

July 1991

# WILDLIFE MANAGEMENT

## Problems Being Experienced With Current Monitoring Approach



144432



**Resources, Community, and  
Economic Development Division**

B-241613

July 22, 1991

**The Honorable Edward Madigan  
The Secretary of Agriculture**

Dear Mr. Secretary:

On March 7, 1991, we issued a report on public lands wildlife management.<sup>1</sup> During that review an issue surfaced that we believe requires your attention concerning the so-called "management indicator species" approach used by the Forest Service to monitor wildlife and their habitat in the national forests. In implementing this approach, Forest Service personnel track the condition of several selected species to measure the overall condition of forest wildlife habitat as well as the impact of Forest Service management actions on that habitat.

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**Results in Brief**

The Forest Service's management indicator species approach to monitoring, as currently practiced, appears to have several practical drawbacks and can be prohibitively expensive to implement. Furthermore, Forest Service officials responsible for conducting monitoring in the field told us that even when planned data collection efforts are completed using this monitoring approach, the data can have limited usefulness because observed population changes in the species being monitored often cannot be related to overall habitat conditions or the effects of Forest Service management actions. Forest Service headquarters officials recognize that practical problems have been experienced but believe these difficulties have stemmed more from the way the management indicator species principles were applied, rather than from fundamental weaknesses with the concept itself. The officials said they are attempting to improve their direction to field staff and believe that with revised direction many of the problems we observed can be resolved.

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**Background**

The 191 million acres of forests and grasslands managed by the Forest Service provide important habitat for many wildlife species, including 93 vertebrate species federally listed as endangered or threatened.<sup>2</sup>

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<sup>1</sup>Public Land Management: Attention to Wildlife Is Limited (GAO/RCED-91-64, Mar. 7, 1991).

<sup>2</sup>Endangered species are those determined to be currently in danger of extinction; threatened species are those not currently in such danger but likely to become so within the foreseeable future.

These lands are especially important to species that require large, undisturbed areas or mature and old-growth forests. Nationwide, Forest Service lands supply more than half of the remaining habitat for big game animals. For example, approximately 93 percent of the nation's elk population spends at least part of each year in national forests.

Under the Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528 et seq.) and the National Forest Management Act of 1976 (16 U.S.C. 1604 (e)), the Forest Service is directed to manage all the various uses of its lands in balanced fashion without permanently impairing the lands' productivity. In implementing this mandate on the national forest system, the Forest Service considers the needs of fish and wildlife along with other uses, such as timber production and recreation. Agency goals for habitat management include (1) recovery of threatened and endangered species, (2) maintenance of viable populations of all vertebrates and plants in each forest, and (3) production of certain other key species within a balance of public demand, multiple-use/sustained-yield objectives, and resource allocations.

The National Forest Management Act did not specify a method for monitoring Forest Service activity to determine its performance toward achieving these goals. However, the act directed the Secretary of Agriculture to appoint a committee of scientists to provide scientific and technical advice in developing implementing regulations. The committee of scientists recommended the management indicator species approach. Forest Service regulations dated September 30, 1982 (36 C.F.R. 219), adopted the committee's recommendations.

Under the management indicator species approach, forest managers identify and select a limited number of species that are then tracked as a means of making broader assessments of the overall ecological condition of the forest's wildlife and wildlife habitat and the other species dwelling in the habitat, as well as the effects of Forest Service management activities. Population changes in the indicator species being monitored are interpreted as a signal of changes in the health of the ecosystem.

Forest Service planning regulations (36 C.F.R. 219.19) direct that, as appropriate, several categories of species are to be represented among the management indicator species selected. These categories include (1) endangered and threatened plant and animal species; (2) species with special habitat needs that may be influenced significantly by planned management programs; (3) species commonly hunted, fished, or

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trapped; and (4) nongame species of special interest. At the four national forests we visited,<sup>3</sup> the number of management indicator species ranged from 8 to 23.

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## Monitoring Using Management Indicator Species Appears Expensive and Ineffective

Forest Service staff we interviewed and previous research studies we analyzed raised several concerns about the utility of the management indicator species approach to monitoring wildlife conditions. This information indicates that while the approach was based on sound theory, nearly a decade of experience trying to implement it in the field demonstrates that it has several practical drawbacks and can be prohibitively expensive. As a result, monitoring using this approach may not be providing enough useful information to forest managers.

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### Practical Drawbacks

Several practical drawbacks exist that raise questions about whether data collected on selected species can provide the basis for drawing conclusions on overall habitat conditions. First, relationships between indicator species and the habitat characteristics they are supposed to predict are often not known. Without a clear understanding of such relationships, an observed population decline in an indicator species may or may not represent a change in overall habitat conditions or establish whether the change was caused by Forest Service management actions or other reasons. Second, as noted by Forest Service managers, changes in population that are detected could be due to habitat changes beyond management control, or be part of a normal cycle requiring no management action.

Third, monitoring of indicator species may be impractical because the large numbers of skilled staff required may not be available during the critical, but short, time periods (such as breeding seasons) on which the effectiveness of the approach depends. Finally, the potential for successfully using the indicator species approach has been hampered because the selection of indicator species is sometimes based on factors other than their biological or ecological representativeness, or their predictive value. Instead, some indicator species have been selected for socioeconomic or political reasons.

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<sup>3</sup>The four forests visited were the Sierra National Forest in California, Chippewa National Forest in Minnesota, Sawtooth National Forest in Idaho, and the Lewis and Clark National Forest in Montana.

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## Costs

In addition to these practical difficulties of a technical nature, the costs of monitoring indicator species populations to show changes in habitat conditions can be prohibitive. The cost of monitoring can be high under the best of circumstances and increases as the population of the species being monitored decreases or as the size of the habitat increases.

Estimates of the costs of monitoring yearly changes in the population of pileated woodpeckers in the Sierra National Forest demonstrate the kinds of costs that can be involved in implementing this monitoring approach. In this case, researchers estimated that detecting a 10-percent change in the population would require on the order of 15,000 staff-days of effort. The researchers estimated the cost of this effort would exceed \$1 million a year.

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## Usefulness of Data Is Questionable

The problems being experienced with the management indicator species approach are shown, in part, by an example at the Chippewa National Forest. At this forest, we found that almost all of the planned management indicator species population monitoring had been accomplished. However, according to the forest's wildlife biologist, the information developed had limited usefulness because it revealed population trends without conclusively relating observed changes to management actions or overall habitat conditions. He told us that in order to determine the impacts of management actions on habitat or on individual species, staff need (1) baseline inventory information on the species being monitored, (2) population targets for the species, and (3) a clear understanding of the relationships among habitat types and the condition of the vegetation and wildlife species. These additional needs had not been met. Accordingly, the staff were not sure what the data they had collected actually indicated.

The problems we observed are broadly consistent with a recent report prepared by the Wildlife Management Institute.<sup>4</sup> This report found that (1) the Forest Service is selecting more management indicator species than can be monitored effectively, (2) many forests have selected indicator species (such as species chosen for socioeconomic or political reasons) that have compromised the effectiveness and credibility of the management indicator species concept, and (3) adjacent forests have monitored different species as indicators of the same ecological conditions in the same types of vegetative communities. The report noted that

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<sup>4</sup>Recommendations to Improve Fish and Wildlife Programs of the USDA Forest Service (Jan. 1990).

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the biological characteristics and habitat relationships of many management indicator species are not well defined and require continuing study. Given the complexity of natural systems, the report noted that substantial additional funds would be needed to support the carefully designed research essential to help identify and judge the efficacy of management indicator species as ecological indicators of management activities. The report observed that without changes in the Forest Service's management indicator species approach, the agency's capability to complete the necessary monitoring and evaluation is questionable.

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## Forest Service Headquarters Officials Acknowledge Problems

Forest Service headquarters officials acknowledged that problems exist in field implementation of the management indicator species approach as currently practiced. They said, however, that the difficulties stemmed from the way the management indicator species principles were applied. They believed that the management indicator species concept itself is basically sound and if direction focusing on habitat is provided, many of the problems we observed can be resolved.

To this end, the officials said that Forest Service headquarters is currently revising its national direction on wildlife and wildlife habitat monitoring. Included in the proposed revision is clarification on what constitutes management and ecological indicators and how these indicators should be considered and applied in forest planning and plan implementation. Relatedly, the Forest Service has recently published an advance notice of proposed rulemaking to simplify its forest planning process. One of the provisions of this preliminary proposal is to replace the existing management indicator species terminology with a broader reference to "management indicators" that would include not only species but also special habitats and unique biological communities identified in the forest planning area. The intent is for monitoring to focus on habitat capability and to relate changes in habitat capability to associated effects on species populations. Headquarters officials believe that these efforts will go a long way toward avoiding the problems we observed during our review.

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## Conclusions

From several perspectives there is reason to question the cost-effectiveness and ultimate usefulness of the Forest Service's management indicator species approach to wildlife monitoring as now being implemented. The Forest Service is currently taking steps to improve its implementing directions to field staff and to make adjustments in the approach itself. The concerns and problems we observed should provide

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valuable input and merit full consideration as these adjustments are being devised and implemented.

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## Recommendations

We recommend that the Secretary of Agriculture direct the Chief of the Forest Service to fully consider the concerns we identified about the utility of the management indicator species approach to wildlife monitoring as the agency considers modification and clarification of the approach. During the ongoing agency examination of the Forest Service's monitoring approach, the needs and experiences of field staff responsible for implementing it should be solicited and reflected in any rules and guidance that are ultimately issued.

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## Agency Comments

We provided a draft of this report to the Forest Service for its review and met with Service officials to discuss their comments. The officials said that although they agree that problems exist with the way the management indicator species approach is currently implemented, the steps the Service is currently taking to improve directions to field staff and adjust the approach will address many of the problems we found. We modified the recommendation in our draft report to acknowledge that the Forest Service has begun to reevaluate its monitoring approach. We continue to believe that the Forest Service needs to consider both the concerns we raised as well as the experiences of field staff in that reevaluation effort.

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As previously noted, we developed the information contained in this report during a broader review of wildlife management on federal lands. Regarding the specific information contained in this report, we talked with researchers at the Pacific Southwest Forest and Range Experiment Station and officials at the four national forests. In addition, we reviewed research papers and evaluation reports assessing the management indicator species approach prepared by Forest Service and other researchers. Our work was conducted in accordance with generally accepted government auditing standards.

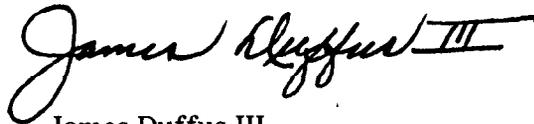
The head of a federal agency is required by 31 U.S.C. 720 to submit a written statement of actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations not later than 60 days after the date of this letter and to the House and Senate Committees on Appropriations with

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the agency's first request for appropriations made more than 60 days after the date of this letter.

If you or any of your staff have any questions concerning this report, please contact me at (202) 275-7756. Major contributors to this report are listed in appendix I.

Sincerely yours,

A handwritten signature in black ink that reads "James Duffus III". The signature is written in a cursive style with a horizontal line at the end.

James Duffus III  
Director, Natural Resources  
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# Major Contributors to This Report

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