University of California, Santa Barbara
Donald Bren School of Environmental Science and Management

A Distributed Graduate Seminar to Analyze the Priorities, Obstacles, and Opportunities that Exist for the Implementation of State Wildlife Action Plans

A Group Project submitted in partial satisfaction of the requirements for the degree of Master of Environmental Science and Management at the Donald Bren School of Environmental Science and Management

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As authors of this Group Project report, we are proud to archive it on the Bren School's website such that the results of our research are available for all to read. Our signatures on the document signify our joint responsibility to fulfill the archiving standards set by the Donald Bren School of Environmental Science and Management.

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The mission of the Donald Bren School of Environmental Science and Management is to produce professionals with unrivaled training in environmental science and management who will devote their unique skills to the diagnosis, assessment, mitigation, prevention, and remedy of the environmental problems of today and the future. A guiding principal of the school is that the analysis of environmental problems requires quantitative training in more than one discipline and an awareness of the physical, biological, social, political, and economic consequences that arise from scientific or technological decisions.

The Group Project is required of all students in the Master of Environmental Science and Management (MESM) program. It is a four-quarter activity in which small groups of students conduct focused, interdisciplinary research on the scientific, management, and policy dimensions of a specific environmental issue. This Final Group Project Report is authored by MESM students and has been reviewed and approved by:

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Abstract

This project is part of a distributed graduate seminar (DGS) funded by the National Council for Science and the Environment's Wildlife Habitat Policy Research Program. The aim was to analyze State Wildlife Action Plans (SWAPs) with the following overarching question: How do conservation science, social, and institutional processes come together to set state and regional conservation priorities and the design and implementation of conservation solutions across the U.S.? Following characterization of the SWAPs in a pilot study, students from eight universities participated in the DGS and synthesized implementation of the SWAPs based on interviews with state agency plan coordinators and stakeholders. The DGS summarized challenges and opportunities in implementation of SWAPs and recommended ways to improve planning and implementation processes. Students from UCSB also analyzed SWAPs to compare states in terms of their emphasis on wildlife movement corridor conservation. The plans varied considerably in the level of attention to wildlife movement corridors. Thus far the plans have had little influence on corridor conservation planning or implementation in the western U.S.

A Note on DGS Products

The Wildlife Group Project consisted of participation in a Distributed Graduate Seminar (DGS) and a preceding pilot study, spanning from May 2007 to February 2008. A portion of the work done in the DGS by the Wildlife Group Project members is represented in this Final Report, but it does not fully capture the breadth of products to be authored by DGS participants. These products, which include scientific articles, white papers, and memos, are in the production stage at this time (March 2008).

This report includes six State Wildlife Action Plan synthesis reports that we produced for the DGS as well as a study on the influence of State Wildlife Action Plans on wildlife movement corridor projects in the country. Any additional documents authored by Wildlife Group Project members and produced after this Final Report will be placed online at http://fiesta.bren.ucsb.edu/~wildlife/ as they are made available.

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Executive Summary

This project was funded by the National Council for Science and the Environment's (NCSE) Wildlife Habitat Policy Research Program (WHRP) and the Gap Analysis Program (GAP). State Wildlife Action Plans (SWAPs) from 56 states and territories were analyzed and synthesized to identify national and regional conservation priorities, examine differences among states in plan development and implementation, and highlight implementation opportunities and obstacles.

Overarching Question:

How do conservation science, social, and institutional processes come together to set state and regional conservation priorities and the design and implementation of conservation solutions across the U.S.?

SWAPs were a progeny of the State Wildlife Grants (SWG) program. The SWG program was created in 2000 and provides federal money to every state and territory for cost-effective conservation aimed at preventing wildlife from becoming endangered. In order to continue to receive SWG funding, each state was required to submit a SWAP by October 2005.

The SWAP process represents the first attempt to gain an assessment of conservation needs and priorities across the nation and to shift the power of conservation planning from the federal level to the state. The SWAPs outline the steps needed to conserve wildlife and their habitats. While they shared a common framework, each state tailored its SWAP to its unique conservation needs.

In the spring of 2007, a pilot study was conducted at three universities. Standard characterization forms designed by project advisors and seminar participants were completed by students for each SWAP. The goal of the characterization process was to compare states in order to understand the potential trends among identified conservation needs and priorities. Scientific information sources, ecological context, institutional settings, and social concerns were recorded for each SWAP.

Quality control of characterizations was performed by comparing forms completed independently by two different students. Results revealed low consistency in answers to a number of questions about the SWAPs. This is due in part to semantic uncertainty in the characterization forms and in part to the ambiguity or complexity of the SWAPs themselves. Some states prepared a user's guide to help readers navigate through the documents, but these guides varied widely and could not be used to mitigate consistency issues.

Eight universities participated in a Distributed Graduate Seminar (DGS) in Fall 2007, following the pilot study. Participants included: Duke University, Indiana University, Northern Arizona University, Texas A&M University-Kingsville, University

of Alaska at Fairbanks, University of Idaho, University of Michigan, and University of California at Santa Barbara (UCSB).

The goal of the DGS was to gain a synoptic view of implementation of the SWAPs by interviewing state agency plan coordinators and conservation partners. The interviews focused on conservation efforts across the U.S. since the development of SWAPs. Questions related to conservation opportunities, impediments, new tools and approaches, and examples of noteworthy conservation projects. Interview information was compiled and written in the form of a synthesis report for each state. The synthesis reports completed by the UCSB group project are included in this Final Report.

After the conclusion of the distributed graduate seminar, a synthesis meeting was hosted by UCSB in January 2008. The meeting focused on impacts, challenges, and enabling mechanisms related to the SWAPs. Seminar participants concluded that the SWAPs have had tangible impacts on wildlife agencies and other organizations, leading to changes in approaches to biodiversity and threat assessment, prioritization, policies, funding, evaluation, education, and outreach. In some areas, the process has stimulated interstate coordination: For example, the Northeastern states have developed a Regional Conservation Needs Program. Landowner incentive programs have surfaced in a number of states as one method to help secure conservation funding. Additionally, a wide variety of stakeholder participation and engagement was identified, with important partners including The Nature Conservancy (TNC), The Audubon Society, the Bureau of Land Management (BLM), and the Department of Transportation (DOT). Parties that were less active in the process included private landowners and local planning groups.

Challenges to implementation that were identified for many states include limited funding and staffing, limited outreach and stakeholder engagement in planning and implementation, political differences between agencies and organizations, absence of habitat or species prioritization, and inadequate linking of conservation needs and priorities with specific conservation or management actions. Seminar participants suggested various actions to address some of these challenges, strengthening the planning process and accelerating SWAP implementation. Some of these suggestions include: prioritizing habitats and species, shifting conservation approaches to appropriate management scales, building agency capacity via training wildlife coordinators in grant writing, monitoring and participatory planning, enhancing evaluation and outreach, and linking conservation actions to funding. Recommendations from the seminar also include standardizing terminology and providing guidance for future planning iterations. (SWAP updates are required every 10 years.)

Deliverables resulting from this DGS are expected to include a website to host synthesis reports, a scientific journal article regarding a synthesis of findings, recommendations to the Doris Duke Charitable Foundation and SWAP advisors, white papers, peer-reviewed publications for a variety of traditional and non-traditional audiences, and a final report for NCSE/WHPRP.

As a subsection of the DGS, UCSB analyzed SWAPs on a national and regional scale with the goal of gaining insight on the degree to which wildlife movement corridors were emphasized. Additional interviews were done to determine how these documents

have influenced corridor conservation. The study, titled "An Analysis of State Wildlife Action Plan Influences on Wildlife Movement Corridor Projects," is included in this Final Report.

UCSB decided to pursue this topic because of the potential for wildlife movement corridors to diminish the threats of habitat loss and fragmentation to biodiversity conservation. Additionally, habitat loss was noted as a major threat throughout many SWAPs. The conservation of wildlife movement corridors could also mitigate possible impacts of future development and climate change on biodiversity.

Research Questions:

1: To what degree do State Wildlife Action Plans address wildlife movement corridors throughout the U.S.?

2: Have State Wildlife Action Plans influenced conservation efforts addressing wildlife movement corridors in the western U.S. (CA, OR, WA, ID, NV)?

Wildlife movement corridors are defined in our study as geographic areas that may vary in scale within or between states and allow for the natural movement of wide-ranging terrestrial mammals, including game species. The analysis of each SWAP involved a word search in combination with a qualitative assessment of the emphasis placed on wildlife movement corridors. As a result, states were classified into high, medium, and low categories of corridor emphasis. Of the 50 states analyzed in this study, 13 were classified as high, 21 as medium, and 16 as low.

Nationally, emphasis on corridor conservation within SWAPs varies tremendously. Based solely on the documents, an accurate interpretation of the reasoning behind the degree to which SWAPs address wildlife movement corridors has proven to be beyond the scope of this study. However, in-depth analysis and interviews in western states helped provide reasoning for such variability.

Interviews with conservation professionals were conducted in each of the five western states. This analysis revealed that SWAP influence on implementation of wildlife movement corridors varied significantly. Among the western states, only Oregon's SWAP has directly influenced conservation efforts thus far, as illustrated in the development of their "Wildlife Movement Strategy." Throughout the region, planning and implementation is in the beginning stages and much still needs to be done to address identification and protection of wildlife movement corridors. Interviewees in all five states agreed, however, that planning for wildlife movement corridors is important but not always feasible due to political issues and limited agency capacity. Recommendations for effective corridor conservation include increasing collaboration between agencies, effective prioritization of conservation actions, and reliable organizational resources.

A common theme that emerged across a number of states was the important role of collaboration in the development and implementation of state wildlife conservation

strategies. This is not unexpected given limited resources available to the states and their reliance on partners for matching funding and project implementation. Other issues include limited organizational capacity, insufficient biological survey and monitoring data, and limited engagement with local governments and private landowners.

This study was intended to contribute to increasing awareness and understanding of the SWAPs, to describe national and regional conservation trends, and to help educate state agencies and policy makers about the status of wildlife conservation in the United States. While many SWAPs have not yet been implemented there, is ample evidence that the documents are helping inform conservation decisions and partnerships within and across local to national scales. Future in-depth regional and state studies can help reveal the emerging role of state agencies and the SWAPs in wildlife conservation, as well as suggest recommendations for the next planning cycle.

Production of SWAPs has certainly elevated the role of the states in non-game wildlife conservation. Federal resource agencies, notably the Fish and Wildlife Service and Bureau of Land Management, are now reviewing their management and restoration priorities to align with the SWAPs. Several congressional bills are under consideration that would significantly increase funding for implementing the action plans as a means of mitigating climate change impacts. Overall, the SWAP planning process is having a tangible and positive influence on conservation planning for native biodiversity in the U.S.

State Synthesis Reports

State synthesis reports were written by the Distributed Graduate Seminar participants for each of the 56 State Wildlife Action Plans. Six of these reports were completed between the five students in this Group Project. In addition to their inclusion in this Final Report, these documents will be published online with synthesis reports from other seminar participants (http://fiesta.bren.ucsb.edu/~wildlife/).

The reports included here synthesize information for the State Wildlife Action Plans of:

- California
- Delaware
- District of Columbia
- Maryland
- Virginia
- Washington

National Council for Science and the Environment
Improving the scientific basis for environmental decisionmaking

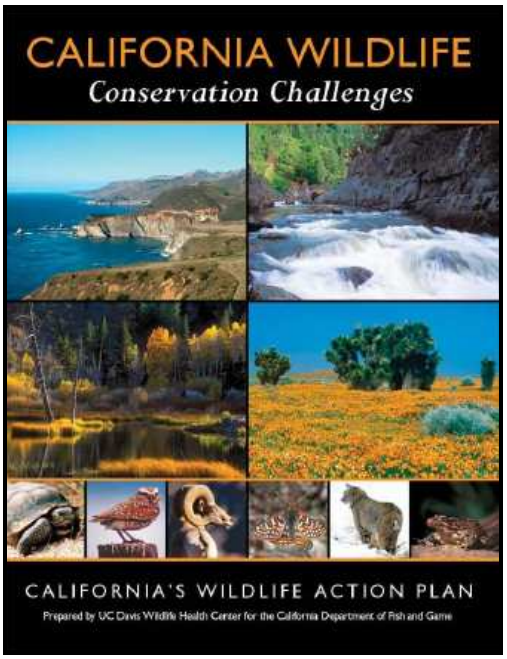
DONALD BREN SCHOOL OF ENVIRONMENTAL SCIENCE & MANAGEMENT
UNIVERSITY OF CALIFORNIA, SANTA BARBARA

California's Comprehensive Wildlife Conservation Strategy: From Planning to Implementation

Evan Lue, Donald Bren School of Environmental Science and Management

OVERVIEW

As part of a distributed graduate seminar funded by the National Council for Science and the Environment's (NCSE) Wildlife Habitat Policy Research Program, eight universities conducted research on development and implementation of Comprehensive Wildlife Conservation Strategies in all 50 states and six territories. The goal is to gain a synoptic view of state activities related to wildlife habitat conservation in the U.S. and territories. Our overarching question is: "how do conservation science, social, and institutional processes come together to set state and regional conservation priorities and the design and implementation of conservation solutions across the U.S.?"



California Wildlife: Conservation Challenges (hereafter "the Plan") was prepared by the UC Davis Wildlife Health Center for the California Department of Fish and Game (DFG). Submitted in 2005 and approved in September 2006, the Plan is intended to guide conservation efforts and funding in California. It is an extensive compilation of information about wildlife management in the state, and takes a bioregional and ecosystem-based approach.

The Plan describes conservation threats and recommends actions statewide and for nine physiographically and politically defined bioregions. Recommendations at the state scale are mainly strategic, such as the development of policies to facilitate integration of conservation considerations into local planning. Regional recommendations include more detailed tactics, often identifying agencies and funding sources for specific conservation actions.

At this time, no significant changes to the Plan have occurred. It is hard to gauge the impact of the Plan because of the high level of conservation activity already underway or in the planning stage across the state. However, State Wildlife Grants (SWG) have funded some on-going conservation efforts that are aligned with the Plan's suggested conservation actions. For example, SWG funds have recently been used to create a report on Bird Species of Special Concern, updating information

on avian Species of Greatest Conservation Need (SGCN) for the purpose of conservation and management. Similar reports for other taxonomic groups are currently underway. Additionally, steps are currently being taken by DFG and several non-governmental organizations (NGOs) to prepare an implementation plan.

THE CHANGING ROLE OF THE STATE IN WILDLIFE CONSERVATION

Several statewide and numerous resource-specific and regional conservation assessments have been produced for California but this is the most comprehensive plan for non-game species ever produced for the DFG. Legislative staff and people in the policy arena who have an influence on DFG funding now have a more synoptic picture of conservation needs and priorities.

Given California's large number of federal- or state-listed threatened or endangered wildlife species (134 identified in the Plan), much conservation attention is already focused on non-game species. Multi-species habitat conservation plans and natural community conservation programs are underway in many counties. There is no indication that the Plan has changed species-level priorities, but the Plan may be drawing more attention to SGCN as a whole.

Among the many habitats of conservation concern, riparian habitats stand out as an urgent conservation priority in virtually every region of the state. Habitat loss, altered flow regimes, and water withdrawal impact a wide range of riparian habitat types and associated species. The Plan brings attention to these threats and is being used to muster additional state funds for riparian protection and restoration.

Riparian areas are high priority habitats for conservation planning in California.
Photo by Steven Choy

The Plan has already helped increase funding for DFG's non-game wildlife programs. For example, in 2006, the state legislature provided a $10 million one-time General Fund allocation for SGCN.[1] The Plan's summary of conservation challenges helped make the funding need clear to legislators. The availability of matching SWG funds was also important.

COLLABORATIVE PROCESSES

DFG provided guidance and reviewed the Plan while the UC Davis Wildlife Health Center wrote the Plan, managed scoping meetings, conducted consultations with experts, and ran workshops. Several NGOs noted that in the initial stages of Plan development, the effort received little support from leaders at DFG. The lack of support was based on the relatively small funds available through the SWG compared to other sources such as state bond funds. Additionally, DFG did not want to commit to an implementation plan. The current leadership at DFG is more supportive of the Plan and its implementation.

Experts were consulted by region to collect information on wildlife, threats, and actions, creating a forum for collaboration and providing region-specific information from a wide variety of organizations. A key player in Plan development commented that the experts were all in agreement on the major stressors threatening wildlife.

Defenders of Wildlife, which provided data for SGCN and played a significant role in Plan preparation, continues to be a major collaborator in California and neighboring states.

INFLUENCE OF THE PLAN ON OTHER ORGANIZATIONS

According to non-agency collaborators contacted in this study, the Plan has not influenced planning, priorities, or actions within their organizations, partly because the Plan was already influenced by and aligned with those organizations. Another collaborator has suggested that it is too soon for organizations to have incorporated the Plan into their activities.

At this time, no SWG funds are being distributed to non-agency collaborators for conservation projects, and it is difficult to attribute the use of SWG funds to specific projects. However, the effort to update information on SGCN uses SWG funds and is a collaborative effort between DFG and several non-agency organizations.

One collaborator suggested that a recent state agency Request For Proposal for private landowners to do riparian habitat restoration uses SWG funds to hire outside organizations as contractors. Another collaborator mentioned that the Plan is being considered by Caltrans in designing transportation corridors.

The Plan's visibility and influence is still growing. For example, the California Biodiversity Council, an entity consisting of resource management and environmental protection organization officials who meet to discuss strategies and policies for conserving biodiversity, just recently devoted its January 2008 meeting to the State Wildlife Action Plan. This meeting helped bring the Plan to the attention of many agencies at federal, state, and local levels.

KEY CHALLENGES TO PLAN IMPLEMENTATION

The issue of funding has been cited as a major challenge by DFG and non-agency collaborators alike. On average, SWG funds are approximately $3 million per year, less than 1% of the total DFG budget (see table).

A non-agency collaborator suggests that the increased budget seen in 2006-2007 is in part attributable to one-time bond funding, and not the ongoing General Fund. This increase does not suggest increased funding for Plan implementation, nor should similar funding be expected in the future.

Until further funding is secured and staffing is increased, DFG will not have the resources necessary to carry out many of the tasks required to implement the Plan. DFG is currently identifying personnel and operating needs for Plan implementation and is exploring mechanisms to fund these needs.

One non-agency collaborator identified lack of public awareness as a major challenge impeding efforts to work with private landowners and to garner political support for conservation efforts.

Another challenge is the lack of adequate prioritization. The Plan for

California does not map priority conservation areas. Given the large number of species and habitats at risk, some additional prioritization may be needed to focus fundraising and outreach efforts.

Fiscal Year	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
DFG Budget (nearest $100,000)[2]	$271,300,000	$273,900,000	$362,200,000	$373,300,000	$509,700,000
SWG Funds[3]	$2,883,633	$3,060,095	$3,104,430	$2,977,785	$3,037,742
SWG Funds as a percent of DFG Budget	1.06%	1.12%	0.86%	0.80%	0.60%

EXAMPLES OF INNOVATIVE OR SUCCESSFUL IMPLEMENTATION

DFG considers several recently completed projects to be examples of successful implementation. These include:

- **Species of Special Concern reports**

Though the Bird Species of Special Concern report (http://www.prbo.org/cms/252) pre-dates and did not utilize SWG funds, DFG lists it as an example of the type of effort that the funds will be used toward. Similar reports are currently being initiated with the funds for mammals, reptiles/amphibians, and non-game fish.

- **Multiple Species Habitat Conservation Plan (MSHCP) for western Riverside County**

http://www.rcip.org/conservation.htm

Representative of Natural Community Conservation Planning in California, this sub-regional habitat conservation and monitoring plan is being implemented for 146 plant and animal species based on adaptive ecosystem-based management.[4]

- **The Greater Sage-Grouse Conservation Plan for Nevada and Eastern California**

Multi-state conservation strategies were completed in June 2004 for this flagship species of the American West's sagebrush habitats. This work aids in the restoration of the greater sage-grouse and its habitat, which will benefit species such as the sage sparrow, sage thrasher, the Brewer's sparrow, the pygmy rabbit, and the pronghorn antelope.[4] SWG funds will also be used to complete strategies for the burrowing owl, the western pond turtle, bats, the fisher, and other priority species.

State Wildlife Grants were used to help fund a study of the greater sage-grouse.
Photo by Paul Ippolito

- **Implementation of the Conservation Plan for the Tricolored Blackbird**

http://www.suscon.org/download/TricolorConservationPlanandMOA.pdf

The Conservation Plan for the Tricolored Blackbird was completed in September 2007 without the use of SWG funds, but these funds will be used in the implementation of the conservation plan.

SUGGESTIONS FOR THE NEXT PLANNING CYCLE

DFG expects to appoint an implementation team and finalize a strategy for priority implementation themes and areas by Spring 2008. Implementation of this strategy is expected to commence later in the year. No specific recommendations regarding implementation can be made until this strategy is put into effect.

General recommendations can be made based on the first planning cycle. There appears to be a need to increase collaboration and build greater support among interest groups, particularly private landowners.

While the Plan was written at the state level, it identifies conservation actions needed at the local level. Increased engagement with local and county governments - who often lack capacity for science-based conservation planning – could improve prospects for successful priority setting and implementation.

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National Council for Science and the Environment
Improving the scientific basis for environmental decisionmaking

DONALD BREN SCHOOL OF ENVIRONMENTAL SCIENCE & MANAGEMENT
UNIVERSITY OF CALIFORNIA, SANTA BARBARA

Delaware's Comprehensive Wildlife Conservation Strategy: From Planning to Implementation

Michela Adrian, Donald Bren School of Environmental Science and Management

OVERVIEW

As part of a distributed graduate seminar funded by the National Council for Science and the Environment's (NCSE) Wildlife Habitat Policy Research Program, eight universities conducted research on development and implementation of CWCS in all 50 states and six territories. The goal is to gain a synoptic view of state activities related to wildlife habitat conservation in the U.S. and territories. Our overarching question is: "how do conservation science, social, and institutional processes come together to set state and regional conservation priorities and the design and implementation of conservation solutions across the U.S.?"

The primary goal of the Delaware Wildlife Action Plan (DE WAP or "the plan") is to "keep species common, and to prevent species from being listed as endangered" (DE WAP, 2007). The plan outlines 11 main goals in defining the scope and trajectory of conservation in the state.

The plan identifies two tiers of Species of Greatest Conservation Need (SGCN) and Habitats of Conservation Concern (pg 4-3). Key habitats are identified based upon SGCN occurrences, habitats of conservation concern, forest blocks and wetland blocks of habitat. The plan is far reaching in scope and addresses key actions and issues developed from well reviewed previous conservation plans. The plan is strategic in the way it directly links issues and actions and in some cases, assigns actions to specific organizations (see chapter 6). For example, one issue is fragmentation of key habitats by wind farms. The action for this issue is to "work with energy companies to develop standards for the location of wind farms to minimize loss and fragmentation of key habitats" (pg 6-11). This level of specificity is a start, however in order to become more tactical, the state feels that specific actions need to be better defined. That is why they are engaged in a process to create a specific implementation matrix that can define who will be responsible for what and when.

The Wildlife Action Plan for Delaware is in the process of transitioning from planning to implementation. Although the implementation progress has been "slow" thus far, several successful projects have been put on the ground. Overall, Delaware's Wildlife Action Plan is regarded with satisfaction and excitement by conservationists within the state. While there have been some road bumps along the way, the Wildlife Action Plan planning and implementation process serves as a catalyst for change in some organizations and is continuing to strengthen conservation across the state.

The Fin Whale is a Tier 1 SGCN for Delaware.
http://www.cleverwomen.de/weblog/uploads/20061025-FinWhale-Lori.jpg

THE CHANGING ROLE OF THE STATE IN WILDLIFE CONSERVATION

Delaware has a plethora of local conservation plans and reserves (see chapter 2) but has never before synthesized statewide conservation needs in one document. The Wildlife Action Plan articulates widely held conservation goals, targets habitats and species of greatest conservation need, and identifies key issues and actions. Because of the collaborative planning process, the Delaware Department of Natural Resources and Environmental Control Divisions of Fish and Wildlife is now more engaged with conservation partners at state, regional and federal levels. As a result some conservation groups are now revising and refining their priority species and habitats to more closely align with the state WAP. Some organizations, such as the Prime Hook National Wildlife Refuge, are rewriting their comprehensive conservation plans to dovetail with the WAP priorities. Thus the prioritization set out by the Plan is and will be very influential to conservation across the state.

Delaware's has traditionally focused on game species for conservation. Due in part to the plan's identification of species of greatest conservation need, non-game amphibians, birds, plants and other species are receiving increased attention. Examples include funding for an eagle watch manager and funding for several projects protecting birds and small mammals.

Delmarva Fox Squirrel, a Tier 1 SGCN in Delaware.
http://www.refugenet.org/critter/squirrel.html

As a result of the WAP, several organizations have come forth with matching funds for SWG funding such as The Nature Conservancy, Delmarva Ornithological Society and others. Funding from these new sources is on the order of tens of thousands of dollars. A streamlined "request for proposals" procedure will help to increase funding for the implementation of WAP actions and accelerate the rate at which conservation can be achieved.

COLLABORATIVE PROCESSES

The state agency relied on a collaborative process to determine SGCN, key habitats, issues and actions. Working groups and websites were developed to gather stakeholder input. Existing partnerships were strengthened by the planning process. Planning might have been even more successful if private landowners, who were invited to planning meetings and events, had participated more fully. Instead, the state has been challenged with a class action lawsuit over State Resource Area (SRA) maps. Private landowners are concerned that the market value of a parcel is reduced once identified as an SRA (although the SRA system has been operating since 1990).

Collaboration in the implementation process is limited pending the production of the implementation matrix and a formal application process for project funds. The significance attached to this matrix and SWG funds shows the

increasing role of the state in the conservation of species and habitats.

From a non agency perspective, the planning process demonstrated an unprecedented example of collaboration within the conservation community. Described as "great fun" by some stakeholders, the process allowed many different groups from different scales of conservation to come together and discuss the most important non game species and important habitats in the state. The planning process also helped strengthen some non-agency relationships.

Collaboration is not as important during local, site-specific implementation of the plan. Multi-organizational collaboration is however, influencing design and implementation of regional conservation efforts to maintain habitat extent and connectivity for some species. For example several organizations and land owners are coordinating to protect habitat extent and connectivity for the endangered Delmarva fox squirrel. Cross-scale coupling of local actions to landscape and regional habitat conservation planning is the most exciting outcome of the collaborative planning process.

INFLUENCE OF THE PLAN ON OTHER ORGANIZATIONS

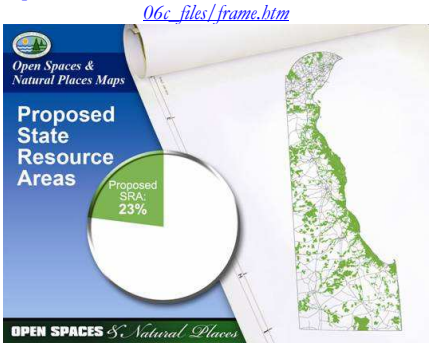
Including new groups in conservation has helped open up new opportunities for preserving non game wildlife in Delaware. Several organizations that prior to SWG funding were purely for recreation or natural history are now more involved in conservation projects within the state. For example using SWG funds and the DE WAP, the Delmarva Ornithological Society has been able to update their Breeding Bird Atlas and focus on new on-the-ground conservation efforts.

Currently the state spends about 90% of its annual SWG allotment of ~ $500,000. Once an implementation matrix is developed, a Request for Proposals process will be instituted to disperse more funds to non agency groups.

KEY CHALLENGES TO PLAN IMPLEMENTATION

Both agency and non-agency interviewees identified collaboration with private land owners, and lack of adequate funding and staffing as key challenges to the implementation of Delaware's Wildlife Action Plan.

Delaware's SRA Map
http://www.dnrec.state.de.us/sra/SRAPresentation-4-21-06c_files/frame.htm



The SRA maps are used in the DE WAP to delineate key habitats for conservation. The maps were created in 1990 and updated in 2006 as part of the WAP planning process. Although the mapping process was fully transparent, local groups and private land owners did not participate much in the planning process. Thus once the maps were released, some private landowners were unprepared for the impact the SRA maps might have on land value and were ill informed as to the purpose of the maps. This issue is in court as of December, 2007.

Funding and staffing are key challenges to the implementation process, mostly at the state level. Currently many state organizations have to cut back staff

and funds which means less effort toward implementation of DE WAP actions. Some agency groups will try to make up this deficit by forming bonds with NGOS and private landowners.

According to the state, the biggest barrier to implementation today is translating Plan priority actions into actual projects. The state is developing an implementation matrix and database to speed up the process. Stakeholders will be given an opportunity to review the document and process once it is completed.

EXAMPLES OF INNOVATIVE OR SUCCESSFUL IMPLEMENTATION

Blackbird-Millington Corridor Conservation Area Plan: The Blackbird Millington Corridor conservation plan was originally developed in 2004 through a collaborative process between Maryland and Delaware involving more than 60 experts, 30 organizations and 150 citizens, The Nature Conservancy and Delaware Division of Fish and Wildlife. This 52,000 acre area encompasses a mosaic of forests, farmland and wetlands supporting many plant and animal species of concern. Private landowners here have traditionally been exemplars of land stewardship. There are also two big preserves within the corridor: the Blackbird forest in Delaware and the Millington management Area in Maryland. The main goals of the corridor are to preserve local community's conservation values, to educate the public about the importance of the land to conservation, to reconcile the vary viewpoints of private land owners and scientists of what the land is valuable for and to identify resources, programs and tools to assist protection efforts of the corridor (Blackbird-Millington Plan, 2004). To achieve these goals the plan sets out to protect, restore and manage (via a landowner incentive program) the landscape, to provide alternatives to plans that are deleterious to the corridor and to learn more about the natural processes there.

State Resource Areas (SRA) maps: State Resource Area maps were originally created in 1990 by the state. As part of the Delaware Wildlife Action planning process the maps were updated in 2006 (DNREC, 2006). The maps delineate open spaces that are of important "natural, cultural or geological significance". Maps are required in each county's conservation comprehensive land use plans and thus are useful for community planning and county land use decisions. The SRA interactive maps are available online and allow anyone to zoom to the parcel level to view identified important habitats and areas. The maps allow landowners to see where important habitats are on their land and allow potential buyers to identify areas for conservation. The maps are part of the statewide effort to control growth and promote preservation.

The Northeast Regional Conservation Need Program: Developed by Association of Fish and Wildlife Agencies in the northeast region, the program provides a mechanism for obtaining State Wildlife Grant funding for regional, transboundary projects by pooling 4% of each state's annual SWG funds. NGOS, non profits, academia and state and federal agencies can apply for these grants. Each grant must be matched by non-federal monies.

http://www.fw.delaware.gov/shorebirds/aboutshorebirds.htm
Delaware Shorebirds migration path each year.

Delaware Shorebird Program: The program was adopted by the state agency in 2005 and is partially funded by State Wildlife Grant funds. Many shorebird SGCN listed within the Delaware WAP are protected by the Delaware Shorebird Program. The goal of the program is to identify the resources needed by shorebirds that use the Delaware coast as a stopover on their way north or south and to reduce threats to those resources. The beaches, mudflats and marshes in Delaware serve as an important source of food and rest on the bird's long journey. The program involves monitoring, research and outreach and has successfully preserved important habitat for SGCN.

SUGGESTIONS FOR THE NEXT PLANNING CYCLE

As discussed above, lack of communication with private land owners has led to difficulties in implementing the plan and conflict over the SRA maps. In the next planning cycle, expanded media coverage, fliers, and communication with all sectors within the state might encourage those who are not satisfied with the plan to come to the table. Perhaps in addition to the website created for public input in the first round, public workshops and outreach will make the plan more accessible to everyone. In addition, perhaps a monitoring program of private land value in and outside of State Resource Areas could be useful.

The DE WAP may become more effective once species can be prioritized more definitively and mapped more fully. This will require continued and furthered monitoring of species and future projects delineating habitats. Specifically, the plan states that estuarine and marine species are in need of monitoring as are several SGCN that had little range data due to administrative constraints in the Natural Heritage program. Although the plan lists species in two tiers, currently they are not prioritized as such due to limitations in mapping SGCN. Thus resolving private landowner discrepancies and pushing forward with monitoring of species and habitats for conservation should be a priority for the next planning cycle.

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http://www.fw.delaware.gov/Info/VolunteerOpportunities.htm
Piping Plover, a Tier 1 SGCN, nesting in Delaware.

ACKNOWLEDGMENTS

We gratefully acknowledge the financial support for this project by the National Council for Science and the Environment—Wildlife Habitat Policy Research Program with funds from the Doris Duke Charitable Foundation and by the US Geological Survey Gap Analysis Program. We would also like to thank the Primehook Wildlife Refuge part of the National Wildlife Refuges Program, USFWS; the Delmarva Ornithological Society; and the Delaware Department of Natural Resources and Environmental Control Division of Fish and Wildlife.

District of Columbia's Comprehensive Wildlife Conservation Strategy: From Planning to Implementation

Jennifer Paludi, Donald Bren School of Environmental Science and Management

OVERVIEW

As part of a distributed graduate seminar funded by the National Council for Science and the Environment's (NCSE) Wildlife Habitat Policy Research Program, eight universities conducted research on development and implementation of CWCS in all 50 states and six territories. The goal is to gain a synoptic view of state activities related to wildlife habitat conservation in the U.S. and territories. Our overarching question is: "how do conservation science, social, and institutional processes come together to set state and regional conservation priorities and the design and implementation of conservation solutions across the U.S.?"

The Comprehensive Wildlife Conservation Strategy (CWCS, or "the Strategy") from the District of Columbia is the first document of its kind for the District Department of the Environment's Fisheries and Wildlife Division. The CWCS has resulted in significant new funding for wildlife conservation and has created new conservation opportunities, especially for non-game species.

The Strategy identifies species of greatest conservation need and priority habitats, with emphasis on conservation within the 69-square mile urban landscape. For species of greatest conservation need (148/782 species) the plan identifies key habitats, threats, conservation actions, and a monitoring plan.

Consultation with land managers and multiple public review meetings during plan preparation were important in identifying gaps in knowledge/data and developing partnerships.

THE CHANGING ROLE OF THE STATE IN WILDLIFE CONSERVATION

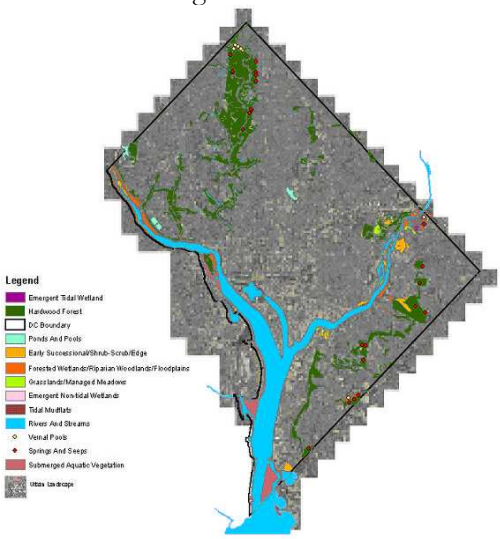
As a result of the State Wildlife Grants and Wildlife Action Planning process, DC has focused more attention on wildlife conservation in urban open space and at the urban-wildland interface.

Two new wildlife biologists have been added to the staff within the Department of the Environment, allowing for expanded species survey and monitoring.

Photo (above): Potomac River at Great Falls, near DC, www.epa.gov

COLLABORATIVE PROCESSES

The writing of the plan and analysis of data were largely in-house. However, much of the planning was accomplished through meetings with partners, who contributed advice and the bulk of the data. Key collaborators included: Defenders of Wildlife, the Nature Conservancy, US Fish and Wildlife Service, US Geologic Survey, the National Park Service (NPS), the National Arboretum, Association of Fish and Wildlife Agencies (AFWA), DC Audubon Society, Maryland Department of Natural Resources (MD-DNR), MD-DC Audubon Society, Virginia Department of Game and Inland Fisheries (VA-DGIF), MD-DC Teaming with Wildlife Coalition.



The Fish and Wildlife Service was instrumental in plan design and ensuring content contained information pertaining to the eight required elements. The USDA (via the National Arboretum) was involved in plan development within DC and the Delaware- Maryland- Virginia region.

A partnership with the National Park Service was strengthened through various implementation measures. DC was able to place its conservation efforts in a larger regional context through regional meetings, interactions with planners in neighboring states, and coordinated monitoring of invasive species.

Interest groups with high involvement included TNC, Defenders of Wildlife, Chapters of the Audubon Society, and the Anacostia Watershed Society.

There was less collaboration at the local scale. The general public was invited to meetings and solicited to provide comments on the plan, but participated minimally and provided little feedback.

Map (left): Priority habitat areas in DC, as seen in DC's Action Plan

INFLUENCE OF THE PLAN ON OTHER ORGANIZATIONS

Plan development sparked ongoing regional collaborations. For example, the Association of Fish and Wildlife Agencies hosted a Northeast Regional meeting that was attended by representatives from DC as well as thirteen northeast states.

The Anacostia Watershed Society is promoting the development of a management plan for the resident Canada Geese population, an action recommended by DC's CWCS. This society is also leading a broader coalition of organizations in developing a regional goose management plan.

The National Park Service and National Arboretum have both increased their roles during plan implementation.

Roughly, 90% of State Wildlife Grant funding is spent within the agency, while the remaining 10% is allocated to

outside organizations by the Fisheries and Wildlife Division. No additional funding has been procured yet for plan implementation.

KEY CHALLENGES TO PLAN IMPLEMENTATION

The Department of the Environment currently has little baseline data on species population status and trends, limiting their ability to develop an effective conservation plan.

The DC planning area is relatively small and most conservation issues extend beyond the agency's jurisdictional boundaries. Data collection needs to be standardized and information needs to be shared across jurisdictions in order to more effectively develop and implement conservation efforts.

Implementation has also been slowed by current staff vacancies within the Fisheries and Wildlife Division.

EXAMPLES OF INNOVATIVE OR SUCCESSFUL IMPLEMENTATION

American Shad Restoration

Approximately one million American Shad fry have been stocked in the Anacostia River, while the upper reaches of Rock Creek have added seventy-thousand Hickory Shad and three-hundred thousand Blue-black Herring fry. All of the re-stocked fish are SGCN listed within the Action Plan, and increasing their population is mentioned as a conservation action.

Stocking shad, a conservation action first obvious within the plan. (Photo: DC Fisheries and Wildlife)

Resident Canada Goose Management

Overgrazing by a growing resident goose population has degraded some wetlands in the Anacostia River basin. The Department of the Environment is collaborating with the National Park Service, Anacostia Watershed Society, USDA Wildlife Service, and the National Arboretum in monitoring and public outreach as they develop a management solution to the issue. The NPS is now producing an Environmental Impact Statement.

Amphibian and Reptile Surveys

Increased amphibian monitoring has become possible through additional conservation funding and staffing.

Photo: DC Fisheries and Wildlife

SUGGESTIONS FOR THE NEXT PLANNING CYCLE

Compilation of new information from DC & MD, such as SGCN lists, maps of priority habitats, exemplar practices, et cetera, will strengthen the next plan revision.

The Plan did not specifically address conservation and management of wildlife species that currently thrive or persist in urban environments. In the spirit of proactive conservation, monitoring and wise management of these species may prevent them from becoming "species of greatest conservation need" in the future. Conservation of urban wildlife is challenging but increasingly important as the U.S. urban population continues to grow. The District of Columbia is well positioned to be a leader in the area of urban wildlife conservation and restoration.

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Resident Canada Geese, well-accustomed to urban habitat. (Photo: DC Wildlife Action Plan)

National Council for Science and the Environment
Improving the scientific basis for environmental decisionmaking

DONALD BREN SCHOOL OF ENVIRONMENTAL SCIENCE & MANAGEMENT
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Maryland's Comprehensive Wildlife Conservation Strategy: From Planning to Implementation

Anne Middleton, Donald Bren School of Environmental Science and Management

OVERVIEW

As part of a distributed graduate seminar funded by the National Council for Science and the Environment's (NCSE) Wildlife Habitat Policy Research Program, eight universities conducted research on development and implementation of Comprehensive Wildlife Conservation Strategies in all 50 states and six territories. The goal is to gain a synoptic view of state activities related to wildlife habitat conservation in the U.S. and territories. Our overarching question is: "how do conservation science, social, and institutional processes come together to set state and regional conservation priorities and the design and implementation of conservation solutions across the U.S.?"

For its relatively small size, Maryland boasts a wide variety of landscapes and biodiversity. From the tidal marshes of Chesapeake Bay – the nation's largest estuary - to forested mountains, Maryland is often referred to as "America in miniature."

Maryland's State Wildlife Diversity Conservation Plan is organized by five physiographic provinces: 1. Lower Coastal Plan, 2. Upper Coastal Plan, 3. Piedmont, 4. Ridge and Valley, and 5. Allegheny Plateau (See Figure 1). Within those five regions, the Plan describes 35 key wildlife habitats in detail.

Statewide, 502 species of greatest conservation need were listed including 35% of all native mammal species, 34% of all birds, and 47% of all reptiles and amphibians. Twenty-nine of these species are federally listed as threatened or endangered. Each of the 35 identified Key Wildlife Habitats captures multiple Species of Greatest Conservation Need.

Implementation has focused on identifying and prioritizing conservation actions. The Maryland Wildlife and Heritage Service within the Department of Natural Resources (DNR) is constructing GIS layers to map areas of highest priority. Monitoring targets are being identified and monitoring systems are being revised. The Audubon Society will be contributing a bird layer that will highlight important bird areas.

Figure 1. Maryland's physiographic regions.

THE CHANGING ROLE OF THE STATE IN WILDLIFE CONSERVATION

Maryland has a tradition of wildlife conservation planning; for instance in the early 1980's the state drafted a comprehensive wildlife management plan focused primarily on game species. Nevertheless, the Maryland State Wildlife

Diversity Conservation Plan represents the first comprehensive statewide wildlife conservation plan.

The Northeast Endangered Species and Wildlife Diversity Technical Committee, comprised of 13 Northeast states plus Washington D.C., have met annually since 1986 to examine regional issues related to wildlife diversity. The wildlife action planning process has strengthened and expanded the level of coordination among the northeast states in biodiversity monitoring and conservation planning.

COLLABORATIVE PROCESSES

The Maryland Department of Natural resources Wildlife and Heritage Service was the principle author of Maryland's plan. TNC has collaborated on land protection/conservation projects with the DNR since the late 1970s and is playing a key role in helping the Wildlife and Heritage Service, and the DNR more generally, protect priority natural areas around the state.

A noteworthy outcome of the planning process in Maryland was the formation of the Wildlife Diversity Advisory Committee (WDAC). The committee is made up of stakeholders from other conservation groups including TNC and The Audubon Society. The role of the WDAC is multi-faceted and includes advising plan implementation, identifying priority planning actions, locating sources of additional funding, and reviewing and ranking all of the State Wildlife Grant proposals.

The Audubon Society is working with the DNR to integrate bird survey data with other biodiversity information. Maryland Audubon has also helped DNR in public outreach to county and local organizations. The help is needed, as DNR does not have the necessary staff for this effort; however, it may lead to an avian emphasis in conservation planning. The identified "important bird areas" are large, but not intended to cover all SGCN.

The DNR is simultaneously working on a Green Infrastructure Assessment that identifies undeveloped green areas in the state in order to connect lands that support a diversity of plant and animal populations.

INFLUENCE OF THE PLAN ON OTHER ORGANIZATIONS

The DNR is disseminating the plan internally to units such as Forestry and State Parks and other state agencies such as the Department of the Environment and the Department of Transportation, which were invited but participated minimally in plan preparation. Now that SGCN and key habitats have been identified, county and local outreach and coordinated land use planning will be essential to successful implementation.

The DNR spends 85-90% of State Wildlife Grant funds internally. The remaining funds are dispersed based upon informal grant applications and are targeted to fill needs in ways that promote collaboration and partnerships with other organizations such as Maryland Audubon, which now uses the plan to guide its grant-writing efforts.

KEY CHALLENGES TO PLAN IMPLEMENTATION

Staffing and funding are the two main challenges to plan implementation.

Maryland is already densely populated and undergoing rapid suburban and rural residential development so there is urgency for conservation action. Public support for stronger, comprehensive land use planning and growth management is uneven at best, so there is a continuing need for public education and outreach.

EXAMPLES OF INNOVATIVE OR SUCCESSFUL IMPLEMENTATION

Maryland is a relatively progressive state regarding issues of conservation and environmental protection. State laws include an Endangered Species Act modeled after the federal ESA, a Critical Area Law protecting the shoreline around the Chesapeake Bay, and a Non-tidal Wetlands protection law. A Smart Growth program was initiated statewide under Governor Parris N. Glendening in the 1990's. Maryland also has the Chesapeake Bay Program and the Chesapeake Bay Agreement, both of which include collaboration with neighboring states.

For 15 years, DNR's Program Open Space (POS) has provided $100-250 million per year for the protection of open space, farm land preservation, and land acquisition. An Enhanced Green Infrastructure network currently in development will include attention to species of conservation concern. The Enhanced Green Infrastructure assessment will be used by POS to set priorities for natural land acquisition.

The Wildlife and Heritage Service in the DNR is also hard at work on project BIONET (biodiversity network) in order to, through analysis of key habitats and SGCN, target areas for conservation and protection efforts. They are hoping to use results of BIONET to solicit partners (including land trusts and county planning agencies) in a variety of aspects to actually develop conservation targets and priority areas.

Ducklings in Chesapeake Bay., MD.
Source: www.fws.gov.

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Virginia's Comprehensive Wildlife Conservation Strategy: From Planning to Implementation

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OVERVIEW

As part of a distributed graduate seminar funded by the National Council for Science and the Environment's (NCSE) Wildlife Habitat Policy Research Program, eight universities conducted research on development and implementation of Comprehensive Wildlife Conservation Strategies in all 50 states and six territories. The goal is to gain a synoptic view of state activities related to wildlife habitat conservation in the U.S. and territories. Our overarching question is: "how do conservation science, social, and institutional processes come together to set state and regional conservation priorities and the design and implementation of conservation solutions across the U.S.?"

Using an ecoregional framework, Virginia identifies 925 species of greatest conservation need (SGCN) and their habitats in each of the state's six ecoregions. SGCN are divided into 4 tiers of imperilment (pg 2-9). Each Tier 1 SGCN within an ecoregion is described in terms of life history, location, habitat requirements, condition of habitat, specific threats and trends, conservation actions and research and monitoring needs.

The plan describes the top 10 threats to state terrestrial and aquatic wildlife and recommends actions to address these threats (pg. 10-1). The plan also identifies current monitoring plans for each taxonomic group and what organization is responsible for them. Monitoring standards and their sources are listed to ensure consistency within the state. Appendices H and I have tables listing specific threats, sources of threats and actions for terrestrial and aquatic SGCN created by the Taxonomic Advisory Committees.

The plan provides detailed descriptions of geography, climate, species, habitats, and natural resource conservation in Virginia.

The Loggerhead Shrike is a Tier 1 SGCN in Virginia.
http://www.birds.cornell.edu/AllAboutBirds/BirdGuide/Loggerhead_Shrike_dtl.html

Species of Greatest Conservation Need were determined based on an existing matrix of conservation concern containing 1433 species, Taxonomic Advisory Committee advice and review of species conservation status by other organizations (pg 2-7). The process of determining key habitats for Tier 1 SGCN was based on a somewhat complex aggregation of place, land cover, elevation, relative phenological index, slope, aspect, landform index, and moisture index (pg 2-13). Species of greatest conservation need and key habitats will be used to determine conservation actions within the state. The plan identifies specific

threats and actions for each taxon but does not always identify who is responsible or the timing for implementing conservation actions.

Virginia's implementation has been slow but will accelerate with the development of an implementation document. The CWCS has already helped advance conservation by providing funding to several projects. The implementation document will specify a proposal process to facilitate distribution of SWG funds.

THE CHANGING ROLE OF THE STATE IN WILDLIFE CONSERVATION

The Wildlife Action plan is the first of its kind in the state to address so many species and habitats in one document.

All projects in the state wildlife diversity division will be expected to further the implementation of the Wildlife Action Plan. This may mean shifting job descriptions for some individuals; however it will streamline the conservation effort within state government.

Local governments are turning to the state for conservation leadership. Facing increasing land development pressure, rural communities in Virginia are concerned about degradation of their quality of life. Many county planners and local governments recognize this concern and are now looking to the state for conservation tools to control sprawl. For example, the Green Infrastructure Project, which identifies green areas such as open space and important habitats and was used in the CWCS planning process, helps counties identify important habitats where development should be avoided.

The Chicken Turtle is a Tier 1 SGCN in Virginia
http://www.uga.edu/srelherp/turtles/deiret.htm

The state has a strong history and public interest in fishing and hunting. With the leadership of the current Director of the Wildlife Diversity Division and the CWCS, Virginia is also paying increasing attention to conservation of non game species and to habitat-based conservation.

COLLABORATIVE PROCESSES

"Much of the success of the Virginia CWCS is founded on the acceptance of it as a conservation plan for Virginia, not simply for the DGIF" (pg 2-1). To ensure that the entire state was represented, collaboration was vital to the planning process. A variety of Virginia organizations, groups and agencies were represented in the Taxonomic Advisory Committees and External Steering Committee. This was especially useful for identifying SGCN and key habitats and for recommending conservation actions.

Although the state did not form any new relationships in the planning process, it did strengthen ties with some organizations that previously were not heavily involved in conservation. Land Trusts in particular are now more focused on collaboration and alignment with the CWCS priorities. A program for distributing state wildlife grant funds could help to engage those groups that do not feel they were as well represented in the planning process.

The Department of Game and Inland Fisheries is particularly excited about

increasing the involvement of private citizens and county planners in conservation-guided planning for growth control and sustainable development. The Landowner Incentive Program, aquatic restoration program and other projects will serve to strengthen the bond between the state, local governments and private landowners.

INFLUENCE OF THE PLAN ON OTHER ORGANIZATIONS

Several organizations have changed their focus to align with the VA CWCS. The Audubon Society in Virginia has harmonized their list of "trigger" bird species with the tiered species in the CWCS.

Virginia Forever is a lobby group that is focused on increasing Virginia state funds for natural resource conservation. The group has successfully lobbied to put into action a state-wide conservation tax credit. Virginia is one of a very few states that has a program like this. Since CWCS publication, Virginia Forever has re-focused its conservation easement purchases on lands that are of high conservation value according to the CWCS.

In addition, the Virginia Lands Conservation Foundation is an organization that makes many land acquisitions possible though matching funds has used the CWCS as a guide to help determine lands in need of protection.

The CWCS has helped expand funding for conservation projects for non-game species. Organizations such as the VA Audubon use the CWCS as such a tool.

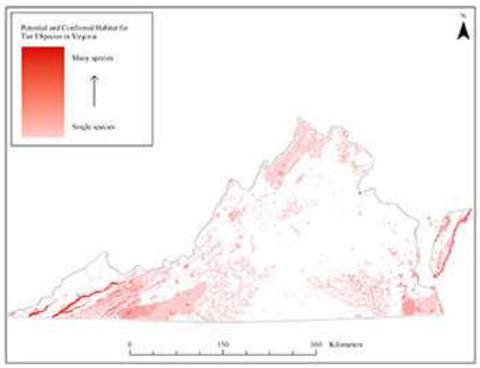
The Eastern Hellbender is a Tier 1 SGCN in Virginia.
http://www.hellbenders.org/

KEY CHALLENGES TO PLAN IMPLEMENTATION

Due to changes in the state staffing just as the WAP was published, the plans implementation phase had a difficult start. Writers of the plan left the project and several positions had to be filled just as the plan was being approved. The implementation phase is therefore just getting underway.

According to the Agency, the implementation document now under development will help prioritize conservation actions and suggest appropriate roles for implementing agencies. This document will also identify performance measures that will be used to evaluate the Wildlife Diversity Division's effectiveness in implementing Virginia's CWCS. Finally, this document will provide significant guidance to future project prioritizations and budgetary allocations

The Virginia SGCN prioritization scheme divided species into 4 tiers. Only tier 1 species were mapped due to time limitations. Mapping Tier 2 and Tier 3 SGCN is also important for proactive and efficient planning and priority setting by both the non agency sector and the state. The state is currently working on mapping other tiers of SGCN.



Potential and confirmed habitat for Tier 1 SGCN in Virginia.
http://www.dgif.virginia.gov/gis/MOM.html

EXAMPLES OF INNOVATIVE OR SUCCESSFUL IMPLEMENTATION

Green Infrastructure: The Green Infrastructure Plan was developed as a collaborative effort between the Department of Conservation and Recreation Division of Natural Heritage, the Virginia Coastal Zone Management Program, the Virginia Land Conservation Foundation, and the Virginia Commonwealth University Center for Environmental Studies. Green infrastructure has been defined as "an interconnected network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas …in order to support native species, maintain natural ecological processes, sustain air and water resources and contribute to the health and quality of life for America's communities and people" (VA Green Infrastructure). The goal of the project is to map Green Infrastructure in Virginia. This program – in concert with the CWCS - is useful to county planners and local groups who want to plan their communities to be more suitable for species and to preserve important habitats.

*Fresh water mussel restorat*ion: Of the 81 species of mussels in VA, 70% are in peril due to pollution and water level problems (Pinder, 2006). Supported in part by State Wildlife Grant funds, this project releases farm raised mussels to augment wild populations.

Dead fresh-water mussels, SGCN in Virginia.
http://www.dgif.state.va.us/awcc/freshwater-mussel-restoration.asp

Landowner incentive program: Landowners are encouraged to conduct restoration on their own lands and are compensated 75% of expenses. In kind matching is accepted as payment for the remaining 25%. Many of the state's 925 SGCN are found on private land, making this project and collaboration with private landowners particularly important. The Landowner Incentive Project, which has grown since the publication of the CWCS and is funded in part by SWG funds, helps promote the goals of the CWCS on a local level.

SUGGESTIONS FOR THE NEXT PLANNING CYCLE

The state agency is interested in incorporating climate change into their next update of the Comprehensive Wildlife Conservation Strategy. Towards this end, the state should begin assimilating current climate change data and information. For example, the National Wildlife Federation and the US Dept of Defense are investigating how climate change and sea level rise will affect fishing and hunting on selected coastal regions, including Chesapeake Bay (Glick, 2007).

Collaboration with and better outreach to organizations that were not involved in the initial planning process will be important for the next VA CWCS iteration. Collaboration with these groups will strengthen the base of data for the CWCS as well as strengthen relationships that may be key to the implementation of projects in the future. Transparency with mapping and implementation of projects for the public and all conservation organizations in Virginia will be very important to the success of the CWCS.

The Green Heron is a Tier 4SGCN in Virginia.
http://www.mbr-pwrc.usgs.gov/id/framlst/i2010id.html

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Washington's Comprehensive Wildlife Conservation Strategy: From Planning to Implementation

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OVERVIEW

As part of a distributed graduate seminar funded by the National Council for Science and the Environment's (NCSE) Wildlife Habitat Policy Research Program, eight universities conducted research on development and implementation of Comprehensive Wildlife Conservation Strategies in all 50 states and six territories. The goal is to gain a synoptic view of state activities related to wildlife habitat conservation in the U.S. and territories. Our overarching question is: "how do conservation science, social, and institutional processes come together to set state and regional conservation priorities and the design and implementation of conservation solutions across the U.S.?"

Map: WA Department of Natural Resources

The Washington Department of Fish and Wildlife (WDFW) was the main developer of the Washington Comprehensive Conservation Strategy (CWCS). The mission of the WDFW is "to provide sound stewardship of fish and wildlife."1 The plan focuses on protecting 20 priority habitats and approximately 700 species of greatest conservation need.

Much conservation in WA is driven by the need to protect federally listed species; however, the Washington CWCS used a "coarse filter/ fine filter" approach to address the protection of both habitats and species. A list of species of greatest conservation need (SGCN) and Conservation Utility Maps were used in developing the CWCS. These were products of ecoregional assessments that attempted to identify the "best" places to conserve a wide range of biodiversity. The ecoregional assessments were conducted with The Nature Conservancy (TNC) and the Washington Department of Natural Resources (WDNR).

The nine ecoregions of Washington host thousands of plants and animals, including 140 mammals, 470 freshwater and saltwater fish species, and 341 species of birds. There are also 150 other vertebrate species, 3100 vascular plant species, and over 20,000 'classified invertebrates.'

Species and habitats were prioritized in terms of conservation needs. According to non-agency sources, the plan is comprehensive in nature and covers conservation in every corner of the state. Also, the plan considers relatively common as well as rare and endemic species.

Although the WDFW wishes to begin implementation of the plan, the agency has been in a holding pattern

pending completion of the Biodiversity Council's "Washington Biodiversity Conservation Strategy" in December, 2007.

The Biodiversity Council is comprised of 23 members from several federal and state agencies, private industry, academia, NGOs and "at-large" representatives. It was created by Governor Gary Locke in 2004 in an effort to "promote more effective ways of conserving Washington's biodiversity"3. The council was charged with the following tasks: develop a 30-year comprehensive prioritized strategy and implementation plan, assess landowner stewardship incentive programs, develop a public education component, develop a website, implement other recommendations, and submit the comprehensive strategy by December 31, 20072. The WDFW and the Washington Department of Natural Resources are principal partners in the development of this conservation strategy, which addresses some key issues not covered by WA CWCS.

THE CHANGING ROLE OF THE STATE IN WILDLIFE CONSERVATION

The first non-game wildlife plan was published in 1980 by the WDFW. Since then, several additional conservation planning efforts have been undertaken by local and national organizations. State government appears to be increasingly proactive in conservation of non-traditional wildlife, but it is unclear if this is a result of the plan or because of efforts by other conservation organizations.

The WA CWCS listed and mapped priority habitats for conservation, but did not prioritize conservation actions, specify costs associated with actions, or clearly recommend organizational roles and responsibilities. Based on ecoregional assessments, the Biodiversity Council created conservation opportunity maps to prioritize ecoregions. The Washington Biodiversity Conservation Strategy addresses some of these topics in more detail. It is important to note the involvement and support from the WDFW in the creation of this plan.

Washington Department of Fish and Wildlife

According to non-agency organizations, the following WDFW priority areas are focal regions for multiple organizations: the Okanogan, the Sinlahekin, the Willamette Valley, and the Puget Sound Trough. High priority habitats include, but are not limited to, shrub-steppe and near shore habitats, the Puget Sound estuarine and coastal areas, dry side forests, south sound prairie habitats, and lynx habitats.

Even though the list of "important" habitats is growing, much effort has previously been spent in the Puget Sound region and focused on anadromous salmonids. This could be due to higher public interest for habitats located on the western side of the state, or on higher availability for funding in this region. The WA CWCS focuses a bit more on the eastern side of the state.

According to several contacts, there is a paradigm shift occurring with conservation approaches in WA. The WA CWCS used a "coarse filter/ fine filter" approach in developing the plan, and many organizations such as TNC join the state in

taking a more habitat-based approach in protecting biodiversity.

All State Wildlife Grant funding goes through the WDFW and a portion is then contracted to other organizations. There is not currently a formal application process, but there WDFW intends to develop one soon. Money is also obtained via other sources; for example $100 million may become available for the protection and translocation of the Pacific fisher.

COLLABORATIVE PROCESSES

The planning process involved collaboration between multiple agencies, other conservation organizations, and stakeholder groups. An advisory council guided collaborative efforts. Collaborators included the U.S. Fish and Wildlife Service and the International Association of Fish and Wildlife Agencies (IAFWA), as well as tribal agencies, the Washington Natural Heritage Program of the Department of Natural Resources, The NatureMapping Program5, and The Nature Conservancy of Washington.

The Nature Conservancy partnered with WDFW on creating ecoregional assessments for all ecoregions in WA. A portion of this information was used as a foundation for the CWCS. The NatureMapping Program disseminated the GAP analysis results and contributed to planning and public meetings.

County level and local agencies were given opportunity for collaboration but did not play a direct role in developing the CWCS. Nevertheless, counties attempt to collaborate with each other in setting conservation goals.

Conservation actions listed in the CWCS have not yet been implemented on a large scale by WDFW or other organizations Washington is still in a planning stage, and even though WDFW is committed to collaborative conservation, there has not yet been significant public outreach.

The Northwest Forest Plan 6 (WA, CA, OR) and the Wildlife Habitat Relationships System are multi-state, public-private efforts that promote collaboration across state boundaries. Species such as the spotted owl, other late-successional–dependent wildlife, migratory birds, and salmonids provide foci for multi-state collaboration during implementation of the WA CWCS.

INFLUENCE OF THE PLAN ON OTHER ORGANIZATIONS

As a result of Washington's CWCS, the Biodiversity Council is attempting to make the process of conservation more strategic. The "Washington Biodiversity Conservation Strategy" provides a 30 year planning horizon with clear guidelines.

The CWCS has not significantly altered the course of other organizations. For those who use it, the CWCS helps to develop conservation strategies and to identify focal areas and species.

WDFW currently has no formal application process for re-granting funds although some contracts have awarded to other organizations. The Nature Conservancy and the Biodiversity Council are currently promoting a couple of new funding initiatives in the state legislature.

KEY CHALLENGES TO PLAN IMPLEMENTATION

A key challenge for wildlife conservation in Washington State is operationalizing the shift from species to habitat based approaches.

Monitoring, although crucial for successful implementation of conservation actions listed in the WA CWCS, was viewed as difficult to coordinate across organizations.

Increased outreach to citizens is needed to elicit public input on conservation goals and to formulate effective community and county conservation plans.

Funding is always an issue, as well as providing means for public input in deciding where funding should be focused.

EXAMPLES OF INNOVATIVE OR SUCCESSFUL IMPLEMENTATION

Washington State Biodiversity Council[3]
www.biodiversity.wa.gov

The completion of the "Washington Biodiversity Conservation Strategy" should catalyze implementation of conservation actions in the state. The Strategy represents more detailed planning as a follow-up to the Washington CWCS and the clarity at which conservation actions are identified aids implementation efforts. The strategy is organized around a conservation opportunity framework which measures biodiversity significance and threat and compares these factors within the ecoregional framework. In developing conservation approaches, additional factors are considered.


Photo by Lois Kemp

Conservation opportunity maps showing biodiversity significance and future risk are available for seven out of the nine ecoregions in WA. Local knowledge and more detailed or specialized assessments will still be needed to guide local conservation actions.

Each section of this strategy first identifies gaps and opportunities for conservation. Beginning with an objective, the sections then cover possible conservation strategies, the problem(s) to be addressed, potential partners, and actions to address the strategy and problems. This template is used to address recommendations, incentives and markets, land use and development, science and information, education and public engagement, as well as a section on 'achieving results'. The "Achieving Results" section provides information to help improve leadership, the availability of information, and funding recommendations, all of which add to the existing WA CWCS and will aid implementation efforts.

In 2007, Joshua Lawler and Molly Mathias completed a report on Climate Change in Washington State for the Washington Biodiversity Council. This report, titled "Climate Change and the Future of Biodiversity in Washington"[3] examines Washington's historic climate, recent climate trends, future predictions for climate, and climate controls on hydrology, fire, sea-level rise, and biodiversity.

SUGGESTIONS FOR THE NEXT PLANNING CYCLE

Orca: Washington Department of Fish and Wildlife

- Begin monitoring to be sure prescribed conservation actions are successful.
- Use SWG grant money to not only aid directly in conservation and restoration projects, but to focus more on public outreach and education.
- Develop a granting process for organizations to obtain funds from the WDFW.

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An Analysis of State Wildlife Action Plan Influences on Wildlife Movement Corridor Projects

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ABSTRACT

As part of a multi-university distributed graduate seminar that examined the impact of State Wildlife Action Plans (SWAPs) on wildlife conservation across the nation, we characterized the degree to which SWAPs have influenced conservation planning for wildlife movement corridors. Our study addressed the following questions: 1) To what degree do State Wildlife Action Plans address wildlife movement corridors in the U.S.? and 2) Have State Wildlife Action Plans influenced conservation efforts addressing wildlife movement corridors in the western U.S. (California, Idaho, Nevada, Oregon, and Washington)? We answered the first question by analyzing the published plans and addressed the second by interviewing conservation professionals concerned with corridor planning in the western states. We found that some states devote considerable attention to corridors in their plans, while others do not even mention the topic. The SWAPs of states in the western U.S. dedicate varying amounts of attention to wildlife movement corridors, and interviews with conservation professionals reveal that SWAPs have not yet influenced corridor conservation projects. We conclude by suggesting changes to SWAP content and design that might accelerate wildlife corridor conservation.

INTRODUCTION

State Wildlife Action Plans

Created in 2000, State Wildlife Action Plans (SWAPs) are a progeny of the State Wildlife Grants (SWG) program, which provides federal money to every state and territory for cost-effective conservation aimed at preventing wildlife from becoming endangered. Though states received SWG funding prior to SWAP development, each state was congressionally required to complete a SWAP by October 2005 in order to continue to receive this funding. The SWAP process represents the nation's first attempt to assess conservation needs and priorities across the country and to shift jurisdictional and authoritative conservation capability from the federal level to the state. Each SWAP outlines the steps needed to conserve wildlife and the habitats in which species occupy. While tailored to each state's unique conservation needs, all SWAPs include eight required conservation elements that provide a common framework.

The Eight Required Elements

1. Identify distribution and abundance of all local species and indicate *Species of Greatest Conservation Need* (*SGCN*; identified based upon state and federal ESA listings, and whether or not a species had low and/or declining population).
2. Inventory all *habitats* within state borders.
3. Identify *threats* to SGCN and/or their habitats.
4. Describe *actions* proposed to conserve identified species and habitats.
5. Describe *monitoring* plans.
6. Outline descriptions of procedures to *review* the plan, at an interval not to exceed 10 years.
7. Illustrate plans for *coordinating* development with other federal, state, and local agencies.
8. Describe how the state plans to *engage the public.*

The Distributed Graduate Seminar

The National Council for Science and the Environment's Wildlife Habitat Research Policy Program (NCSE/WHRPP) and the Gap Analysis Program (GAP) funded a national study of SWAP planning and implementation. Pilot studies were conducted in Spring 2007 and a distributed graduate seminar (DGS) followed in Fall 2007. The project included involvement of graduate students from Duke University, Indiana University, Northern Arizona University, Texas A&M University-Kingsville, University of Alaska at Fairbanks, University of California at Santa Barbara (UCSB), University of Idaho, and University of Michigan. Participants summarized planning and early implementation efforts in each state and are currently synthesizing findings across states through regional and topical reports.

Seminar participants at most universities also undertook focused research on a range of "drill-down" topics. We chose to explore the role of SWAPs in wildlife movement corridor conservation. Corridors have been identified as important tools for mitigating the effects of habitat loss and habitat fragmentation on wildlife (White et al 1997). These threats to biodiversity are among the most pervasive (Beier and Noss 1998, WGA 2007), and are listed as challenges in many SWAPs. In fact, more than 50 states listed fragmentation as a leading threat to species survival (Lerner et al 2006). Development, roadways, utility line corridors, and agriculture are just a few of the many disturbances contributing to the increasing fragmentation of habitats and the increasing threat of species extinctions (Haddad and Tewksbury 2006). The effects of fragmentation on wildlife could be additionally exacerbated by rapid climate change (Hannah et al 2007).

Our investigation of wildlife corridor planning in the SWAPs considered two questions:

> 1) To what degree do State Wildlife Action Plans address wildlife movement corridors in the U.S.?
>
> 2) Have State Wildlife Action Plans influenced conservation efforts addressing wildlife movement corridors in the western U.S. (California, Idaho, Nevada, Oregon, and Washington)?

Defining Corridors

Published work reveals varied and often contradictory definitions of wildlife movement corridors. In the 1930's, corridors were described as routes permitting the relatively rapid and unselective spread of biota between regions (Perault et al 2000). Corridors have also been defined as linear strips of habitat linking two core areas (Tigas et al 2002) that may facilitate

species movement (Wildlands Project 2007). Beier and Noss (1998) define a corridor as "a linear habitat, embedded in a dissimilar matrix that connects two or more larger blocks of habitat and that is proposed for conservation on the grounds that it will enhance or maintain the viability of specific wildlife populations in the habitat blocks." For the purpose of our analysis, a wildlife movement corridor is defined as an area that allows for the natural movement of wide-ranging wildlife, including both game and non-game species. Our study is particularly focused on corridors for wide-ranging terrestrial mammals that require large areas for population viability, specifically carnivores and ungulates. By focusing on these species, this study examines wildlife that move and migrate terrestrially at a multi-state scale.

Importance of Corridors

Interchange of species between isolated populations is important to the persistence of the populations and maintenance of gene flow (Rosenberg et al 1997). Existing studies support the role of corridors in increasing movement rates of animals between otherwise isolated patches (Haddad and Tewksbury 2006). Protecting existing corridors promotes ecological processes and may benefit regional and local diversity (Rosenberg et al 1997). Reducing local extinctions in small populations with rare dispersal and low growth rates can be accomplished through the maintenance of corridors.

The Wildlands Project is an example of an alliance between conservation organizations, citizens, and conservation biologists with a common goal conserving corridors to facilitate wildlife movement. Initiated in 1991, the Wildlands Project continues to promote landscape and regional scale conservation efforts and to facilitate species movement in an increasingly fragmented landscape (Noss 2003). Although various programs such as the Wildlands Project exist to promote corridor use, state and regional scale conservation of corridors has yet to be fully embraced by most states and regions. The SWAPs provide an opportunity to systematically assess the extent to which conservation organizations and states are concerned with wildlife movement corridors and to learn about ongoing actions to protect or restore movement corridors.

METHODS

PART 1: To what degree do State Wildlife Action Plans address wildlife movement corridors in the U.S.?

We examined SWAPs for 49 states and Washington, D.C., excluding Hawaii because of its archipelago geography and absence of large, wide-ranging native mammals. We developed characterization forms to synthesize information on corridor conservation for these 50 SWAPs. Frequency of the following key terms related to corridor conservation was tallied for each SWAP: *corridor*, *linkage*, *habitat connectivity*, *wildlife connectivity*, and *movement* (Appendix 1, Box 1).

The word search revealed sections of the SWAPs specifically related to conservation of corridors that were then scrutinized in more detail. Using these combined processes, the SWAPs were classified into three categories (high, medium, and low; Appendix 1, Box 3) indicating the level of emphasis on wildlife movement corridors in each state plan.

PART 2: Have State Wildlife Action Plans influenced conservation efforts addressing wildlife movement corridors in the western U.S. (California, Idaho, Nevada, Oregon, and Washington)?

We conducted interviews with conservation professionals working on projects in California, Idaho, Nevada, Oregon, and Washington. The purpose of the interviews was to gain insight on the influence of the SWAPs and related planning processes on corridor conservation activities. Interviewees included conservation biologists, members of conservation organizations, and state agency personnel. Not all interviewees were involved in the development or implementation of SWAPs.

A questionnaire (Appendix 2) was developed containing questions divided into four categories: conservation strategies for wildlife movement corridors, specific species and habitats identified for wildlife movement corridors, collaboration, and general corridor conservation information. The questionnaire provided the opportunity to maintain consistency throughout interview topics so information for the study region could be easily synthesized. Information was compiled via tabulation of interview notes, resulting in an overall synthesis.

RESULTS

PART 1: To what degree do State Wildlife Action Plans address wildlife movement corridors in the U.S.?

The results of the characterization revealed much heterogeneity in the mention of wildlife movement corridor terms across the U. S. (Appendix C, Appendix D). Keyword counts varied dramatically by state, with five states (Arizona, California, Washington, New Mexico, and New Jersey) mentioning the search terms 100 times or more in their SWAPs and three states (Arkansas, Maine, and Wisconsin) not mentioning any of the terms.

Thirteen states were rated as high, 21 as medium, and 16 as low in their attention to wildlife movement corridors. Both the word count and in-depth reading of SWAP sections were needed to ascertain a state's level of attention to corridor planning. For example, states such a Oregon (21 total hits) and Vermont (15 total hits) mentioned the search terms relatively few times, but their SWAPs' attention to specific species, habitats, and locations associated with corridor conservation made them better candidates for a "high" ranking than states like Michigan (55 total hits) or Nevada (62 total hits). Oregon discussed in detail the function of wildlife movement corridors in the context of fragmentation, and recommended development of a Wildlife Movement Strategy. Vermont mentioned the use of corridors as a potential tool to mitigate the altering effect that climate change will have on landscapes. Other characteristics that are associated with "high" states include the use of corridor maps or the inclusion of case studies and specific actions to be taken regarding corridor design and implementation.

PART 2: Have State Wildlife Action Plans influenced conservation efforts addressing wildlife movement corridors in the western U.S. (California, Idaho, Nevada, Oregon, and Washington)?

The western states vary in the degree to which the SWAPs have influenced planning for corridors. California, Oregon, and Washington SWAPs ranked high for corridor planning while Idaho and Nevada SWAPs were ranked as medium. The ranking, however, is most attributable to the many corridor-related projects that were already underway before the completion of the

SWAPs. Interviewees in all states agreed that planning for movement corridors is both extremely important (especially in the face of climate change) but highly constrained in practice by political and financial limitations.

California

The identification of key wildlife corridors to address habitat fragmentation is listed in California's SWAP as one of seventeen important statewide conservation actions. The SWAP divided California into eight terrestrial regions and one marine region, with threats and actions described for each. Of the eight terrestrial regions, actions related to movement corridors were addressed specifically in four: the Colorado Desert Region, the Central Coast Region, the Sierra Nevada and Cascades Region, and the South Coast Region (Bunn et al 2007).

The Draft Coachella Valley Multiple Species Habitat Conservation Plan was noted in the SWAP as an example of a current conservation effort in the Colorado Desert Region. The blockage of corridors as a result of development pressures was identified as a major conservation challenge in Coachella Valley. A similar challenge was described for the Central Coast Region, where developmental threats such as expanding vineyards are encroaching into movement corridors for the San Joaquin kit fox. For the Sierra Nevada and Cascades Region, recreational activity and highway development were explicitly listed as threats to wildlife movement corridors.

The South Coast Region section of the SWAP went to greatest depth with respect to corridors, citing several specific projects such as land protection in the Santa Ana–Palomar and the Tehachapi linkages and corridor mapping by the South Coast Missing Linkages Project. Areas surrounding Camp Pendleton and Marine Corps Miramar Air Station were also identified as important for wildlife corridors.

Conservation professionals interviewed tended to take a regional perspective that aligned with the state's bioregional approach to conservation planning. Interviewees named species by region when describing corridor work, for example, the mountain lion in the Central Coast and Southern California, the kit fox in the Central Valley, the bighorn sheep in the Colorado Desert, and the fisher in the Sierra Nevada. All these species have been identified as SGCN in California's SWAP, but interviewees agreed that the SGCN listing has not yet had an influence on corridor conservation for these species. Moreover, the consensus is that the SWAP has not yet had any influence on corridor projects in California.

New corridor projects have recently begun in California, but none can be attributed directly to the SWAP. This may be due in part to the limited time since plan publication and also to the lack of implementing mechanisms in the plan. The situation may be changing, however, as funding and staffing for an implementation team are currently being sought. An implementation strategy is expected in Spring 2008 with implementation occurring as early as Summer 2008. Until the implementation strategy is created, the SWAP will likely have little influence on California's corridor projects.

Idaho

Focus on wildlife movement corridors in Idaho is largely related to highway crossings. Several on-going projects to facilitate wildlife movement across roads involve collaboration between Idaho Fish and Game (IDFG) and the Idaho Department of Transportation (IDOT), and include identifying important highway crossings, designing highway overpasses, and installing blinking wildlife-crossing signs.

Most of the species identified by planners as having movement concerns are also listed as SGCN: bears (brown and grizzly), lynx, wolves, fishers, and wolverines. Important game species such as black bear and deer are also considered when identifying key areas for facilitated wildlife crossings. Moreover, IDOT is attempting to minimize human injury due to wildlife

collisions by identifying areas where collisions are likely to occur. Experts in this arena did not consult the SWAP when identifying wildlife movement problem areas and Idaho did not specifically delineate corridors in the SWAP. Future corridor planning by IDFG will include species movement data tracked by telemetry.

Other organizations such as Y2Y (Yellowstone to Yukon), The Nature Conservancy, the Western Governor's Association, and researchers within the greater Yellowstone ecosystem have on-going corridor projects that do not appear to be related to the SWAP. Multi-agency planning within Idaho as well as multi-state corridor planning, notably with Montana and Wyoming, has proven challenging.

Nevada

Nevada Fish and Game (NFG) has managed wildlife movement corridors associated with big game herds (such as mule deer) since the inception of NFG over 50 years ago, but corridor protection for non-game species has been limited. Corridor protection is challenging given Nevada's basin and range topography naturally creating pockets of habitat. There is a need, however, for wildlife to move locally within and between habitat islands such as high-elevation forest "sky islands." In the western half of the state, large landscape corridors are relatively unaddressed with the exception of migratory corridors from winter to summer ranges for mule deer and pronghorn antelope. In the eastern portion of the state where topography is more homogenous, the Nevada SWAP was used as a vehicle to provide for the protection of migratory corridors for wildlife conservation issues that had not received priority under the traditional hunter-funded regime. Nevada officials are confident that landscape-level planning is moving forward, and emphasis for corridor planning is shifting to key species like the pronghorn and the American marten (NDW 2006).

Current planning efforts to address movement corridors involve collaboration among the following agencies: Lahonton Audubon Society, Teaming with Wildlife, Nevada Department of Wildlife, The Nature Conservancy, and the Nevada Natural Heritage Program, among others. The Nevada Department of Wildlife actively practices herd management, and the Bureau of Land Management and the U.S. Forest Service manage livestock, range health, fire management, and oversee interstate deer herds and coordination with California. Nevada is in the process of developing and/or discussing inter-jurisdictional plans that benefit mule deer (and a host of game and non-game species which depend on functional sagebrush habitats) with California, Oregon, and Utah.

NFG is considering the impact of climate change on Nevada's habitats. Restoring natural fire intervals to many of the key sagebrush habitats as well as averting the widespread conversion of rangelands through wildfire and cheat grass invasion will be important tools to help mitigate the effects of a warmer climate. According to interviews, however, climate change has yet to become an integral part of wildlife corridor planning.

Oregon

In Oregon, corridor conservation is considered to be critical by conservation professionals as well as by private land owners and industry stakeholders. Oregon's SWAP discusses wildlife movement under "*Issue 4: Barriers to Animal Movement.*" Urban sprawl is the main catalyst for corridor planning, while in rural areas planners hope to conserve open space for wildlife movement prior to development. The SWAP lists two main actions to address barriers to wildlife movement:

1. Identify key areas of wildlife mortality on highways and consider animal movements when planning new roads.

> 2. Maintain and restore habitat to ensure… terrestrial corridors in priority areas, such as conservation opportunity areas and urban centers (ODFW 2006).

The Oregon Department of Fish and Wildlife (ODFW) utilized SWG funding to hire a coordinator to organize implementation of the SWAP. SWAP coordinators are charged with assisting in the implementation of wildlife connectivity projects in Oregon. Currently, the coordinator is advising an effort initiated by the Oregon Department of Transportation (ODOT). The initiative, entitled the Oregon Wildlife Movement Strategy, focuses on wildlife movement across the landscape and on barriers to movement, including roads and highways. The strategy has 15 focal species of which 10 are SGCN, including the black bear, elk, mule deer black-tailed deer, and Columbia white-tailed deer. The U.S. Forest Service, Defenders of Wildlife, and the Federal Highways also collaborate on planning for corridors in Oregon. Collaboration across state lines has been limited because of inconsistencies in data and differing political and financial situations.

Washington

In Washington, experts agree that planning for corridors is critical for sustaining healthy populations, limiting human-interaction, and facilitating genetic dispersal. Washington is in the process of shifting from a species-based conservation approach to a habitat and landscape-based conservation approach.

Washington's SWAP mentions the need to identify and protect wildlife movement corridors and habitat connectivity on both public and private lands. Moreover, the Washington Growth Management Act requires that landscape-scale data and best available science be readily available to local governments to aid in the protection of important wildlife habitat and other critical areas. Historically, the western portion of the state has received more attention to planning detail than the eastern portion. The SWAP addresses conservation in the eastern side of the state and the importance of wildlife movement corridors, but has not yet directly led to any new corridor conservation projects.

Much of the focus on corridors in the SWAP relates to riparian and riverine corridors. This could be due to the cultural and ecological importance of salmon in the state. Additionally, SGCN such as the lynx, bear, cougar, wolverine, and wolf (and their prey, including deer and elk) utilize mentioned riparian corridors. Cougars receive special focus in Washington due to their role as an indicator species and their increasingly frequent contact with humans. Planning for corridors may assuage negative interaction with large carnivorous mammals by providing travel pathways away from urban areas.

Leaders in collaboration for corridor planning in Washington include Department of Fish and Wildlife, Department of Transportation (DOT), Department of Natural Resources, and The Nature Conservancy. Research has been conducted in regard to wide-ranging terrestrial mammalian movement, resulting in a recent plan with the Washington DOT that includes development of highway overpasses encompassed within an interstate expansion project on I-90, a roadway transecting the Cascade Range from east to west. This plan, however, is not a direct result of the SWAP.

Climate change is just now coming into the political view and might be more important in considering species that persist in higher elevation habitat types (e.g., lynx in boreal habitat). According to interviewees, large parks may not comprise enough area to sustain appropriate habitats and associated species for the persistence of populations or to limit the spread of disease in the event of climate change. Thus, conservationists have identified a need for corridor maps and pilot projects as well as public outreach. The impacts of urban sprawl and climate change at local levels need to be made available to planners, developers, and transportation organizations.

Also, according to interviewees, the inclusion of corridors in the SWAPs will be essential to mitigating these impacts and should be based on science, modeling, and an understanding of habitat needs and movement patterns.

DISCUSSION AND CONCLUSIONS

National Emphasis on Corridor Conservation in SWAPs

Since habitat fragmentation is listed as a leading threat to wildlife in more than 50 SWAPs, it was expected that most plans would focus considerable attention on maintaining connectivity through corridor planning. Instead, results suggest that attention to movement corridors in the SWAPs varies widely. There are many possible reasons for the limited focus on corridors. For instance, corridor conservation is just one of many conservation tactics and approaches. Core area conservation, habitat restoration, and species management are examples of approaches that may have been given higher priority. Furthermore, the required elements of the SWAP framework focused attention on species, habitats, and threats more than on explicit geographic areas and features like movement corridors.

The geography of a region may or may not easily lend itself to the creation or maintenance of wildlife movement areas, and the notion of what constitutes a corridor will necessarily be somewhat region- and species-specific. Riparian and riverine habitats are probably the best example of spatial networks that occur in virtually all parts of the country and are universally important as species habitat and movement areas. Thus, it is not surprising that much of the discussion of corridors in the SWAPs tends to have a riparian focus.

There are notable differences in corridor emphasis not only across the U.S. but between adjacent states, a difference indicative of the relatively independent planning processes among states. An exception may be the Northeast states, many of which ranked high in their attention to movement corridors (Appendix D). This finding may partly be a result of the Northeast Regional Conservation Needs Program where SWG funding is used for regional and transboundary projects, pooling 4% of each state's annual funding (WMI 2007). Maine is an exception to this high ranking in the Northeast, with a low ranking that could be explained by the relatively high amount of rural land in the state that may lower corridor conservation as a priority.

Kansas stands out among Midwestern states with higher emphasis placed on movement corridor planning. The Kansas Wildlife Action Plan pays considerable attention to riparian corridors as avenues of wildlife movement for species like the black bear and grey fox.

In the northwestern U.S., the lower rankings for states like Montana and Idaho may be due to the relatively high percentage of federally owned land in these states, putting the onus of corridor conservation for key habitats in the hands of the federal government and not the state. Similarly, some ecoregions within states that have relatively high levels of urbanization may not have large areas or associated species for which the conservation of wildlife movement corridors is important.

Implementation Trends in the Western U.S.

In general, given the slow pace of SWAP implementation, it is too early to judge the influence of the plans on corridor conservation. In the cases of California and Washington, implementation has not yet begun; these states are still in the planning stages. Furthermore, a number of ongoing corridor conservation projects precede the plans. Thus, there is little coupling between the state strategies and on-the-ground conservation efforts at this time.

Nevertheless, initiatives at the state and national level are emerging that may promote wildlife movement conservation. For example, the Wildlife Movement Strategy in Oregon, which grew out of the SWAP process, has provided an impetus for the Oregon Department of Transportation and Oregon Department of Fish and Wildlife to collaborate in planning for wildlife movement corridors. The strategy's next step is to prioritize identified corridors and move towards incorporating Oregon's WAP priority habitat to protect SGCN.

There are several possible reasons why implementation of corridor actions mentioned in the plans has not begun, notably insufficient funding and staffing and difficulties in multi-jurisdictional coordination and collaboration over large areas. In some cases, conservation of wildlife movement corridors may not be as pressing as other conservation problems facing agencies and organizations. More generally, lack of clear prioritization of species and habitats as well as associated conservation actions has hindered plan implementation, including corridor conservation.

Identifying a connection between conservation needs, actions, funding sources, and organizations charged with preparing and implementing SWAPs could help achieve conservation goals. An example of a recent policy resolution that may be doing this is the work done by the Western Governors Association, highlighting concern for species movement in an increasingly fragmented landscape and a changing climate (WGA 2007). This new policy will provide financial support for the conservation of wildlife movement corridors. It is anticipated that federal, state, and local agencies will collaborate to identify important wildlife movement corridors and linkages as well as develop new policies and tools for preserving those landscapes. The WGA resolution indicates that the political will and financial backing for wildlife movement corridor conservation is growing, and may work in conjunction with the SWAPs to promote conservation projects specifically related to wildlife movement corridors.

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To view SWAPs or to obtain more information regarding them, please visit http://www.wildlifeactionplans.org

APPENDIX A

Description of Methods for the National-Scale Study

BOX 1
Terms, Criteria, Definitions, and Assumptions for the Word Search

Search Terms

Corridor
Linkage
Habitat Connectivity
Wildlife Connectivity
Movement

Criteria

A term is relevant only when the subject is wide-ranging terrestrial mammals or when species are not specified (e.g., "Corridors are important for moose" and "Corridors are important for wildlife" both count, but "Corridors are important for reptiles" does not count).

Specifically for CORRIDOR hits, note that riparian or river corridors should be counted only if the species are either unspecified or wide-ranging mammals.

Specifically for MOVEMENT hits, movement between and within habitats both count.

Definitions for the purpose of this analysis

wildlife movement corridor - geographic areas that may vary in scale within or between states and allow for the natural movement of wide-ranging terrestrial mammals, including game and non-game species.

wide-ranging terrestrial mammals - terrestrial mammals (not marine mammals or bats) that require large areas for population viability (specifically carnivores and ungulates)

Assumptions

1. This word search can provide insight into the status of conservation of corridors within the SWAPs.
2. The terms used in our search are indicative of the use of corridors in SWAPs.
3. The number of interviewees per state (3-4) is sufficient to represent the amount of knowledge of corridor conservation in each state.

BOX 2
Corridor-Related Content Search for in the SWAPs (See Appendix C)

Corridors Identified – corridor conservation is recommended as an action.
Species Identified – corridor conservation is related to at least one specific species.
Habitats Identified – corridor conservation is related to at least one specific habitat.
Actions Recommended – corridor conservation is recommended for a specific location, species, or habitat.
Maps of Corridors – a map of present or potential corridors is included in the SWAP.
Allusions to Geographic Areas – corridors are discussed for a specific location.
Corridor Case Studies Mentioned – examples of past or current corridor projects is given.

BOX 3
Classification Scheme for SWAP Characterizations

High – the high category contained states in which the SWAPs contained high hits for the word search or included maps or case studies of corridors.
Low – the low category contained states in which the SWAPs contained low hits for the word search and included no maps or case studies corridors.
Medium – states not classified as either "High" or "Low" were placed in the medium category.

APPENDIX B

Interview Questionnaire for the Regional-Scale Study

Questions for telephone interviews with agency and/or non agency stakeholders regarding:

Wildlife Movement Corridors

UCSB Drill Down Questionnaire
Name:
Date/Time:

I. INTRODUCTION

We are part of an eight campus-wide graduate seminar whose overarching goal is to synthesize a report on the implementation of State Wildlife Action Plans via analysis and characterization of the plans. Our team is particularly interested in the following drill-down question: Have wildlife action plans acted as a catalyst for conservation efforts addressing wildlife movement corridors* for wide-ranging terrestrial vertebrates within the continental states of Fish & Wildlife Service (FWS) Region 1? (States of interest include: WA, OR, CA, NV and ID.)

*Wildlife corridors are defined here as: Geographic areas that may vary in scale within or between states that allow for contiguous movement of wide ranging terrestrial vertebrate species (both game and non-game).

1. *Would it be OK to record the interview? The interview will remain anonymous and your name will not be used during release of any deliverables as a result of this project.*

2. Do you have any questions before we begin?

II. BACKGROUND INFORMATION ABOUT THE INTERVIEWEE

3. How would you describe your position and role within your organization?

4. What was your role in the identification or design of wildlife movement corridors at the time the action plan was being developed? How does this compare to your current role related to the plan and/or wildlife movement corridors?

III. QUESTIONS ABOUT CONSERVATION STRATEGIES

5. *Did the development of the CWCS alter planning processes related to wildlife corridors? Examples?*

6. *Do CWCS documents represent the state's first attempt at identifying or establishing wildlife movement corridors statewide? If not, what are its predecessors?*

IV. SPECIFIC HABITATS/SPECIES

*5. Within your state which wide ranging species are the focus for corridor conservation? Why? Similarly is there a focus on priority habitats in corridor planning? {** We are not interested in birds, bats, or aquatic species**}.*

6. Are these species listed as SGCN? If not have SGCN and priority habitats influenced corridor delineation at all?

7. Based on your knowledge does planning for wildlife movement corridors encompass a variety of habitats?

8. Have corridors been delineated based on pre-existing species movement patterns, or rather been superimposed on human infrastructure? (Examples include highway underpasses, bottlenecking associated with development, riparian areas).

V. COLLABORATION

9. *Who are the leaders in state and regional planning efforts for wildlife corridors? (Examples include: conservation organizations, federal, state, or local agencies…)*

9b. To what extent are the above involved?

10. *(If not mentioned in the plan) Are there projects, catalyzed by the CWCS that involve conservation of corridors across state lines? Explain.*

10b. If not, what are the main obstacles related to collaboration between states for corridor implementation? Do you see any opportunities for collaboration between states? Any changes politically that may aid/HINDER conservation?

VI. BROAD CONSIDERATIONS

11. *How important is corridor conservation in the grand scheme of state-wide wildlife conservation?*

12 How has climate change affected conservation planning approaches for wildlife movement corridors? If climate change is being considered in corridor planning, what are the tools being

used to ensure that species can keep up with shifting ecosystems? (e.g., assisted migration, planning for northward movement and elevation gain, etc.)

13. Can you list examples of innovative and effective wildlife movement corridor projects in your state that are a product of CWCS planning or funding? What is their status? Can you provide us with additional references?

14. What is your view on the future of terrestrial large vertebrate wildlife movement in the US? Is this a big issue within the conservation community given the recent media/ scientific emphasis on climate change increased habitat conversion/disturbance, and the prevalence of sprawl on the forefront of increasing human population? What are the most effective tools for successful corridor conservation?

VII CONCLUSION

- *Any questions?*
- *Is there any additional information or data that you feel may be helpful to us in the analysis of this issue?*
- *Are there other sources or contacts that you can provide for more in-depth information gathering?*

Thank you! We will be sure to send you any products when we are finished with our analysis. For updates, you can visit www.bren.ucsb.edu/~wildlife, or email us with questions at wildlife@bren.ucsb.edu.

APPENDIX C

Results of the SWAP Characterizations

Table Format

States and territories are organized by the emphasis placed on corridor conservation in their SWAPs (dark green = high emphasis, light green = medium emphasis, and light yellow = low emphasis). This color classification is the same as in the corresponding map in Appendix D. The legend for the column names is shown above the table.
Corridors Identified – corridor conservation is recommended as an action.
Species Identified – corridor conservation is related to at least one specific species.
Habitats Identified – corridor conservation is related to at least one specific habitat.
Actions Recommended – corridor conservation is recommended for a specific location, species, or habitat.
Maps of Corridors – a map of present or potential corridors is included in the SWAP.
Allusions to Geographic Areas – corridors are discussed for a specific location.
Corridor Case Studies Mentioned – examples of past or current corridor projects is given.

State/Territory	Search Term Count	Corridors Identified	Species Identified	Habitats Identified	Actions Recommended	Maps of Corridors	Allusions to Geographic Areas	Corridor Case Studies Mentioned
Arizona	193	•	•	•	•	•	•	•
California	139	•	•	•	•		•	•
Georgia	71	•	•	•	•	•	•	•
Kansas	16	•	•	•			•	
New Hampshire	40	•	•	•	•	•	•	•
New Jersey	100	•		•	•		•	
New Mexico	105	•	•	•	•	•	•	•
New York	25	•	•	•	•		•	•
North Carolina	55	•		•	•	•	•	•
Oregon	21	•	•	•	•			
Pennsylvania	43	•	•	•	•	•	•	•
Vermont	15	•	•	•	•		•	•

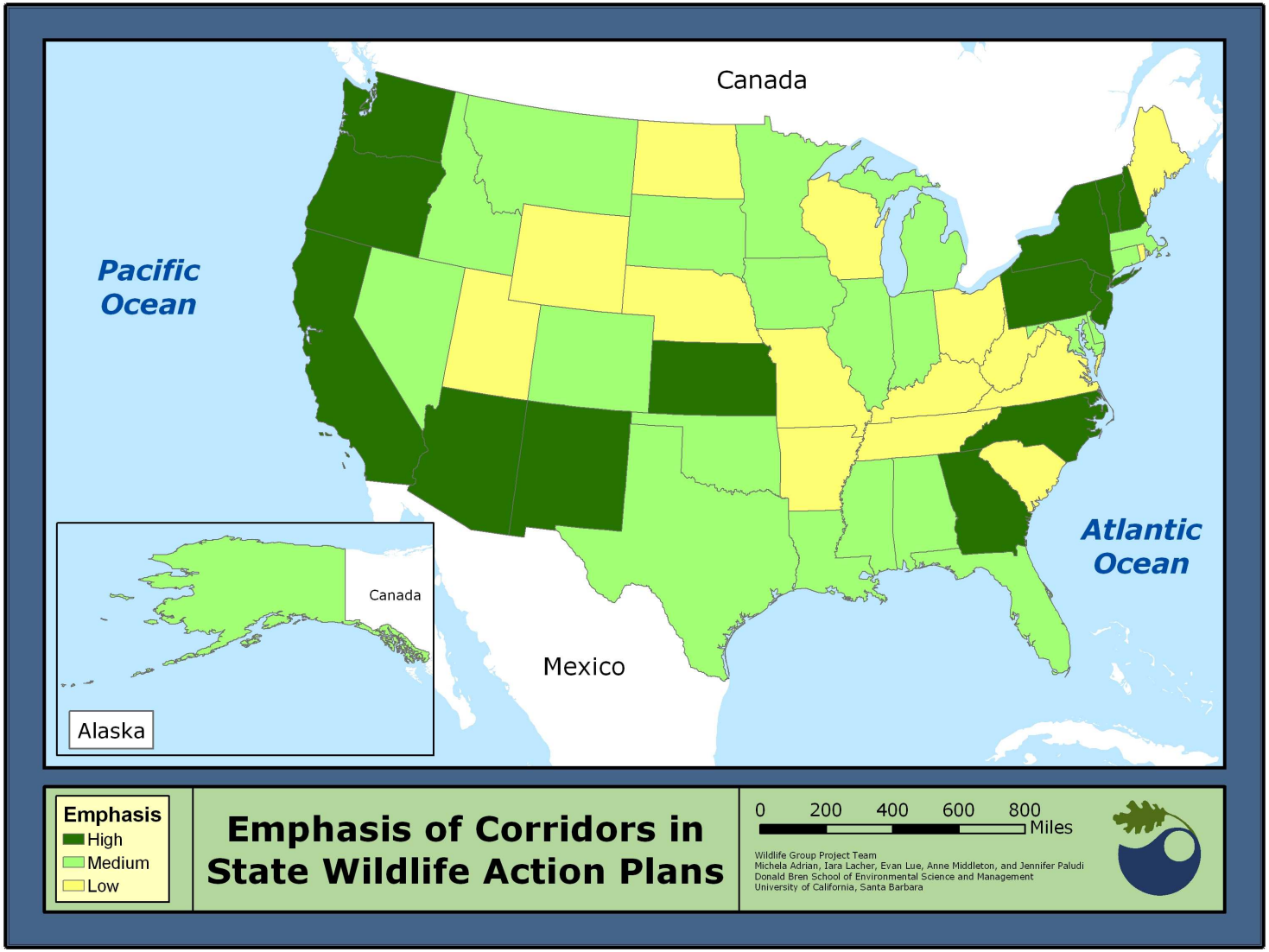
State/Territory	Search Term Count	Corridors Identified	Species Identified	Habitats Identified	Actions Recommended	Maps of Corridors	Allusions to Geographic Areas	Corridor Case Studies Mentioned
Washington	125	•	•	•			•	
Alabama	6	•		•			•	
Alaska	19	•	•	•			•	
Colorado	22	•	•	•				
Connecticut	22	•		•	•			
Delaware	8	•		•				•
Florida	19	•	•		•			
Idaho	22	•	•	•			•	
Illinois	11	•		•	•			
Indiana	11	•		•				
Iowa	23	•		•	•			
Louisiana	18	•	•	•	•			
Maryland	47	•	•	•	•		•	•
Massachusetts	21	•	•	•				
Michigan	55	•		•				
Minnesota	28	•		•			•	
Mississippi	23	•	•	•				
Montana	41	•	•	•			•	•
Nevada	62		•	•				•

State/Territory	Search Term Count	Corridors Identified	Species Identified	Habitats Identified	Actions Recommended	Maps of Corridors	Allusions to Geographic Areas	Corridor Case Studies Mentioned
Oklahoma	26	•		•	•			
South Dakota	22	•	•	•	•		•	•
Texas	49	•	•	•	•		•	
Arkansas	0							
District of Columbia	5	•						
Kentucky	5		•			•		
Maine	0							
Missouri	21	•		•	•		•	
Nebraska	5	•						
North Dakota	14	•	•	•				
Ohio	9							
Rhode Island	1							
South Carolina	7	•						
Tennessee	3	•						
Utah	6	•						
Virginia	4							
West Virginia	11	•	•	•			•	
Wisconsin	0							
Wyoming	11	•					•	

APPENDIX D

Results of the SWAP Characterizations

Map Format


Canada
Pacific Ocean
Atlantic Ocean
Mexico
Canada
Alaska
Emphasis
High
Medium
Low
Emphasis of Corridors in State Wildlife Action Plans
0 200 400 600 800
Miles
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