

WILDLIFE ECOLOGY SUPPORT TO ECOSYSTEM MANAGEMENT - EMPHASIS AREAS -

Wildlife ecology is part of the Watershed, Fish, Wildlife, Air, and Rare Plants program in the National Forest System of the USDA Forest Service. Wildlife ecologists are responsible for developing much of the technical information necessary to successfully manage animal habitats on the National Forests, within the context of ecosystem management. The efforts of wildlife ecologists in the 9 regions of the Forest Service are supported by and coordinated through the Washington Office by the Terrestrial Wildlife Ecology Unit.

Much of the work of the wildlife ecologists requires liaison with the Forest Service Research and Development program to facilitate the timely application of research information in ecosystem management. Close coordination with field biologists, specialists in other disciplines, and managers at every level is also critical to ensure that the products and tools we develop are compatible with decision-making frameworks.

ACTIVITIES OF THE WILDLIFE ECOLOGISTS

Activities of wildlife ecologists are organized into 4 main tasks:

- Inventory and monitoring species and habitats
- Species and habitat modeling and information systems
- Analysis and planning procedures
- Training, education, and technology transfer

INVENTORY AND MONITORING SPECIES AND HABITATS

Inventory information is a basic starting point for understanding and managing ecosystems. It is critical for understanding current conditions, for describing desired conditions, and for understanding what ecosystem components and processes need to be considered in analysis and management. Inventories are needed for species themselves, as well as for components of their habitats. Inventories of animal species can be focused on a variety of characteristics including species occurrence, distribution, abundance, and population performance.

Monitoring is central to the concept of ecosystem management. Monitoring is used to determine how well proposed actions are implemented, the effects of management actions, the validity of assumptions used in developing ecosystem management plans, and the need for changes in management. It thus provides the basis for adaptive management. Monitoring is particularly critical for animal species for which our understanding of responses to management is limited.

CURRENT STATUS

Inventories of animal species have generally not been conducted systematically within the National Forest System. Inventories are routine only for species with very high public interest, such as threatened or endangered species or highly-prized game species. For many of the species that inhabit National Forests, the most basic information on occurrence and distribution

is not available. Information on abundance is available for even fewer species, and demographic information is available in only a few cases.

Vegetation inventories have been a basic component of Forest Service management programs for decades. The inventories have traditionally focused on the timber resource, but are undergoing fundamental changes to better reflect the change in the agency's mission toward ecosystem management. As part of this process, protocols and designs must be developed for many aspects of habitat.

Monitoring of habitats and species is variable across the agency. Monitoring directed specifically at habitat characteristics has been infrequent. Basic implementation monitoring of habitat protection measures, such as snag retention, is lacking in some areas. Monitoring for animal species has generally focused only on rare or endangered species. Individual efforts have taken place on some districts and forests, but improved protocols, designs, and coordination are needed to improve the utility of monitoring efforts.

WHAT TOOLS, PRODUCTS, AND PROCESSES ARE NEEDED?

Improvement of our inventory and monitoring processes requires the development of coordinated protocols and sampling designs, the development of useful databases, and national emphasis in budgeting.

Following are the key roles of the regional and national wildlife ecologists in development of inventory and monitoring protocols, sample designs, and data bases.

- Define information needs at various scales for both habitat and animal species
- Provide national and regional leadership for the design of species inventory and monitoring protocols and sample designs
- Promote the design, implementation, and coordination of national and regional databases
- Provide training on protocols and sample designs
- Develop budgets, schedules, and tracking systems for the implementation of inventory and monitoring efforts by field units
- Work with other resource databases and data acquisition efforts (particularly timber, range, and vegetation ecology) to improve access and usefulness of data and databases for wildlife biologists

SPECIES AND VEGETATION MODELING

STATEMENT OF NEED

Ecosystem protection and restoration require that we be able to describe the current situation for components of ecosystems, understand historical conditions, and project likely future conditions based on different management and natural event scenarios. Credible inventory data provide the starting point for these efforts. However, inventory data provide basic information and requires interpretation for many ecosystem elements. For example, inventory information may have to be interpreted through a habitat capability model in order to inform us of the likely conditions for a particular wildlife species of interest. In order to project those conditions into the future, we need to have reliable models that allow us to describe how vegetation might change under different scenarios. These must then be linked to the species models to characterize habitat conditions for species of interest. Species modeling also requires the accumulation of basic information on species life history, population dynamics, and distribution.

CURRENT SITUATION

Species models

A variety of habitat capability models are currently available throughout the Forest Service and elsewhere. These models are generally quite rudimentary, but some have proved very useful in particular locations. However, most of them suffer from weaknesses including lack of clearly specified objectives, inaccuracies, poor design, misapplication, and lack of evaluation.

An additional weakness is the lack of consistency among regions in deciding what species should be the focus of modeling. As a result, some regions have a very limited number of models available, while others have undertaken regional modeling efforts for dozens of species. Because of the uneven availability of models, and the weaknesses in those that are available, opportunities are often lost to fully incorporate habitat capability information into decision-making.

Development of population models has, quite naturally, lagged behind habitat models. Few population models have been developed, and examples of their use are scarce.

Vegetation models

Models of stand development are available for most forest types in the country, but these models generally emphasize stand characteristics that are important to an evaluation of timber production potential. Other stand characteristics, such as the presence of standing and down dead material, or canopy structure, are often not well represented in the models.

Models of vegetation change at scales larger than stands have generally focused on the analysis of sustainable levels of timber production. The basis for such models is being reconsidered, and implementation of ecosystem management requires predictive models for vegetation at all scales addressing all key characteristics.

WHAT TOOLS, PRODUCTS, AND PROCESSES ARE NEEDED?

Species models

The following are actions needed for improvement of species modeling within the context of ecosystem management.

- Develop a classification system for models that would allow us to distinguish basic types of models and develop national and regional standards for each type of model
- Develop and maintain a catalog of available models
- Establish and fund Regional and inter-Regional priorities for model development and evaluation
- Investigate the utility of models addressing guilds or functional groups of species and develop them as appropriate
- Expand the range of habitats for which models are available (e.g., non-forested habitats)
- Incorporate the use of spatial information to better describe species-habitat relationships

Vegetation models

Actions needed to improve vegetation modeling include:

- Enhance existing stand growth and yield models to improve their capability to project characteristics particularly important to wildlife habitat
- Promote the development of ecosystem models that operate at scales larger than stands
- Develop automated links among vegetation, species, and other ecosystem models

ANALYSIS AND PLANNING PROCEDURES

STATEMENT OF NEED

Protecting and restoring healthy ecosystems requires analysis and planning at multiple scales, both temporally and spatially; understanding of ecological relationships and the status of key ecological indicators; and application of appropriate management regimes at these scales. Definition, assessment, and management of ecosystems must include both coarse and fine-filter approaches and perspectives, implemented across the full range of temporal and spatial scales.

Sustaining ecosystem health also requires maintenance of biodiversity, which in turn requires management for sustainable populations of native species. Consideration of species sustainability is a challenging task that requires the development and application of standard

methods and collaboration and review with peers. Additionally, assessment of and management for other species of interest and importance to society, such as game species, must be included.

CURRENT SITUATION

To date, sustainability and biodiversity analyses have not been standardized, and are being applied inconsistently within the Forest Service. Challenges to these analytical procedures have been among the most persistent legal problems faced by the agency in recent years. The lack of accepted procedures also leads to great inefficiency, as forest and district biologists struggle to develop acceptable procedures.

Standard analysis for project planning still focuses at the stand scale in much of the country. This scale is inappropriate for landscape issues such as species sustainability. Analysis at larger scales is hampered by inadequate personnel and funding; inadequate inventory data and poor availability of data; lack of analytical tools; and lack of an accepted analytical framework.

WHAT TOOLS, PRODUCTS AND PROCESSES ARE NEEDED?

The following actions are needed to establish consistent, credible procedures for consideration of terrestrial animals and their habitats in our planning processes.

- Review current conservation assessments and identify additional needs for assessing species at risk
- Coordinate and seek approval for conservation assessments at the Region and Washington Office levels as a priority for ecosystem management and obtain the necessary funding
- Collaborate with experts in the development and refinement of principles and protocols for hierarchal analysis of biological diversity, population sustainability, and ecosystem function and integrity
- Incorporate these principles and protocols into planning direction at forest, regional, and national scales
- Define issues and topics of high priority (e.g., rare or endemic habitat types) and identify information needs at national, regional, and sub-regional scales for conducting analyses
- Provide support to Forests and Districts for analysis of local biodiversity and sustainability issues

TRAINING AND EDUCATION

STATEMENT OF NEED

While our biologists are highly trained and skilled in the field of wildlife management, many lack extensive, formal training in the fields of ecosystem management, landscape ecology, conservation biology, experimental design, and data analysis. The ability of our wildlife workforce to correctly apply new scientific concepts at the field level is critical to organizational effectiveness and ecosystem sustainability.

CURRENT SITUATION

A national continuing education program for wildlife biologists and associated specialists was started in 1986. This program has helped to increase workforce awareness of new developments in the fields of wildlife biology, conservation biology, and analytical applications. However, the courses in the program are limited to 2 weeks duration, making it difficult to fully train biologists to apply new tools in their everyday work.

At the current time, there is a lack of appropriately trained biologists to fill many of the critical, technical positions in the agency, and there is no established pathway that biologists can follow to get the training to fill these needs.

WHAT TOOLS, PRODUCTS, AND PROCESSES ARE NEEDED?

More intensive and diverse training opportunities are essential. Necessary actions include:

- Refine the series of continuing education courses to focus on monitoring, sustainability risk assessments, wildlife inventories, wildlife monitoring, model applications, GIS, and other computer applications
- Provide opportunities for intensive individual training such as graduate coursework at universities and semester-long intensive training programs
- Provide opportunities for additional forms of diverse training experiences such as details, sabbaticals, liaison positions with Forest Service Research and Development, and Interagency Personnel Agreements
- Support an ongoing technology transfer program including formal transfer through Forest Service general technical reports and other scientific publications, as well as newsletters, briefings, presentations, workshops, and other informal transfer mechanisms
- Develop continuing education opportunities through distance learning and web-based courses