

# APPLICATIONS

## The Integration of GAP Data into State Comprehensive Wildlife Conservation Strategies

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### Introduction

One of the primary goals of the Gap Analysis Program (GAP) has always been to facilitate conservation planning by providing objective information that local, state, and national decision makers can access for managing biological resources. GAP products, including land cover, predicted species distributions, species richness indices, land stewardship maps, species habitat models, and even the GAP approach itself, could be key tools in making decisions about conservation. GAP products are freely available to anyone who wants them, yet few conservation agencies have taken advantage of the available data and protocols (McClafferty and Waldon 2002).

Now, with the advent of a federal mandate requiring each state to develop a Comprehensive Wildlife Conservation Strategy (CWCS), a perfect opportunity for GAP implementation has presented itself. In turn, many state wildlife professionals, faced with the task of inventorying and planning for the conservation of fish and wildlife species in their states, have turned to GAP as one of the tools that can help them. This paper provides a brief legislative background of the State Wildlife Grants (SWG) program and summarizes how states have used GAP data to develop their CWCSs.

### History of Wildlife Conservation Strategies

The SWG program is the direct result of a coordinated lobbying effort in the late 1990s by a coalition of state wildlife management agencies (Teaming with Wildlife), the public, and other interested organizations. The proposed Conservation and Reinvestment Act (CARA), which the coalition lobbied for, would have created a new long-term Wildlife Conservation and Restoration Fund focused on conservation, recreation, and education. Despite strong bipartisan support and a broad conservation coalition, Congress did not fund CARA. Instead, in October 2000, a compromise package of conservation spending was cobbled together. One component of this new package was the State Wildlife Grants program, which was designed to provide competitively awarded, cost-shared grants to states for conservation.

In 2001, Congress empowered the SWG program to award money on a formula basis. In contrast to earlier programs, which

focused primarily on game species or on threatened and/or endangered species, SWG projects are directed to focus on the conservation of fish and wildlife species of greatest conservation need (SGCN), while promoting proactive conservation to keep common species from becoming endangered. Since 2002, Congress has distributed \$270 million in SWG funds to the states, U.S. territories, the District of Columbia, and the Commonwealth of Puerto Rico according to a formula based on land area and population. Approximately \$75 million will be distributed in FY2005.

In exchange for the funding they receive, each state must complete a CWCS. The deadline for completion of the initial plans was October 1, 2005. Upon completion, each state must review and reevaluate its plan on a regular schedule of at least every 10 years. If a state did not produce a CWCS by the deadline, it may be required to repay all the SWG funds it has received.

The responsibility for developing the CWCS rests with each state. State fish and wildlife agencies are involving a broad spectrum of partners, including other government agencies, conservation groups, private landowners, and the public (IAFWA 2004b).

Guidelines to state planners regarding the development of their conservation strategies encourage state coordinators to use relevant existing information; in particular, to integrate appropriate elements of other plans, databases, GIS layers, reports, and information that overlap or complement the strategies they are developing (IAFWA 2002). Most states seem to be heeding this advice. As of January 1, 2005, 37 states had completed their GAP projects. Of these, 25 had incorporated GAP data into the development of their CWCSs. Another eight states that did not yet have complete GAP data sets and final reports were using the GAP data available to them for CWCS development.

### Essential Elements of Comprehensive Wildlife Conservation Strategies

Congress directed that the state wildlife strategies must identify and be focused on SGCN species, yet also address the “full array of wildlife” and wildlife-related issues facing the state. To help establish a framework for the conservation plans,

Congress identified eight required elements to be addressed in each state's CWCS:

1. **Information on the distribution and abundance of species of wildlife**, including low and declining populations, as the state fish and wildlife agency deems appropriate, that are indicative of the diversity and health of the state's wildlife
2. **Descriptions of locations and the relative condition of key habitats and community types** essential to conserving the species identified in (1)
3. **Descriptions of problems** that may adversely affect species identified in (1) or their habitats, **and priority research and survey efforts** needed to identify factors that may assist in the restoration and improved conservation of these species and habitats
4. **Descriptions of conservation actions** proposed to conserve the identified species and habitats, and priorities for implementing such actions
5. **Proposed plans for monitoring** species identified in (1) and their habitats, for monitoring the effectiveness of the conservation actions proposed in (4), and for adapting these conservation actions to respond appropriately to new information or changing conditions
6. **Descriptions of procedures to review the strategy** at intervals not to exceed 10 years
7. **Plans for coordinating the development, implementation, review, and revision of the plan with federal, state, and local agencies and Indian tribes** that manage significant land and water areas within the state or administer programs that significantly affect the conservation of identified species and habitats
8. **Broad public participation**, which was affirmed by Congress through this legislation as an essential element of developing and implementing these strategies, as well as of the projects that are carried out as part of the strategies (IAFWA 2004a)

## GAP Data Use in Comprehensive Wildlife Conservation Strategies

Four of these required elements could benefit from geospatial information in general, and from GAP data in particular. For the first element, there is a clear fit with GAP's predicted species distribution maps for fulfilling the requirement for information on the distribution of species. For the second element, GAP provides location information that can facilitate making site visits to assess the locations and relative condition of key habitats and community types. For the third element, GAP land stewardship and predicted species distribution data could be used, in conjunction with other data about land use, to identify areas threatened by impacts such as urbanization, invasive species, or mining. This would address the requirement to describe problems that may adversely affect species. And for the fourth element, GAP land stewardship and species richness data could be key in determining conservation opportunity areas that, if protected, could secure SGCN species and their habitat. These data would help address the requirement for descriptions of conservation actions proposed to conserve the identified species and habitats (NBII 2004).

The fifth element, which requires plans for monitoring species and their habitats, could be addressed by coordinating with GAP's NatureMapping program, which is currently operating in six states. One of the primary objectives of the NatureMapping program is the collection of data on wildlife and habitat by trained observers. Through carefully designed workshops, even people with little experience in field data collection are taught to observe wildlife and transmit their observations to a central database using online forms. All NatureMapping data are reviewed by experts before being accepted for entry into a database of observations. This database could later be used to validate habitat models or record species' expansions. By using NatureMappers to monitor wildlife and habitat in high-value conservation areas, states could get a dynamic picture of how their conservation efforts are progressing.

Since GAP data are potentially useful in completing CWCSs, the focus of this project was to investigate the extent to which GAP data were being used in their development. State wildlife strategy coordinators and GAP principal investigators were surveyed. Because this was a preliminary assessment, subjects were simply asked whether GAP data were being used for CWCS development in their state; if yes, how; and if no, why not. Responses were received from at least one person in 39 states, and of the 11 states that did not respond, three had not yet completed their GAP project.

Survey results (Figure 1) showed that GAP data have most often been used to address CWCS elements one and two. Sixteen states have used GAP data to develop or refine predicted species distribution maps for SGCN species. Sixteen states have used the

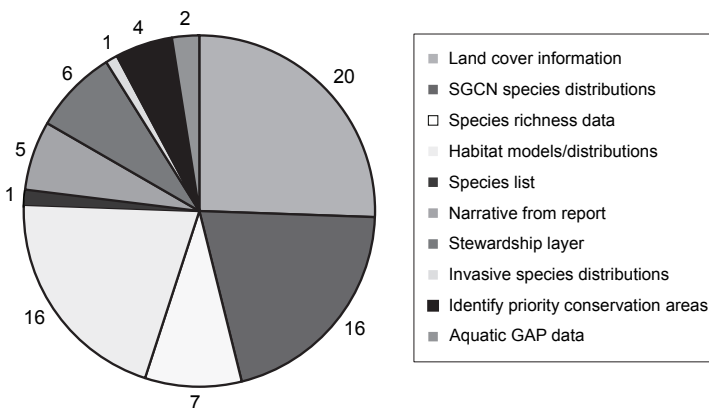


Figure 1. Use of GAP data in the development of state comprehensive wildlife conservation strategies.

data to develop maps of habitat for SGCN species, while seven states are using GAP data to update or refine species richness maps—often weighting the maps in favor of SGCN species to help identify priority conservation areas. For example, Kentucky used GAP predicted species distribution maps for high-priority species as a key layer in identifying the most important habitat parcels to protect. A species-weighting matrix was developed from NatureServe G and S ranks that allowed each species to be assigned a score reflective of rarity in Kentucky. GAP species distribution models were recoded so that each high-priority species was assigned a relative rarity score and each 30 X 30 meter pixel of the land cover map was given a score based on whether it provided no data (0), marginal (1), or optimal (2) habitat for that species. The “weighted” scores were summed using ESRI’s Spatial Analyst extension for all high-priority species across the landscape (Figure 2). The resulting predicted-species rarity layer was used in conjunction with other data sets to identify optimal conservation areas (Wethington 2003). New Mexico has used a similar process of rating target species, in combination with the use of intelligent assemblages to capture taxonomic diversity within identified land cover types, to identify priority habitat types (Schrupp and Boykin 2004).

GAP’s land cover data have been an important piece in plan development in 20 states. In five states, GAP land cover was the basis for the habitat classification system used (TWW 2003). Some states, such as North Carolina, reclassified land cover to a habitat map to show the distribution of broad habitat types. Other states made a subset of land cover that corresponded to natural vegetation to help identify potential conservation opportunity areas. Georgia incorporated GAP data for land cover, conservation lands, and predicted species distribution maps, along with ancillary data sets, to identify high-quality habitat patches—particularly patches adjacent to existing conservation lands (Ambrose 2004; Kramer and Ellittott 2005).

Other ways that states have used GAP data for their CWCSs include using the habitat narratives from GAP reports (four states), using the GAP stewardship layer to identify priority conservation areas (six states), using GAP aquatic data to develop models and predicted distribution maps for SGCN aquatic species (two states), and using the data to identify threats posed by invasive species (one state).

The six respondents who did not incorporate GAP into their strategies cited several reasons: one said the data in their state were too old to be useful, one said the data were too coarse to be useful for a small New England state, and four expressed frustration that data were not yet available for them.

### Conclusion

GAP data have played an important role in the development of state CWCSs. This is an encouraging sign that some early challenges to GAP implementation are being met. Other challenges, such as the lack of awareness and access to GAP data, the difficulty of applying coarse-scale maps to small areas, and the age of the data, will be resolved as GAP moves into regional efforts.

It is possible that as planners and other land-use decision makers see GAP data being used, they will begin to incorporate them more into their own efforts. Because GAP projects were designed as collaborative projects, they have helped to develop and foster the cross-agency partnerships that will be essential to integrated conservation efforts, such as CWCSs, in the future. More important, as regional GAP projects, land cover maps, and data sets are completed, state conservation professionals will continue to find GAP data an important tool in conservation planning.

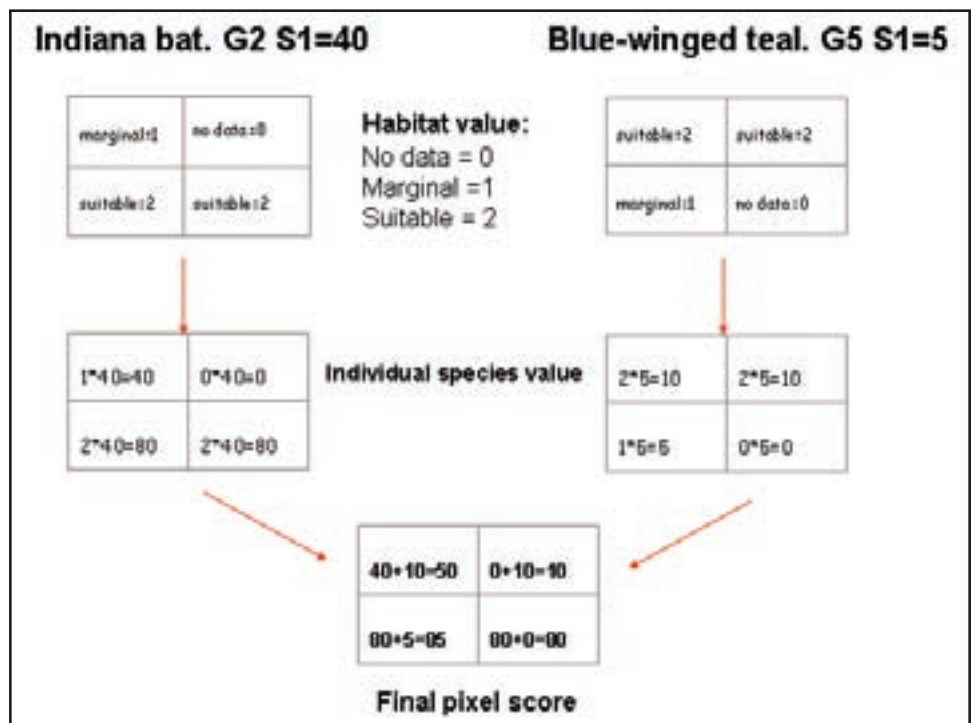


Figure 2. Matrix showing habitat and individual species values for Indiana bat and blue-winged teal and resultant final pixel scores.

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## Literature Cited

- Ambrose, J. 2004. Identifying conservation opportunity areas in Georgia. Presentation to the Georgia Department of Natural Resources, Wildlife Resources Division.
- IAFWA. 2002. Guiding principles for states to consider in developing comprehensive wildlife conservation plans and wildlife conservation strategies (plans-strategies) for the state wildlife grant and wildlife conservation and restoration programs. Retrieved March 18, 2005, from <<http://www.teaming.com/pdf/State%20Strategies%20Guiding%20Principles.pdf>>.
- . 2004a. State wildlife conservation strategies: Eight required elements for conservation strategies. Retrieved March 18, 2005, from <<http://www.teaming.com/pdf/Eight%20Elements%20for%20Conservation%20Strategies.pdf>>.
- . 2004b. State wildlife conservation strategies: Defining a vision for conservation success. Retrieved March 15, 2005, from <<http://www.teaming.com/pdf/State%20Strategies%20Overview.pdf>>.
- Kramer, L., and M. Elliott. 2005. Identification of conservation priority areas in Georgia. *Gap Analysis Bulletin* 13: 14-20.
- McClafferty, J. A., and J. L. Waldon. 2002. Opportunities for and barriers to GAP implementation. Presentation to the 2002 Gap Analysis Meeting, Shepherdstown, W.Va.
- NBII. 2004. Using GAP data in state comprehensive wildlife management plans. National Biological Information Infrastructure fact sheet.
- Schrupp, D., and K. Boykin. 2004. Potential uses of SWReGAP products in support of development of comprehensive wildlife conservation strategies. Presentation to the Organization of Fish and Wildlife Information Managers, San Diego, Calif.
- TWW. 2003. Ecological framework options for comprehensive wildlife conservation strategies. Retrieved March 18, 2005, from <<http://www.teamingwithwildlife.org/pdf/3%20Ecological%20Framework.pdf>>.
- Wethington, M. K. 2003. The role of GAP data and GIS modeling techniques in developing a comprehensive plan for state and tribal wildlife grants. Presentation to the 2003 Gap Analysis Meeting, Fort Collins, Colo.