300 to 4000 feet.

Some of the species of greatest conservation need found in the Great Plains Steppe Ecoregion are:

Grass/shrub ecosystems
- greater sage-grouse
- long-billed curlew
- American burying beetle
- lesser earless lizard
- black-footed ferret
- western box turtle
- Iowa skipper

Riparian/wetland ecosystems
- marbled godwit
- interior least tern

Aquatic ecosystems
- finescale dace
- northern redbelly dace
- pearl dace
- sturgeon chub

Forested ecosystems
- fringe-tailed myotis

Black Hills Ecoregion

This area of approximately 1.5 million acres has the most diverse topography within the state. Forested ecosystems comprise more than 1 million acres, and they include characteristics or both eastern and western forests. Historical disturbance factors included frequent, low-intensity fires, with infrequent occurrences of large fires. Current land uses include timber harvest, agriculture, mining, recreation and tourism.

Average annual precipitation ranges from 12 to 26 inches. Soils have fine to medium textures and vary from shallow to deep. Slopes can be moderate to very steep. Drainages are well defined. Elevation ranges from 3000-7200 feet.

Some of the species of greatest conservation need found in the Black Hills Ecoregion are:

Grass/shrub ecosystems
- ferruginous hawk

Riparian/wetland ecosystems
- American dipper
- Bear Lodge meadow jumping mouse
- Black Hills fritillary
- Black Hills redbelly snake

Aquatic ecosystems
- lake chub
- mountain sucker

Forested ecosystems
- northern goshawk
- Lewis's woodpecker
- fringe-tailed myotis
- northern flying squirrel
- Dakota vertigo
- Cooper's rocky mountainsnail

Missouri River Ecoregion

The Missouri River's channel originated primarily from glacial water that scoured deep channels during warm periods. Historically, the Missouri River was a dynamic system with a shifting channel, a series of sandbars in various stages of

deposition, and abundant forests dominated by cottonwoods and green ash. The construction of 4 dams drastically altered this ecosystem to create a series of reservoirs – Lake Oahe, Lake Sharpe, Lake Francis Case and Lewis and Clark Lake.

The river cut a valley now known as the Missouri River Trench, which averages slightly more than one mile wide. The river drops roughly one foot per mile, and elevation changes from 3700 feet in the north to 1100 feet in the south.

Some of the species of greatest conservation need found in the Missouri River Ecoregion are:

Riparian/wetland ecosystems

- piping plover
- false map turtle

Aquatic ecosystems

- Higgin's eye
- scaleshell
- pallid sturgeon

Eastern Prairie Ecoregion

Mixedgrass Subregion: This area of approximately 13.5 million acres is relatively flat glacial till plains interrupted by moraines and potholes, which cover roughly 10% of the subregion's area. The predominant grass/shrub ecosystems have characteristics of both short-statured, warm-season grasses of the Great Plains Steppe Ecoregion and taller, cool- and warm-season grasses of the Tallgrass Subregion. Forest ecosystems were historically rare. Ranching and farming are important land uses.

Mean annual temperature ranges from 34 to 48° F, and the growing season lasts 110 to 155 days. Soils are generally deep and moderately well-drained, with sandy to clayey textures. Depressional wetlands may cover 10% of the land.

Some of the species of greatest conservation need found in the Mixedgrass Subregion are:

Grass/shrub ecosystems

- greater prairie-chicken
- chestnut-collared longspur
- regal fritillary

Riparian/wetland ecosystems

- Le Conte's sparrow
- northern cricket frog

Aquatic ecosystems

- mapleleaf
- Topeka shiner

Tallgrass Subregion: This area of approximately 8.8 million acres shows major glacial influence, resulting in glacial sediments with an average thickness of 450 feet in the Coteau des Prairies, which covers much of this subregion. Glaciers also helped create wetlands commonly called potholes. Upland forests were likely rare in this subregion. An estimated 70% of grass/shrub ecosystems have been converted to cropland, and farming remains an important land use.

Average annual precipitation ranges from 20 to 26 inches, the highest range in South Dakota. The deep soils generally have loamy to silty textures. The Coteau des Prairies rises as much as 1000 above the Minnesota River Valley to the northeast and 700 feet above the James River Lowland to the west.

Some of the species of greatest conservation need found in the Tallgrass Subregion are:

Grass/shrub ecosystems

- Franklin's ground squirrel
- Powesheik skipperling
- lined snake

Riparian/wetland ecosystems

- northern river otter
- Cope's gray treefrog

Aquatic ecosystems

- elktoe
- rock pocketbook
- banded killifish
- northern redbelly dace
- trout-perch

Navigating the Plan

FOREWORD

Secretary John Cooper introduces the Plan by describing the voluntary nature of this effort and the hope that it will foster cooperation among government entities, tribes, organizations and individuals for the benefit of wildlife and habitats.

EXECUTIVE SUMMARY

South Dakota's Plan includes a thorough Executive Summary, which is critical reading for anyone with an interest in understanding the Plan's approach and component parts.

SECTION 1.0 - INTRODUCTION

This section describes the evolution of wildlife funding mechanisms, including State Wildlife Grants funding and the associated requirement to prepare the Wildlife Action Plans. The required elements are listed with a guide to finding them in the Plan. The Plan's goal and purpose are described, including its relevance to agencies, organizations and individuals. This section includes a list of some existing conservation plans or strategies relevant to South Dakota, a glossary of terms and a list of acronyms used in the Plan.

SECTION 2.0 - CONSERVATION STRATEGY

This section describes the rationale for South Dakota's coarse filter and fine filter approach and its associated benefits. This section also presents the sequence of steps detailing how this approach was applied in the Plan's development.

SECTION 3.0 - ECOSYSTEM DIVERSITY

South Dakota's technical approach is described in detail in this section. Included are the justification for using NRCS' ecological sites as the basis of the classification system for terrestrial ecosystems and an explanation of the ecosystem diversity matrix (EDM) as a planning tool. The role of historical disturbance is described, with background information provided on the major disturbance factors that affected South Dakota's ecosystems – climate, fire, grazing, black-tailed prairie dogs, beaver and flood events. The section describes the data sources for developing the EDMs for the four ecosystem categories - grass/shrub, riparian/wetland, aquatic and forested.

South Dakota's ecoregions are listed and described, along with ecosystem types within each ecoregion. Ecoregion descriptions include general information about the landscape, historical vegetation, representative wildlife species during historical times and descriptions of current land use and land management. If the information was available, summaries of acreages in various types of ecological sites are included.

EDMs are included for the 16 ecosystems found within the four ecoregions. Cells within these matrices reflect the dominant plant species of an ecological site under the various disturbance scenarios.

- Great Plains Steppe Ecoregion
  - Grass/shrub ecosystems (Figure 3.4)
  - Riparian/wetland ecosystems (Figure 3.6)
  - Aquatic ecosystems (Figure 3.7)
  - Forested Ecosystems (Figure 3.8)
- Black Hills Ecoregion
  - Grass/shrub ecosystems (Figure 3.10)
  - Riparian/wetland ecosystems (Figure 3.11)
  - Aquatic ecosystems (Figure 3.12)
  - Forested Ecosystems (Figure 3.13)
- Missouri River Ecoregion
  - Riparian/wetland ecosystems (Figure 3.15)
  - Aquatic ecosystems (Figure 3.16)
- Eastern Prairie Ecoregion
  - Mixedgrass Subregion
    - Grass/shrub ecosystems (Figure 3.18)
    - Riparian/wetland ecosystems (Figure 3.19)
    - Aquatic ecosystems (Figure 3.20)
  - Tallgrass Subregion
    - Grass/shrub ecosystems (Figure 3.22)
    - Riparian/wetland ecosystems (Figure 3.23)
    - Aquatic ecosystems (Figure 3.24)

SECTION 4.0 - SPECIES OF GREATEST CONSERVATION NEED

This section begins with a description of the three criteria used to develop the list of species of greatest conservation need. Each species account follows a standard format, including common and scientific names, description, protection status, historical and current distribution, key habitat and linkage to ecosystem diversity, causes of concern, a list of existing recovery plans or conservation strategies and a map depicting current distribution.

The ecosystem diversity link is made by listing the ecoregions where the species occurred during historical times, the primary EDMs for the species and relevant qualifiers, such as specific habitat features important for that species. Following each animal group is a series of EDMs illustrating the expected distributions for each species. For example, Figure 4.1.2.1 depicts the expected distributions of bird species of concern in the riparian/wetland ecosystems of the Tallgrass Prairie Subregion. Figure 4.4.1.2 illustrates the expected distributions of mammal species of concern in the grass/shrub ecosystems of the Great Plains Steppe Ecoregion.

As with other components of South Dakota's Plan, the information is sometimes sketchy or nonexistent for EDM components. Specific habitat needs of individual species may be unknown. The best educated guess was often made, with the hope that additional study can allow completion of the EDM cells with more certainty.

SECTION 5.0 - PROBLEMS AND CAUSES OF CONCERN

This section describes three main challenges to meeting ecosystem diversity goals in South Dakota. They are direct alteration and conversion of ecosystems, indirect alteration and/or suppression of historical disturbance processes and indirect alteration resulting from human activities. The text describes how each of these concerns impacts the ecosystem types within each of the four ecoregions. Also included are acreages and percentages of ecological site types that have been converted for various purposes, including agriculture, urban and rural development and mining and gravel operations.

Main causes of concern for species in South Dakota are habitat loss or degradation and non-habitat related issues. Habitat needs should be addressed via efforts to identify and meet ecosystem diversity goals. This section includes a table summarizing the potential impacts of 17 problems or concerns to South Dakota's list of species of greatest conservation need. Also included are 16 EDMs with the same framework as the EDMs found in Section 3.0, but in this section the cells list the total number of animal species of concern rather than dominant plant species. For example, Figure 5.5.4 indicates that within the forested ecosystems of the Black Hills Ecoregion, 7 species of concern are accommodated in warm, moist ponderosa pine habitats with a stand structure dominated by medium trees.

SECTION 6.0 - CONSERVATION GOALS AND ACTIONS

This section describes the challenge of setting conservation goals within an ecosystem-based planning approach that lacks important baseline information. South Dakota's planning approach does not promote a return to historical times, but we must estimate how much of each historical ecosystem type is required to provide for wildlife needs. The section explains the concept of adequate ecological representation. Within the context of an historical range of variability, what is needed to "represent" each ecological community that existed under historical disturbance regimes? This threshold level is the minimum amount of each community type needed to provide for biodiversity and ecosystem integrity within a certain level of risk. The companion role of societal pressures is also discussed in determining "how much is enough."

Various habitat-related factors that affect the adequacy question for ecosystem diversity are discussed. Ecosystem amounts, sizes, distributions and quality must be meshed with species habitat needs to determine adequate representation levels. South Dakota's Plan identified 10% as the goal for adequate ecological representation of historical ecosystems. This is considered a minimum acreage to conserve ecosystem diversity, and it may be refined with better information. Two methods helped determine the 10% representation goal. A computer model called SIMPLLE was used to make this calculation for the grass/shrub ecosystems in the Great Plains Steppe Ecoregion and the Mixedgrass Subregion, areas where the historical range of variability is known. An alternate method is used for ecosystems where the historical range of variability is unknown. In the second method, estimates of historical ecosystem acreages are allocated across ecosystem types, potentially overestimating or underestimating historical ecosystems.

This section also addresses how conservation priorities were set. Two methods were also used, depending on whether information was available about the historical range of variability and existing conditions. The first and preferred method ranks ecosystem types by the acreage percentage that exists today compared with 10% of the maximum historical range of variability. The second method of setting conservation priorities is based on a value determined by a combination of the percentage of altered or converted ecosystems and the species of greatest conservation need associated with each ecosystem. The text describes which method was used to calculate conservation acreage goals and conservation priorities for each of the 16 ecosystems. Corresponding figures are color-coded to indicate whether ecosystem conservation goals are high, medium or low priority. A reader can quickly scan for red-colored boxes to see which habitat types are most in need of conservation or restoration in South Dakota.

This section also addresses conservation goals and actions for species of greatest conservation need, along with cautions associated with these preliminary conservation goals. As described throughout the Plan, South Dakota's ecosystem approach will accommodate the needs of the majority of wildlife species if conservation acreage goals are met. A critical habitat-based conservation action found throughout this section is the development of cooperative programs involving agencies, landowners and organizations to meet habitat conservation goals. Such programs may include incentives or other approaches to encourage participation and cooperation. Species accounts within this section list the ecoregions that each species will benefit from and the associated conservation acreage goals. The listed acreage goals are ecosystem goals, and they are not exclusive to one species. Two species with similar habitat needs within ecoregions are likely to have similar acreage goals listed in the habitat portion of the species account. Each account also lists nonhabitat actions and research priorities.

SECTION 7.0 - AGENCY COORDINATION, COOPERATOR INTERACTIONS, AND PUBLIC INVOLVEMENT IN PLAN AND ACTIONS

This section describes methods used to share information and gain input during all phases of the Plan's preparation. Five groups were used for different purposes; a Science Team, various technical experts, Outreach Team, Advisory Team and SDGFP staff. Comments were sought using an interactive website, town hall meetings and a 30-day public comment period on a draft version of the Plan. Appendix H includes names and affiliations of Advisory Team members; meeting summaries from town hall meetings; a list of frequently-asked questions and answers; press releases; summaries of coordination meetings with agencies; universities and tribes and a listing of all comments received during the public comment period and respective responses from the Plan's preparers. The section also lists methods of gaining input from agencies, tribes and the public during Plan revision.

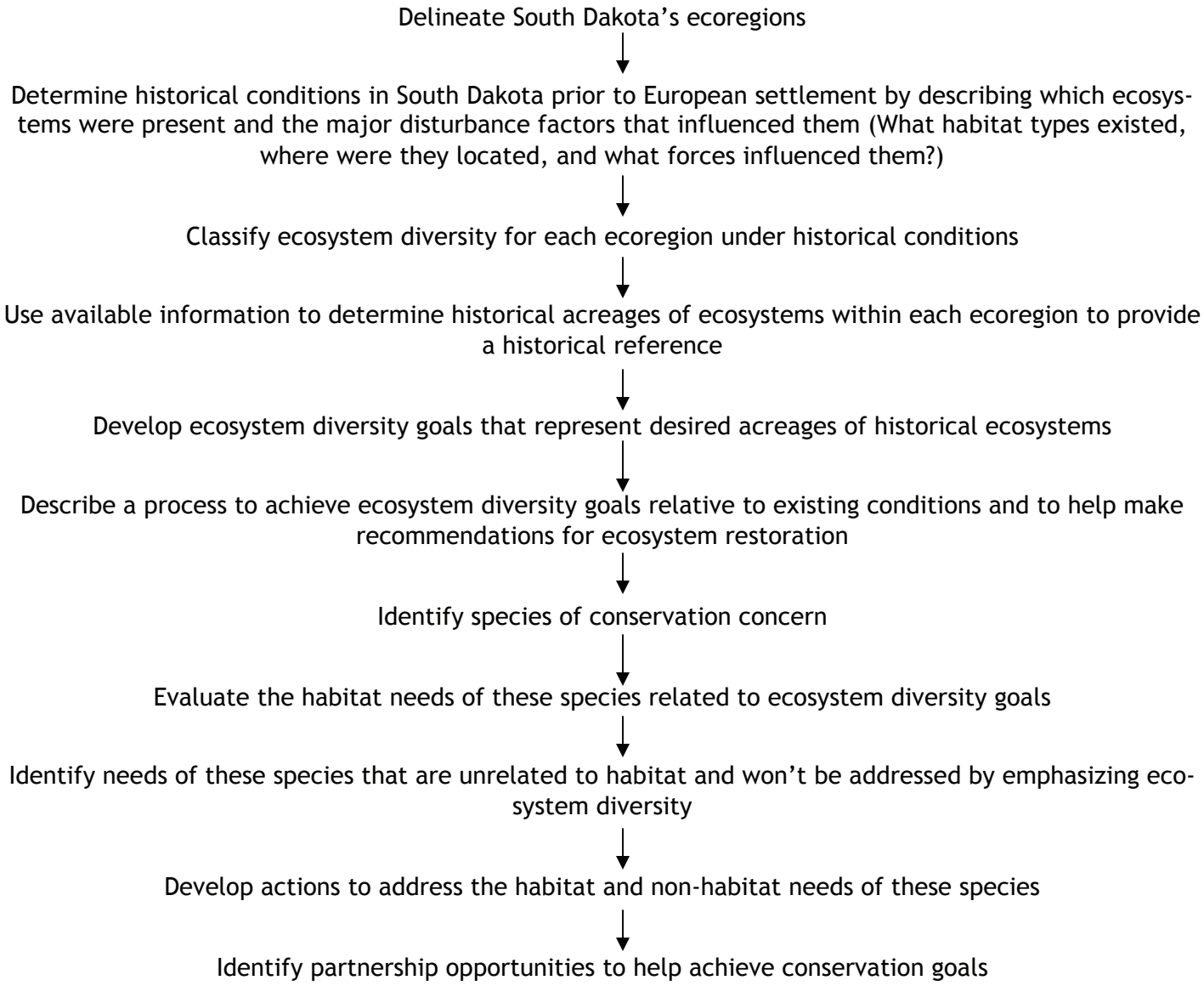
SECTION 8.0 - MONITORING OF CWCP AND ADAPTIVE MANAGEMENT

This section begins with an explanation of the distinction between monitoring and inventory. Since South Dakota's Plan uses an ecosystem diversity approach to planning, monitoring should follow suit by examining progress in meeting ecosystem representation goals at the ecoregion and ecosystem levels. Basic questions must be addressed: What is the appropriate representation goal (acreage) for an ecosystem? Is 10% of historical acreage sufficient? What is the current acreage of these various ecosystems, and is it sufficient to meet our representation goals? Are there public lands that can help meet representation goals? At the ecosystem level, what represents a suitable area such that it counts toward the representation goal? For example, how much of a site can be composed of exotic invasive grasses and still function as needed by the associated wildlife species? Some examples of current monitoring or inventory programs with relevance to South Dakota's species list are presented along with ideas for future projects that may address monitoring needs. An adaptive management approach will be used for monitoring ecosystem diversity and species diversity.

SECTION 9.0 - REVIEW SCHEDULE

The Plan will be revised at 5-year intervals. Biennial progress reports will be prepared and made available to encourage continued coordination among partners. State Wildlife Grants projects must now be tied to the Plan, and results of completed projects will be included in the biennial progress assessment.

The Planning Steps



What's Next?

South Dakota's Wildlife Action Plan is a beginning, not an end. The Plan presents a framework that we hope will be considered by other agencies and entities devoted to South Dakota's natural landscapes and wildlife. SDGFP continues to make the best use possible of the annually appropriated State Wildlife Grants funding to benefit rare species and to address species and plant community information needs identified in the Plan. SDGFP will continue working with the Association of Fish and Wildlife Agencies and others who are committed to finding the funding needed to fulfill the mission of accommodating all wildlife species and the habitats they need.

"This Plan is a voluntary guidance document with an emphasis on conserving biological diversity in South Dakota through partnerships and cooperation…To be successful in avoiding future endangered species conflicts and jeopardizing unique habitats, we must engage private landowners, tribes, environmental and agricultural organizations, government entities ranging from local to federal agencies, as well as the more than 90% of our citizens who believe in the importance of wildlife to our quality of life and to our economy."

John Cooper, SDGFP Secretary and President of the Association of Fish and Wildlife Agencies

"The South Dakota Action Plan will benefit the health of people and wildlife by conserving wildlife and natural places through the protection of clean water and air."

Chuck Schlueter, SDGFP Wildlife Division Communications Manager

"This plan will help us conserve our fish and wildlife species that are most apt to lose their critical habitats by identifying those areas that most need to be protected."

Will Sayler, SDGFP Hatchery Manager

"Identifying and conserving critical habitat types (wetlands, streams and rivers) where up to 90% of our fish and wildlife species are found will assist with better informed management decisions. By having the best information on our Wildlife Division lands we can set the example for other agencies and also be able to justify our management approach on these units to our publics."

Dennie Mann, SDGFP Regional Land Manager

"Inventory efforts of grassland habitat will allow us to concentrate retention and restoration efforts that will benefit game and nongame species alike."

Tom Kirschenmann, SDGFP Senior Wildlife Biologist

"Work on watershed scale projects will greatly enhance and will ultimately renovate and restore fisheries resources."

Dennis Unkenholz, SDGFP Fisheries Program Manager

Doug Backlund

"As I watched the flying birds and insects, I thought what a grand thing it would be if only the sky trails of volant beings would last for a time like prints in the dew or tracks in new fallen snow. Physicists have their cloud chambers wherein atoms and their neutrons and protons register their paths in lines of light. How nice, like vapor sky-writing, if birds could leave at least transitory trails behind them. Think of the sun rising after a night at the height of migration, and what an awe-inspiring sight the sky would present, with its thousands upon thousands of avian trails."

William Beebe, author and naturalist