United States Government Accountability Office

GAO

Report to Congressional Requesters

May 2009

ENDANGERED SPECIES ACT

The U.S. Fish and Wildlife Service Has Incomplete Information about Effects on Listed Species from Section 7 Consultations

GAO-09-550

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The U.S. Fish and Wildlife Service Has Incomplete Information about Effects on Listed Species from Section 7 Consultations

GAO Accountability·Integrity·Reliability

Highlights

Highlights of GAO-09-550, a report to congressional requesters

Why GAO Did This Study

The western United States, including vast stretches of federal land, is home to more than a third of the 1,317 species listed under the Endangered Species Act. Under section 7 of the act, federal agencies must ensure that any actions they authorize, fund, or carry out, whether on federal or private lands, do not jeopardize listed species. To fulfill this responsibility, the agencies often must formally consult with the Department of the Interior's U.S. Fish and Wildlife Service (Service), which issues a biological opinion assessing whether an action is likely to "take," or harm, a listed species. The Service may require the agencies to monitor and report on the action's effects on listed species, including take.

For listed species subject to formal consultations in 11 western states, GAO was asked to examine the extent to which the Service tracks (1) required monitoring reports and (2) cumulative take. GAO reviewed the act, regulations, and policy and interviewed Service staff in all western states, reviewed 128 consultation files in five offices, and analyzed 23 listed species in detail.

What GAO Recommends

GAO recommends that the Service develop a cost-effective method for tracking required monitoring reports systematically and continue to develop existing databases to enable tracking of cumulative take. The Department of the Interior concurred with GAO's findings and recommendations.

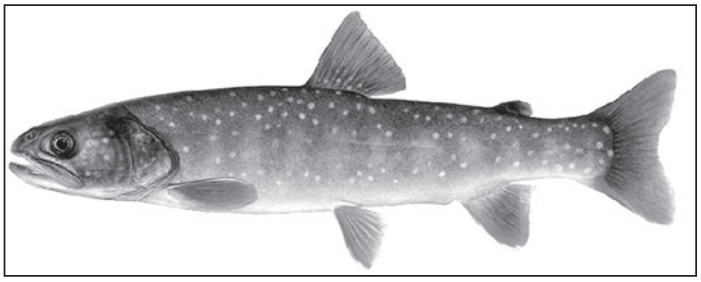
View GAO-09-550 or key components.
For more information, contact Robin M. Nazzaro at (202) 512-3841 or nazzaror@gao.gov.

What GAO Found

The Service lacks a systematic means of tracking the monitoring reports it requires in biological opinions and does not know the extent of compliance with these requirements. To track monitoring reports, the Service relies on its biologists to keep abreast of biological opinions and follow up on required monitoring reports. At the field offices GAO visited, Service biologists could not account for all required monitoring reports in 40 of 64 consultation files (63 percent) requiring such reports. Service staff said they face a demanding workload, and responding to new consultation requests often takes higher priority than following up on monitoring reports. This reliance on individual biologists leaves the Service with incomplete institutional knowledge of the extent of action agencies' compliance with reporting requirements, as well as with incomplete information on species' responses to the actions under consultation.

The Service also lacks a systematic method for tracking cumulative take of most listed species. Out of 497 listed species in the western states, GAO identified 3 species for which the Service has a formal, Web-based database for tracking cumulative take: northern spotted owl, marbled murrelet, and bull trout. GAO identified 7 more species for which Service biologists developed informal means to track cumulative take. While Service staff generally agreed that it is important to track cumulative take of all species, they cautioned that one size does not fit all in terms of tracking take. For some species, Service biologists said, systematically tracking cumulative take has not been critical, either because very few consultations have occurred with little to no take anticipated, or the Service has good information on the species' status through other sources. For other species, however, such as those that are frequently consulted on and wide-ranging, Service biologists believed that having a more systematic take-tracking method was warranted. The lack of systematic means to track cumulative take for some species, and the resulting gap in knowledge of the species' status, exposes the Service to vulnerabilities, including the threat of litigation and unobserved declines in species. The Service has been developing various databases for more systematically tracking cumulative take, though their development largely depends on resources not yet available in the Service's budget.

Bull Trout



Listed as threatened, the bull trout lives in the cold streams, creeks, and rivers of the western United States. The Service is developing a database to track cumulative take of bull trout throughout its range, in part in response to litigation.

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Abbreviations

TAILS Tracking and Integrated Logging System

GAO
Accountability * Integrity * Reliability

United States Government Accountability Office
Washington, DC 20548

May 21, 2009

The Honorable Nick J. Rahall, II
Chairman
Committee on Natural Resources
House of Representatives

The Honorable Peter A. DeFazio
House of Representatives

The Honorable Jay Inslee
House of Representatives

Vast stretches of the millions of acres of federally managed lands in the western United States are home to more than a third of the 1,317 species listed as threatened or endangered under the nation's Endangered Species Act.[1] Under section 7 of the act, federal agencies must ensure that any action they authorize, fund, or carry out—such as building highways, harvesting timber, or drilling for oil and gas—is not likely to jeopardize the continued existence of a species protected under the act. To fulfill this responsibility, the agencies must, under some circumstances, formally consult with the Department of the Interior's U.S. Fish and Wildlife Service (Service) when their actions may affect listed species or habitat identified as critical to the species' survival.[2] Formal consultations generally result in the issuance of biological opinions by the Service. The biological opinion contains a detailed discussion of the effects of the action on listed species or critical habitat, and the Service's opinion on whether the agency action is likely to jeopardize the continued existence of the species. The opinion also determines the amount or extent of anticipated "incidental take"—that is, take (harm) resulting from but not the purpose of the agency action—in an incidental take statement.

[1]16 U.S.C. §§ 1531-1544.

[2]The Department of the Interior, which has responsibilities for implementing the Endangered Species Act for all terrestrial (land-dwelling) and freshwater species, as well as for sea turtles when on land and all birds, including seabirds, has largely delegated these responsibilities to the Service. The Department of Commerce, which is responsible for implementing the act for most anadromous (saltwater-freshwater migrant) fish, such as salmon, and most marine species, has delegated its responsibilities to the National Marine Fisheries Service. This report does not address the National Marine Fisheries Service.

Biological opinions also often contain provisions directing an agency to monitor and report on the effects of its action on listed species. For example, the Service may ask an agency to monitor the number of bird nests affected during forest thinning or the densities of fish in a river after levee construction. This monitoring information enables the Service to assess an action's effect, including take, on listed species, which the Service can then roll up for a picture of the cumulative effects that federally authorized actions are having on listed species. Given the many listed species, the extent of federally managed lands, and increasing demands on the nation's lands with new federal spending on infrastructure and energy projects, particularly across the western United States, the Service's need to assess the impacts of federally authorized actions on listed species is of growing importance.

In this context, for the 11 contiguous western states, and listed species subject to formal consultations, we were asked to report on (1) the extent to which the Service tracks required monitoring reports and (2) the extent to which the Service tracks cumulative take.

To determine the extent to which the Service tracks required monitoring reports and the extent to which the Service tracks the cumulative take of species, we reviewed the Endangered Species Act and relevant regulations, Service policy, and litigation. We interviewed Service managers, biologists, and other staff from headquarters, four regional offices, and all 18 field offices in the 11 western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming). To assess the Service's tracking of required monitoring reports, we reviewed 128 randomly selected formal consultation files out of the 831 formal consultations completed from fiscal years 2003 through 2006 at 5 field offices: Arcata, California; Carlsbad, California; Lacey, Washington; Lakewood, Colorado; and Phoenix, Arizona. In addition to reviewing these files, we also interviewed Service staff knowledgeable about the formal consultations. To determine the extent to which the Service tracks the cumulative take of species, we judgmentally selected a sample of 23 listed species that occur in the 11 western states. These species included all those identified by Service staff as having a means for tracking cumulative take, plus other species, to capture a range of variability of species characteristics. For each selected species, we reviewed documentation about the species and relevant consultation-related actions and interviewed Service staff knowledgeable about both. Additionally, we reviewed documentation and asked Service staff to explain their efforts to develop various consultation-related databases.

We conducted this performance audit from July 2008 through May 2009, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Appendix I describes our scope and methodology in greater detail.

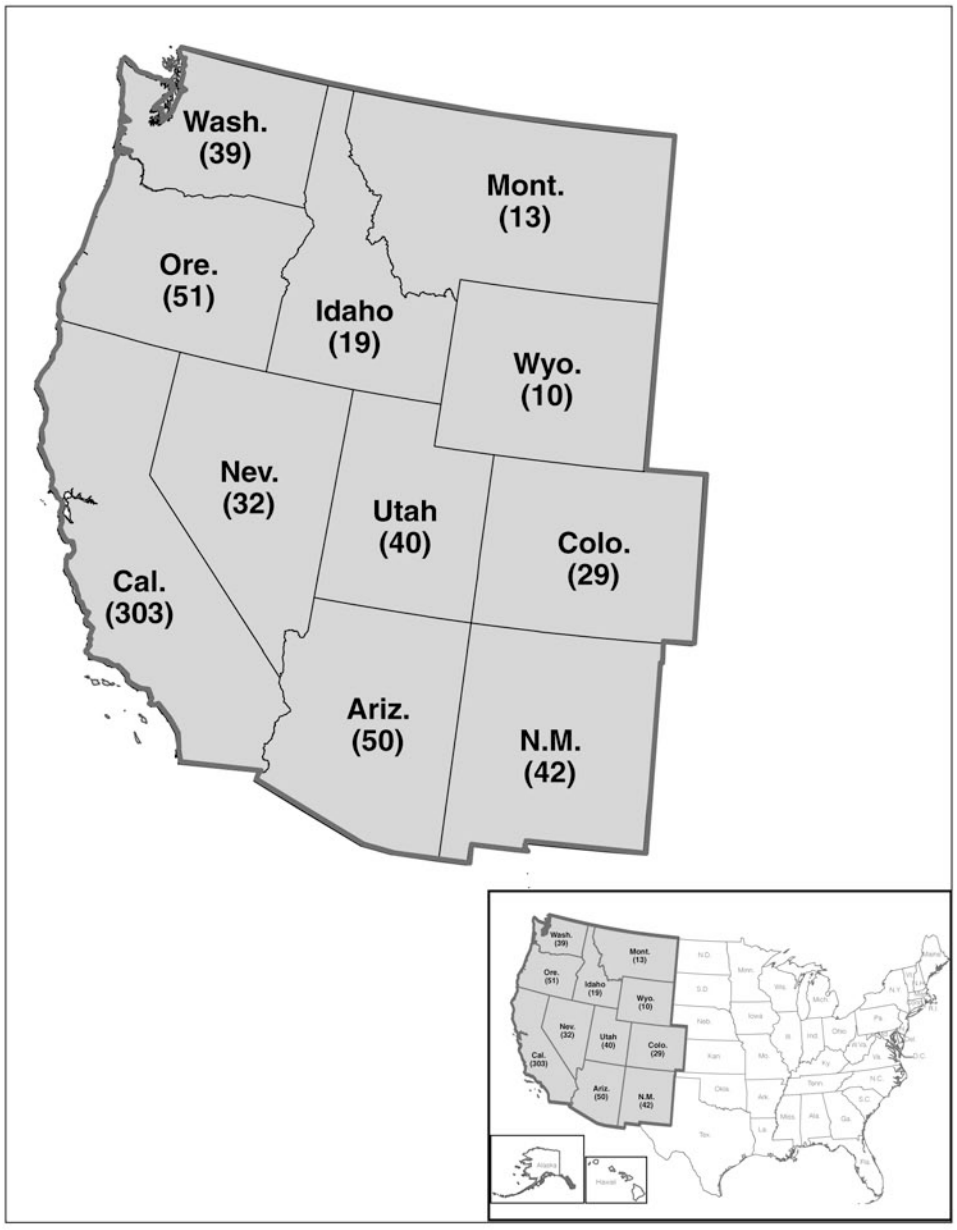
Background

The purpose of the Endangered Species Act is to conserve threatened and endangered species and the ecosystems upon which they depend.[3] The act includes provisions for listing species that need protection, designating habitat deemed critical to a listed species' survival, developing recovery plans, and protecting listed species against certain harms caused by federal and nonfederal actions. As of May 2009, a total of 1,317 species were listed in the United States, 497 in the 11 western states (see fig. 1).[4]

[3]An endangered species is any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. A threatened species is any species of animal or plant that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

[4]The National Marine Fisheries Service has jurisdiction for 68 of the total 1,317 species, and 40 of the 497 species listed in the 11 western states.

Figure 1: Number of Listed Species Found in Each of the 11 Western States, as of May 2009



Sources: U.S. Fish and Wildlife Service; Map Resources (map).

Note: The number for each state represents the total number of species both federally listed and found in the state (some listed species may be under the jurisdiction of the National Marine Fisheries Service). Some listed species are found in more than 1 state; therefore, the sum of numbers on the map exceeds the total number of listed species in the 11 states.

Once a species is listed, the act requires that the Service designate critical habitats, geographical areas that are essential for the conservation of listed species; develop and implement a recovery plan containing objective, measurable criteria that, when met, would result in a determination that the species be removed from the list; and review the status of listed species every 5 years.[5] The act also requires landowners who are engaged in nonfederal activities that are likely to cause the incidental take of a listed animal species to develop a habitat conservation plan and obtain a permit from the Service allowing for incidental take.

Section 7 of the act further directs federal agencies to consult with the Service when an action they authorize, fund, or carry out could affect listed species.[6] Section 7 applies not only to actions taken on federal lands, but also to other federal actions that may affect listed species, such as federal permits or licenses to nonfederal entities to conduct activities on nonfederal lands. Section 7 also applies if nonfederal entities receive federal funding to carry out actions that may affect listed species. Before authorizing, funding, or carrying out an action, federal agencies (called action agencies) must determine whether the action may affect a listed species or its critical habitat.[7] If an agency determines a proposed action may affect a listed species, formal consultation is required unless the agency finds, with the Service's written concurrence, that the proposed action is not likely to adversely affect the species. To initiate a formal consultation, an action agency submits to the Service a written request that includes the action agency's biological assessment or similar document, which describes the proposed action and its likely effects on the listed species and its habitat (see fig. 2). The consultation usually ends with the issuing of a biological opinion by the Service, which generally

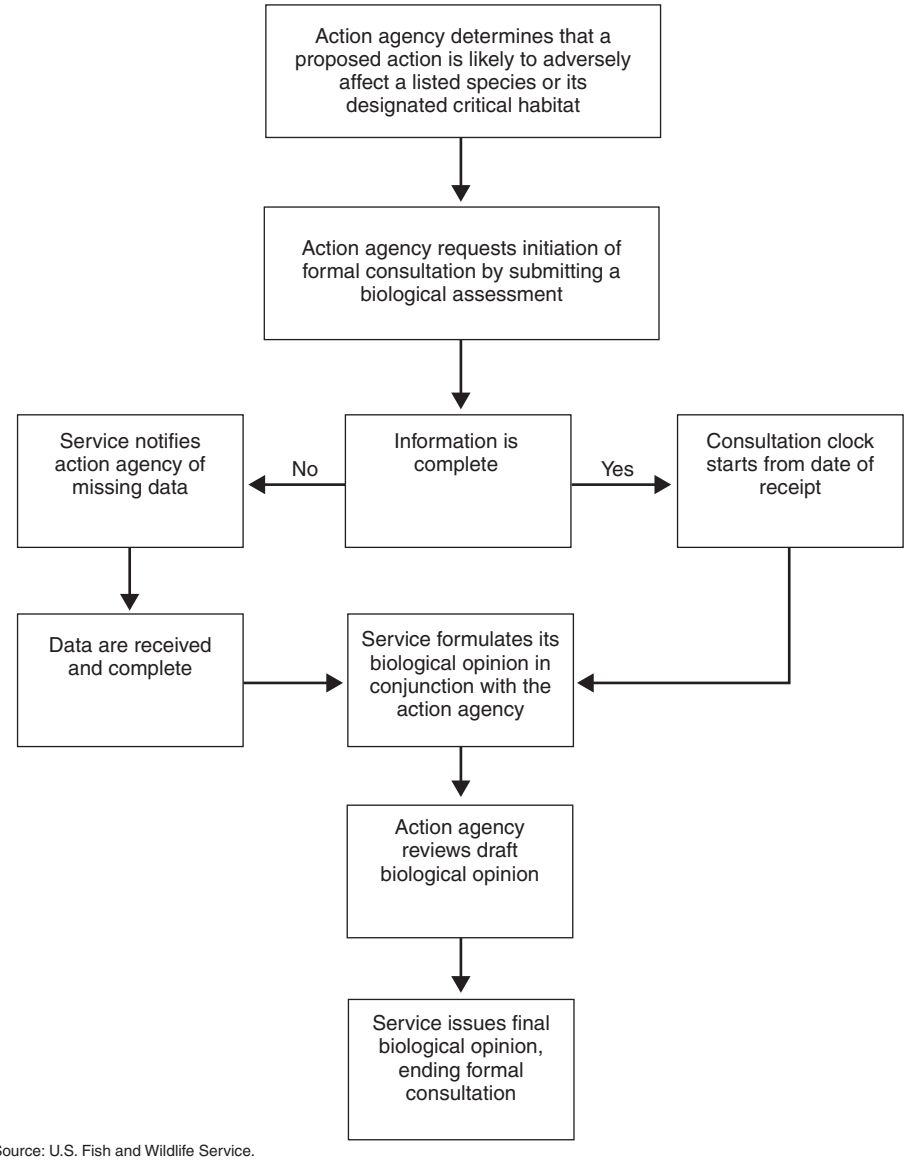
[5]See GAO, *Endangered Species: Many Factors Affect the Length of Time to Recover Select Species*, GAO-06-730 (Washington, D.C.: Sept. 6, 2006); *Endangered Species: Fish and Wildlife Service Generally Focuses Recovery Funding on High-Priority Species but Needs to Periodically Assess Its Funding Decisions*, GAO-05-211 (Washington, D.C.: Apr. 6, 2005); and *Endangered Species: Fish and Wildlife Service Uses Best Available Science to Make Listing Decisions, but Additional Guidance Needed for Critical Habitat Designations*, GAO-03-803 (Washington, D.C.: Aug. 29, 2003).

[6]The Service issued regulations to interpret and implement section 7 of the act (50 C.F.R. pt. 402) and developed the *Endangered Species Consultation Handbook*, outlining procedures for conducting consultations under section 7 of the act.

[7]Throughout the remainder of this report, the term "listed species" should be read to mean a listed species and its critical habitat, if critical habitat has been designated.

must be done within time frames specified in the act and in the implementing regulations.[8]

Figure 2: Formal Consultation Process



Source: U.S. Fish and Wildlife Service.

[8]The act requires consultations to be completed within 90 days; the implementing regulations require biological opinions to be delivered within 45 days after consultation has been completed. 16 U.S.C. § 1536(b)(1)(A) and 50 C.F.R. § 402.14(e), respectively.

The Service's biological opinion—which is to be based on "the best scientific and commercial data available"—constitutes the Service's determination of whether the effects of an action, when viewed against the status of the species, are likely to jeopardize the species' continued existence.[9] In its biological opinion, the Service evaluates a species' current status; analyzes the species' "environmental baseline" (essentially a snapshot of a species' status in the action area at a specified moment in time);[10] and the effects of the action on the species, including the amount or extent of incidental take that Service biologists anticipate will result from the action. "Take" is defined as to harass, harm, pursue, shoot, wound, kill, trap, hunt, capture, or collect or to attempt any such conduct. Without an appropriate exemption, the act prohibits the taking of animal species listed under the act.[11] Through an "incidental take statement" in the biological opinion, the Service determines the amount or extent of anticipated incidental take; the Service construes the term "take" broadly to mean harm to a species or its habitat.[12] In the statement, take is generally expressed as the number of individuals of a species likely to be harmed or killed, or the extent of habitat likely to be destroyed or

[9]If a jeopardy finding is reached, the Service's biological opinion includes reasonable and prudent alternatives to the agency's proposed action, which enable the action to continue while remaining consistent with the act's requirements for protecting species. The action agency may apply to the Secretary of the Interior for an exemption from the act's consultation provisions if the Service's opinion includes a jeopardy finding.

[10]To determine the environmental baseline, the Service analyzes the effects of past and present human and natural factors leading to the current status of the species, its habitat, and ecosystem within the action area. The environmental baseline includes the impacts of all federal, state, or private actions, including the anticipated impacts of all proposed federal actions in the area that have already undergone separate consultation with the Service.

[11]The Endangered Species Act contains no general take prohibition for listed plant species, although plants are protected against certain forms of destruction. For example, protection for listed plants is provided to the extent that the act prohibits the removal, reduction, and possession of federally listed endangered plants; the malicious damage or destruction of such plants on areas under federal jurisdiction; and the destruction of endangered plants on nonfederal areas in violation of state law or regulation or in the course of violation of a state criminal trespass law. 16 U.S.C. § 1538(a)(2)(B).

[12]Specifically, Service regulations state that "harm" in the definition of "take" in the Endangered Species Act means an action that actually kills or injures wildlife. Such an action may include significant habitat modification or degradation that actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 C.F.R. § 17.3). The Supreme Court upheld this broad definition of harm in *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 515 U.S. 687, 697 (1995).

disturbed.[13] In addition, the statement also specifies "reasonable and prudent measures," that is, protective measures intended to minimize the impact to the species of any take that will occur.[14] For example, an action may be restricted to a time of year when the species is not present; buffer zones might be required around known nesting areas so as to leave those areas undisturbed; or species might have to be trapped and moved elsewhere before an action can proceed.

Biological opinions also contain provisions for the action agency to monitor the actions' effects on listed species and to reenter into, or reinitiate, consultation if the level of anticipated take is exceeded.[15] On the basis of their professional knowledge and judgment, Service biologists also often include specific provisions for the action agency to monitor and report on the actions' effects on listed species. These monitoring reports may contain information on (1) adverse effects resulting from an approved action, (2) actual take in comparison with anticipated take levels documented in biological opinions, (3) whether the anticipated take level has been exceeded, and (4) the effectiveness of protective measures designed to minimize the impact of take. These reports allow the Service

[13]In its discussion of the incidental take statement provision added to the act in 1982, a relevant congressional committee report indicated that the committee preferred the incidental take statement to contain a numerical value: "[W]here possible, the impact should be specified in terms of a numerical limitation on the federal agency or permittee or licensee." The committee recognized, however, that a numerical value would not always be available: "The Committee recognizes . . . it may not be possible to determine the number of eggs of an endangered or threatened fish which will be sucked into a power plant when water is used as a cooling mechanism. The Committee intends only that such numbers be established where possible." H.R. Rep. No. 97-567 at 27 (1982). In 2007, the United States Court of Appeals for the Ninth Circuit ruled that if the Service chooses to employ a nonnumerical surrogate for take, the chosen surrogate must be able to perform the functions of a numerical limitation, in particular, establishing a trigger requiring the parties to reinitiate consultation. *Oregon Natural Resources Council v. Allen*, 476 F.3d 1031, 1038 (9th Cir. 2007).

[14]Reasonable and prudent measures, along with the terms and conditions that implement them, cannot alter the basic design, location, scope, duration, or timing of the action and may involve only minor changes. 50 C.F.R. § 402.14(i)(2).

[15]Reinitiation of formal consultation is required in four instances where discretionary federal involvement or control over the action has been retained or is authorized by law: (1) if the amount or extent of taking specified in the biological opinion is exceeded, (2) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (3) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion, or (4) if a new species is listed or critical habitat designated that may be affected by the identified action. 50 C.F.R. § 402.16.

to verify its assessment of an action's effects or to assess the effectiveness of protective measures so as to refine them in future consultations on similar actions. Required monitoring reports may also provide the Service with information about the health of a listed species in a particular area, which, along with various other monitoring and information sources the Service has available (such as academic research or monitoring activities carried out through a recovery program), can improve the Service's knowledge of the species' status. From the information provided in biological opinions and associated monitoring reports, the Service can roll up the overall, or cumulative, take of a species across its range and over time, thereby assessing the collective effect that federally authorized actions are having on listed species.

The consultation process allows some actions to take place that may involve the incidental take of listed species and helps action agencies avoid adversely affecting listed species. The Service views its consultation process as a collaboration with action agencies and, throughout the development of its biological opinions, seeks to assist action agencies in designing and implementing their actions so as to minimize the adverse effect on listed species. The majority of formal consultations in the western states take place with the federal agencies in table 1.[16] In some cases, the Service itself may be the action agency—for example, if it carries out an action on Service land, such as a wildlife refuge restoration project. Since the Service has the same consultation requirements for its actions as any other federal agency, when those situations arise, the Service conducts an "intra-Service" consultation.

[16]In 2004, we issued a report evaluating the consultation process in Idaho, Montana, Oregon, and Washington for the Service, the National Marine Fisheries Service, the Army Corps of Engineers, the Bureau of Land Management, the Bureau of Reclamation, and the Forest Service. GAO, *Endangered Species: More Federal Management Attention Is Needed to Improve the Consultation Process*, GAO-04-93 (Washington, D.C.: Mar. 19, 2004).

Table 1: Federal Agencies Frequently Consulting with the Service in the Western States, Fiscal Year 2008

Action agency	Action agency description and types of actions consulted on	Number of formal consultations completed and ongoing	Percentage
U.S. Army Corps of Engineers	Supports navigation of the nation's waterways by maintaining and improving channels. Also maintains control of dams and operates hydroelectric facilities. In addition, issues permits under section 404 of the Clean Water Act for the discharge of dredge or fill material into U.S. waters and, under section 10 of the Rivers and Harbors Act, for the construction, excavation, or deposition of materials in, over, or under any navigable U.S. water.	278	33
U.S. Forest Service	Manages more than 140 million acres of national forests in the western states and manages and issues permits for activities such as timber harvesting; recreation; livestock grazing; mining; environmental restoration; and rights-of-way for road construction, ski areas, and access to private land.	93	11
Bureau of Land Management	Manages more than 170 million acres of federal land in the western states and manages and issues permits for activities such as livestock grazing, recreation, mining, timber harvesting, and oil and gas development.	90	11
U.S. Fish and Wildlife Service	Conducts intra-Service consultations on actions such as wildlife refuge operation and maintenance and wetland restoration efforts.	57	7
Federal Highway Administration	Assists state departments of transportation in the construction and maintenance of transportation facilities through federally funded highway projects.	38	5
Bureau of Reclamation	Delivers water and hydroelectric power through the hundreds of dams and reservoirs it has built throughout the western states, which supply water for irrigation and municipal and industrial use and water for hydropower, flood control, recreation, water conservation, land resource management, and fish and wildlife protection.	22	3
Other	Many other federal agencies (e.g., Department of Energy, Department of Homeland Security, Environmental Protection Agency, Federal Energy Regulatory Commission) and actions (e.g., energy transmission projects, border patrol activities, regulation of environmental contaminants, hydroelectric power licensing).	254	31
Total		**832**	**100**

Sources: U.S. Fish and Wildlife Service data and GAO analysis.

Note: Percentages do not sum to 100 percent because of rounding.

The Service Lacks Complete Monitoring Information from Formal Consultations

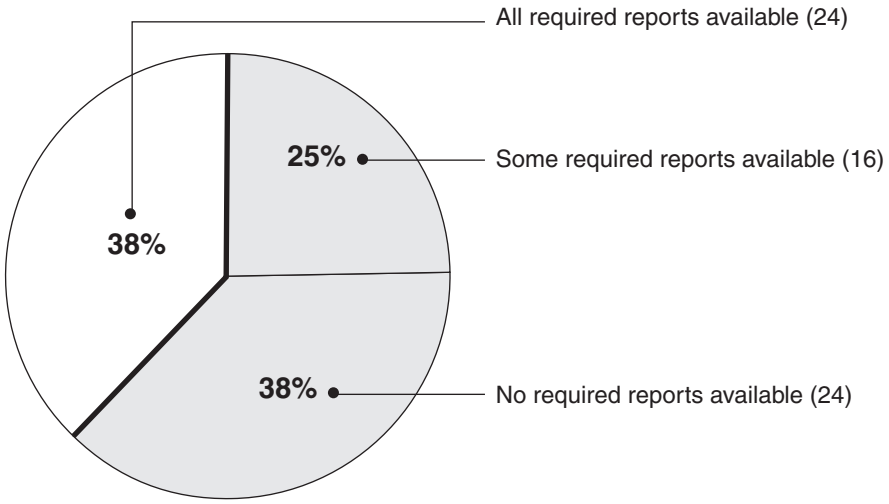
The Service lacks a systematic means of tracking the monitoring reports it requires in biological opinions for consulted-on species and does not know the extent of compliance with these requirements. Rather, the Service relies on its biologists to keep abreast of the pertinent biological opinions and to follow up on any associated required monitoring reports. This reliance on individual biologists, rather than on a systematic process, leaves the Service with incomplete knowledge of the extent of action agencies' compliance with reporting requirements, as well as with incomplete information on species' responses to the actions under consultation.

The extent to which the Service includes monitoring and reporting requirements in its biological opinions varies considerably. In all biological opinions, the Service requires that action agencies monitor the effects of their actions to determine if consultation must be reinitiated; the extent to which Service biologists include further provisions for additional monitoring and reporting varies. Service staff explained that the reporting provisions they include in their biological opinions are project specific and largely tailored to the complexity of a given action, including size, scope, length of time, and potential impact on listed species. Thus, in a biological opinion, the Service may ask an action agency to submit monitoring reports on a one-time basis; on a regular, reoccurring basis; or not at all. For example, after completion of a single action—such as building a bridge or widening a highway—the Service may require the action agency to provide a report to document the action's completion and the actual take. If, on the other hand, multiple actions are involved, a single action will cover an extended period, or an action's effects are not yet well understood or could be significant over the long term—such as multiple vegetation management actions across one forest, continuing operation of a major dam, or new alternative energy development—the Service may ask for annual, or even monthly, reports. In contrast, in some biological opinions, the Service may not require monitoring reports. In general, Service staff explained, they may not require monitoring reports in their biological opinions when they expect an action's effects on a listed species to be minor or when the action is routine and its effects relatively well understood. Similarly, a few Service staff said, when they want feedback on the effectiveness of protective measures specified in a biological opinion, they may require monitoring reports on those measures. On the other hand, when such protective measures are standard best practices, monitoring reports on their effectiveness may not be necessary.

To track required monitoring reports, each of the Service's field offices relies on its biologists—generally the author of a biological opinion or another designated biologist—to keep informed of the monitoring and

reporting requirements contained in the biological opinions for which they are responsible. Field office managers explained that each biologist is responsible for a certain set of biological opinions, and as a part of that responsibility, he or she is also responsible for tracking any associated required monitoring reports.[17] Thus, the extent to which reports are tracked varies by biologist. At the field offices we visited, Service biologists could not fully account for required monitoring reports in 40 of the 64 consultation files (63 percent) we reviewed that had reporting requirements with reports due (see fig. 3).[18]

Figure 3: Consultation Files in Which All, Some, or No Required Monitoring Reports Were Available



Source: GAO analysis.

Note: Percentages do not sum to 100 percent because of rounding. These data are based on the 64 consultation files we reviewed that contained reporting requirements with reports due at the five field offices we visited.

[17]Several years ago, at least two field offices employed staff whose responsibility was to track compliance with biological opinions, including monitoring and reporting requirements. According to Service staff, both of these positions were eliminated because of budget pressures.

[18]We reviewed a total of 128 consultation files at five field offices; 45 of them did not contain reporting requirements. In 19 consultation files, documentation indicated that the action had not been carried out or reports were otherwise not due. Thus, in determining the proportion of files containing required monitoring reports, we based our calculations on the remaining 64 consultation files that did contain reporting requirements with reports due.

In some cases, where monitoring reports were not available, action agencies had failed to comply with their reporting requirements; Service biologists suggested that such failures to comply were not uncommon. In some of these cases, Service biologists followed up with the action agencies to request overdue reports. In other cases, however, Service biologists could not confirm whether the action agency had submitted required reports or whether the action had in fact been completed.

Overall, Service managers and biologists from headquarters, the regions, and field offices said that tracking monitoring reports is not a high priority for several reasons. First, they said, they face a demanding workload, and responding to requests for consultations often takes a higher priority than following up on monitoring reports, especially in light of the statutorily defined time frames for issuing biological opinions. In addition, Service staff said, they put a high priority on consulting informally, so they can help agencies design actions that will have little or no effect on listed species. Informal consultation can avert the need for formal consultation or, when formal consultation is necessary, help the action agency design projects that will minimize adverse effects on listed species. Service staff explained that from a conservation standpoint, they believed the Service could gain more by spending its limited resources on collaborating with action agencies up front than by following up on completed actions. In addition, Service staff at some offices said they have had high staff turnover, which, combined with a backlog of consultations, contributed to the failure to diligently track monitoring reports. When new biologists arrive at the Service, or successor biologists assume new responsibilities, they may not have time to go through already-issued biological opinions to see what reports are due because they must focus their efforts on completing pending consultations on time. Some Service biologists said that to deal effectively with demanding workloads and often-competing priorities, they take a risk-management approach in deciding which monitoring reports to track, following up on actions they believe are likely to have greater impacts on listed species than other actions.

Second, Service staff in many offices observed, they may occasionally use informal means to collect information similar to what a monitoring report would provide. Some Service biologists said that through routine telephone and e-mail conversations with action agency officials, for example, they may learn whether an action, and its effects on listed species, went as expected or whether protective measures to minimize the impact of take were effective. Similarly, they may receive information through regular quarterly or annual meetings with the action agencies. In a few instances, Service biologists said, they may visit sites to observe an

agency action in progress. Service biologists pointed out that these means may provide them with more timely information than monitoring reports because reports are generally received by the Service after agency actions are completed, whereas informal communication often happens while the action is going on. Such informal communication, however, usually takes place only when Service staff have working relationships with action agency officials. Service biologists said such relationships can develop when they repeatedly work with the same officials within an action agency. But the Service may also work with an action agency only in isolated instances, and in those situations, informal communications conveying information similar to what might be included in a monitoring report would be more unlikely.

Third, some Service staff said they may not give high priority to tracking monitoring reports because tracking reports is not an agency performance measure. To measure its performance in the consultation arena, the Service tracks the number and types of consultations completed on time by field offices. Several Service staff told us that as a result, they tend to emphasize completing biological opinions over tracking monitoring reports, even though following up on monitoring reports may also be important. Finally, Service managers noted that tracking monitoring reports may not be a high priority because they do not believe it is their job to "police" the action agencies but, rather, to advise them. Once a biological opinion has been issued, they believe their responsibilities have been fulfilled and that it is the action agencies' responsibility to comply with all the requirements in the biological opinion.[19]

We found that the Service's reliance on its biologists to track monitoring reports exposes the agency to vulnerabilities. In particular, without a systematic means of tracking monitoring reports, the Service does not know the extent of compliance with its monitoring report requirements. While the Service's approach may be sufficient when the responsible biologist has the knowledge and ability to track all required reports, it may prove insufficient if the responsible biologist departs and does not leave behind a clear record. In that event, the Service may lose that biologist's knowledge about what reporting requirements may be due and when, or the Service may also lose information the biologist learned from the action

[19]The act requires "*each federal agency* . . . to insure" that its actions are not likely to jeopardize listed species. 16 U.S.C. § 1536(a)(2) [emphasis added]. While agencies must carry out this responsibility "in consultation with" the Service, the act imposes this responsibility directly on the action agency.

agency through e-mail, phone, or in-person communications if that information is not clearly documented. We identified several instances where the biologist who had drafted the biological opinion, or was otherwise most familiar with the action, had left the Service, and the successor biologist had limited knowledge about the action or any required monitoring reports.

Additionally, in the absence of monitoring reports, the Service may be unable to assess the effects agency actions are having on listed species or whether the level of anticipated take has been exceeded. For example, in one case, the Service discovered that an action agency had not submitted required monitoring reports for over 10 years. The biological opinion, issued in 1992, required annual reports on the effects of livestock grazing on an endangered plant species in the action area. In 1994, the Service reminded the action agency of its reporting requirements. Nevertheless, the action agency failed to consistently submit the required reports; grazing continued; and by 2007, when the action agency submitted a report, it reported that the population, which had once numbered more than 1,400, was not found at all. By not following up more diligently on the annual reports, the Service lacked critical information that might have helped mitigate or avert the ultimate loss of the endangered plant population. Moreover, without such information, the Service could not recommend additional protective measures for similar actions in the future to ensure that listed species would not be further harmed.

Conversely, without monitoring reports, the Service may overestimate the effects of actions on listed species. Several Service staff said that in the absence of monitoring reports or other information on actual take resulting from an agency action, they assume that what was anticipated in the biological opinion in fact occurred. Others pointed out, however, that when consulting, action agencies may overestimate the level of activity to be carried out to ensure that all their possible actions, and any incidental take occurring as a result, are approved by the Service. It is not uncommon for some of the approved actions to be carried out only in part. For example, in consulting with the Service, an action agency estimated it would maintain an average of 65 miles of recreational trails per year. In the first year, however, the agency completed maintenance on only 33 miles, approximately half the estimated average authorized in the biological opinion. Thus, if the Service relied on anticipated take information for this action, it could have overestimated the action's effect on listed species.

Furthermore, in the absence of monitoring information, the Service may not know the effectiveness of the protective measures it requires to

minimize the impact of take on listed species, which could result in requiring measures that are either overly restrictive or insufficiently protective. For instance, to minimize the impact of take, one biological opinion required an action agency to dig up and relocate all burrows of a listed species located within a half-mile radius of the action area before carrying out its action. At the time, little was known about the effects of ground disturbance on the species. Through information gleaned in part from monitoring, the Service learned that a shorter radius would minimize the impact of take effectively, and as a result, the Service reduced the radius in subsequent biological opinions. Had monitoring information not been provided, however, the Service may have continued to require the more restrictive measure in its biological opinions. In another instance, the Service required an action agency to construct fencing around an action area to keep out a listed species. A Service manager told us, however, that the measure was probably ineffective because, she believed, the species was able to climb over the fence. She suggested that monitoring reports would have demonstrated the ineffectiveness of this measure, which would have then prompted the Service to remove or alter the fencing requirement and identify better protective measures in future biological opinions.

The Service Lacks a Systematic Method for Tracking Cumulative Take of Most Species but Has Plans to Expand Its Capabilities

As with monitoring reports, the Service lacks a systematic method of tracking cumulative take for most species, although it is currently expanding its efforts by developing various databases.

With Few Exceptions, the Service Has No Systematic Method for Tracking Cumulative Take of Species

The Service's assessment of take, for a single consulted-on action and for multiple actions collectively, provides it with important information on the impacts that its formal consultations are having on listed species. The Service commonly measures take by estimating the number of individuals of species likely to be killed or injured or the extent (typically in acres) of habitat that will be temporarily or permanently lost or degraded as a result of an agency action. The Service's estimate of anticipated take is, in essence, its assessment of an action's effects on a listed species. By synthesizing take information from biological opinions, monitoring reports, and other information, the Service can obtain a picture of the

cumulative effects that consulted-on actions are having on listed species through time and across the species' range. Tracking cumulative take thus enables the Service to strengthen its understanding of a species' status and to factor that knowledge into future consultations.

Service staff cautioned, however, that measuring cumulative take needs to account for real variability among species, habitats, and actions on the ground. When synthesizing take information, one cannot simply assume that anticipated take, as estimated in a biological opinion, equals actual take after an agency action is completed. Service staff explained that if they assume that all anticipated take actually occurs—as some have said they do in the absence of monitoring reports or other information to provide a more accurate picture—then they may in fact be overestimating the actions' cumulative effects on listed species. It is not uncommon, for example, that some approved actions are postponed indefinitely or even canceled. Over a 5-year period in one forest, for example, the Service issued biological opinions for four timber sales, two of which were later canceled. If the Service had assumed that all four timber sales had taken place, it would have overestimated the cumulative effects on the listed species inhabiting that forest. Similarly, Service staff said that when rolling up cumulative take, it is important not to double-count the effects of temporary actions in the same action area. In addition, Service staff explained, a species' characteristics—such as life span, reproductive rate, and population fluctuations—and the interaction of the species with its habitat can affect the degree to which take can be meaningfully synthesized. For example, for plants or other species that do not move from a particular area, estimated numbers of individuals of species that will be killed or injured or the number of habitat acres lost serve as a reasonable measure for take, and these numbers can easily be added up to give a cumulative total over time and across geographic areas. In contrast, the populations of many listed fish species fluctuate widely and often, and their reproductive rates are high, so information on the numbers of individuals of a species killed or injured may not necessarily be meaningful to add over time. For such fish species, an often-used measure for take is number of stream miles affected by an action. But in any given stream, the effects on the fish and their habitat may be temporary, or long-term effects may be poorly understood. Moreover, the effects on the same listed species inhabiting one stream may not be directly comparable with effects on that same species in a different stream. Consequently, simply adding affected stream miles across the two streams may not be a meaningful synthesis of take for the species. With such factors in play, Service staff explained, it may be difficult to identify take measures that can be reasonably summed over time.

To date, partly because of a demanding workload and competing priorities, the Service has not developed a systematic method for tracking cumulative take of most listed species. Although Service managers at headquarters, the regions, and field offices generally expect their biologists to track cumulative take for all listed species, they do not dictate how to do so, and the method used therefore varies. For most species, it is up to individual Service biologists to maintain and track take information. We found that out of the 497 species listed in the western states, a formal system for tracking cumulative take exists for only 3 species. These are Web-based databases that allow all Service biologists consulting on the species, from multiple Service offices, to enter anticipated take information from each biological opinion. This information can then be rolled up for a total estimate of anticipated take. The three formal take-tracking systems include the following:

- First, in 2002, the Service developed a take-tracking database (the Northwest Forest Plan and Section 7 Consultation Effects Tracker) for the entire range of the threatened northern spotted owl, a small brown owl that inhabits old-growth forests of the Pacific Northwest. According to Service staff, the database was developed in response to litigation, which challenged, in part, how the Service developed environmental baseline information in various biological opinions.[20] The database was designed to track the effects of actions occurring on federal land—largely actions occurring in federally managed forests—on the owl and its habitat. Service biologists enter anticipated take information—measured in various forms, including acres of nesting or foraging habitat permanently removed or degraded—from each biological opinion into the database. Biologists can also enter actual take information once an action is completed, if that information is available. With the take information entered, the database can generate reports of cumulative take for the owl across its range or for smaller geographic units.

[20]A suit was filed in November 2000, challenging six biological opinions, related to timber harvests in certain national forests in the Pacific Northwest, that authorized incidental take of the northern spotted owl. Shortly after the suit was filed, the Service began developing a take-tracking database. In 2004, the Ninth Circuit Court of Appeals held, in part, that the Service could not unilaterally amend a biological opinion to add new baseline information without reinitiating consultation. *Gifford Pinchot Task Force v. United States Fish & Wildlife Service*, 378 F.3d. 1059, 1076-77 (9th Cir. 2004).

Marbled Murrelet

Source: U.S. Fish and Wildlife Service.

Listed in 1992 as threatened, the marbled murrelet is an elusive small seabird that winters and feeds in nearshore marine waters from central California to Alaska. It took a century, and a $100 reward, before the species' nesting habitat was discovered—high atop trees of coastal old-growth forests. Parent murrelets take turns feeding their single chick for a month or more. Then, weighing just over 5 ounces, the young bird flies from its nest at dusk—straight to the ocean, it is thought—and is on its own. Like other members of the alcid family—whose pedigree includes the extinct flightless great auk, or "penguin" of the Northern Hemisphere—murrelets feed on small fish and crustaceans by "flying" underwater, sometimes to a depth of 164 feet. The species is threatened by habitat loss due to logging and coastal development, as well as by fishing practices, oil spills, and threats to its prey.

- Second, within the database developed for the northern spotted owl, the Service developed the capability to also track cumulative take for the marbled murrelet (see sidebar). Service biologists explained that it was possible to develop a module for the murrelet within the owl database because the murrelet and owl share similar nesting habitats, and the Service measures take in a similar manner for the two species. Anticipated take information is entered identically for both species, and, as for the owl, actual take information can be updated when it is available. The cumulative take reports that can be generated for the murrelet are not as detailed as they are for the owl, however, and do not include the southernmost portion of the murrelet's range.

- Third, in 2004, the Service began developing a take-tracking system for the full range of the bull trout, a threatened fish that inhabits cold streams, creeks, and rivers of the western states. According to Service staff, the development of this Consulted-on Effects Database was also prompted by litigation.[21] The database, in its final stages of development, was designed to capture all the anticipated effects on the species resulting from formal consultation actions to enable updating of the species' status throughout its range and the species' environmental baseline within a specific action area. Service biologists will enter anticipated take information, measured as the number of fish killed or injured or the number of stream miles affected, among other measures, from each biological opinion into the database. Unlike the northern spotted owl database, the database for the bull trout will not include the capability for Service biologists to update anticipated take with actual take after an action is completed.

[21]The litigation challenged, in part, the Service's analysis of the cumulative effects of approved projects on the bull trout, contained in a biological opinion associated with a mining project. The plaintiffs argued that "if the biological opinions all concluded that bull trout subpopulations must be preserved but some damage to this particular subpopulation is acceptable, then it would be death by a thousand pinpricks." See *Rock Creek Alliance v. United States Fish & Wildlife Service*, 390 F. Supp. 2d 993, 1001 (D. Mont. 2005). In 2005, a federal district court held that the Service's cumulative effects analysis contained in the mining project biological opinion was invalid because it failed to adequately consider the cumulative effects of other approved projects on the species. *Id.* at 1010. The court noted that the act's regulations allow the Service to limit its cumulative effects analysis to the action area for the project being examined, but the Service's evaluation of the species' current status and its ultimate jeopardy determination is not limited in geographic scope. *Id.* Thus, the Service must examine the current status of the species across its entire range, along with the effects of the action in the action area, to make a jeopardy determination. *Id.*

In addition, we identified seven other species for which Service biologists developed their own informal means of tracking cumulative take. In most cases, a Service biologist enters anticipated take information from biological opinions as they are completed into an electronic spreadsheet (see table 2). Take information is generally entered for some or all of the species' range and may or may not include relevant consultations completed by all field offices. Only in rare instances do biologists enter actual take information, instead relying on anticipated take information from the biological opinion. For example, for the threatened Mexican spotted owl, whose range extends from southern Utah and Colorado south into Mexico, a Service biologist maintains several electronic spreadsheets to track cumulative take across the four states the owl inhabits. The Service biologist asks all other biologists consulting on the owl to send her the biological opinions they complete so that she can enter the anticipated take information into the spreadsheets. Additionally, in instances where actual take information becomes available—which, according to the Service biologist, is not very often—the biologist adds that information to the spreadsheets as well.

Table 2: Species with Informal Means of Tracking Cumulative Take

Species	Listing status	Species' range in the western states[a]	Means of tracking cumulative take
Canada lynx	Threatened	Colorado, Idaho, Montana, Oregon, Utah, Washington, Wyoming	Electronic spreadsheet maintained by a Service biologist based in a Colorado field office. Spreadsheet covers biological opinions issued in Colorado for consultations on multiple agencies' actions affecting the lynx; it does not include lynx consultations in states besides Colorado. Spreadsheet tracks anticipated take as the number of lynx harassed or killed or the number of habitat acres modified. Anticipated take is tracked by the county where it is expected to occur.
Desert tortoise	Threatened	Arizona, California, Nevada, Utah	Electronic spreadsheet maintained by a Service biologist based in a Nevada field office. Spreadsheet covers biological opinions issued in Nevada for consultations on multiple agencies' actions affecting the tortoise; it does not include tortoise consultations in states besides Nevada. Spreadsheet tracks anticipated take as number of tortoises harassed, injured, or killed and number of acres of critical habitat and noncritical habitat modified. Anticipated take is tracked by county and recovery unit. Office is also developing an online database for recovery and consultation information, including a module for tracking cumulative take.
Mexican spotted owl	Threatened	Arizona, Colorado, New Mexico, Utah	Electronic spreadsheets maintained by a Service biologist based in an Arizona field office. Spreadsheets cover biological opinions issued by field offices in Arizona, New Mexico, Utah, and Colorado for consultations on multiple agencies' actions affecting the owl. Spreadsheets track anticipated take as number of owls harassed and number of habitat acres modified. Anticipated take tracked by recovery unit. Actual take entered when available.
Pecos bluntnose shiner (a fish)	Threatened	New Mexico (Pecos River only)	Electronic spreadsheet maintained by a Service biologist in a New Mexico field office. Spreadsheet covers a biological opinion issued by that office for one action agency's multiple actions over a 10-year period. Spreadsheet tracks the fishes' population density, as recorded through monthly sampling.
Pima pineapple cactus	Endangered	Arizona	Electronic spreadsheet maintained by Service biologists based in an Arizona field office. Spreadsheet covers biological opinions issued in Arizona for consultations on multiple agencies' actions affecting the cactus. Spreadsheet tracks anticipated take as number of cactuses affected and number of habitat acres modified. Spreadsheet also tracks conservation mitigation acres purchased to offset the removal of habitat as a result of consulted-on actions.
Preble's meadow jumping mouse	Threatened	Colorado	Electronic spreadsheet maintained by Service biologists based in a Colorado field office. Spreadsheet covers biological opinions issued in Colorado for consultations on multiple agencies' actions affecting the mouse. Spreadsheet tracks anticipated take as number of mice affected and number of habitat acres temporarily or permanently modified. Anticipated take tracked by county or watershed.

Species	Listing status	Species' range in the western states[a]	Means of tracking cumulative take
Southwestern willow flycatcher	Endangered	Arizona, California, Colorado, Nevada, New Mexico, Utah	Electronic spreadsheet maintained by a Service biologist based in an Arizona field office. Spreadsheet covers biological opinions issued by field offices in all states where the listed bird occurs for consultations on multiple agencies' actions affecting the flycatcher. Spreadsheet tracks anticipated take as number of habitat acres degraded or eliminated and number of birds harassed or harmed. Anticipated take tracked by state, county, and management unit.

Sources: U.S. Fish and Wildlife Service data and GAO analysis.

[a]This range represents the states where the species is both listed and found within the 11 western states included in our review; a species may also occur in states besides those listed in the table.

Chiricahua Leopard Frog

Source: U.S. Fish and Wildlife Service.

Listed in 2002 as threatened, the large, green, stocky Chiricahua leopard frog lives in springs, marshes, pools, and even cattle tanks of the U.S. Southwest. Its call has been described as a "long snore" lasting a second or two. Once denizens of a wide variety of aquatic habitats, the frogs are now restricted by the presence of the even larger nonnative American bullfrog—which prey on their smaller relatives—to water that may be unpredictable and temporary. In keeping with a pattern of global decline among amphibians, Chiricahua leopard frogs face threats including fungal disease, drought, floods, human activities, and habitat loss. Yet much of the species' life history and ecology remains poorly known.

While most Service staff at headquarters, the regions, and field offices agreed that it is important to track cumulative take for all species, they cautioned that one size does not fit all in terms of tracking take. In their view, the degree of effort necessary depends on such factors as how often a species is consulted on and by how many offices, how wide-ranging the species is, and how much other scientific information is available. For some species, Service biologists said that systematically tracking cumulative take has not been critical, either because very few consultations have occurred, with little to no take anticipated, or the Service has good information on the species' status from other sources, such as population surveys. For several of the species we reviewed, the Service has issued very few biological opinions, largely because the species occurs on private land. For example, for the endangered Point Arena mountain beaver, which inhabits a 24-square-mile area of mostly private land in northern California, three biological opinions were issued over the last 5 years. Two of the opinions permitted recovery work to benefit the mountain beaver, and the third did not anticipate any take. As a result, Service biologists said that, to date, there has been no need to systematically track cumulative take of the mountain beaver. For other species we reviewed, Service biologists said they maintain detailed information on the species' status, which is used to develop biological opinions. For example, population surveys of the threatened Chiricahua leopard frog (see sidebar) provide the Service with information that is used to develop biological opinions. In addition, although the frog has been affected by numerous consulted-on actions over the past several years, many of the actions have affected the frog only temporarily (such as prescribed burns) or have actually benefited the species (such as grazing, when carried out within certain parameters). According to a Service biologist, very little permanent habitat loss has resulted to date from consulted-on actions. Consequently, as for the mountain beaver, the

biologist said, no critical need has arisen as yet for systematically tracking cumulative take for the frog.

Coastal California Gnatcatcher

Source: U.S. Fish and Wildlife Service.

Listed in 1993 as threatened, the tiny, blue-gray coastal California gnatcatcher has been the centerpiece of a novel land-use program called Natural Community Conservation Planning. By focusing on tracts of potential habitat instead of individual species, the program encourages collaboration over conflict between developers and conservationists. Fewer than 5,000 pairs of coastal California gnatcatchers now reside on some of Southern California's most expensive real estate—the coastal sagebrush-dominated scrub between Los Angeles and San Diego, which continues to experience loss and fragmentation. Moving quickly through branches of shrubs, the birds often glean relatively immobile prey such as spiders, beetles, and leaf-sucking insects and may rear three successful broods in a single year; young birds rarely disperse farther than 6 miles from where they were hatched.

In contrast, many Service biologists believed that having a more systematic method for tracking cumulative take would help them better manage other species. We identified several species where the Service did not have a method for tracking cumulative take, but because of how often the species was consulted on, the species' wide-ranging nature, or the general lack of good information on the species' status, Service biologists believed that taking a more systematic approach would be warranted. For example, for the threatened coastal California gnatcatcher, one of the most frequently consulted-on species in southern California (see sidebar), urban development pressures have been high, often resulting in the permanent loss of the coastal sage-scrub habitat the bird depends on. Service biologists said they rely on their firsthand knowledge of the biological opinions issued out of their office to give them a sense of the cumulative effects of consulted-on actions. For the gnatcatcher, the biologists said they recognize the need for a more formal method for tracking cumulative take, in part because information about the species' status is thin, but a demanding workload and limited resources have precluded them from developing a more formal method.

Similarly, for the endangered tidewater goby—a small fish that inhabits coastal brackish-water habitats, such as estuaries and lagoons, in California—consultations have been frequent, including on water-related activities such as culvert replacements, modifications to levees, and water diversions for agricultural use. A Service biologist said that although the Service has no systematic method for tracking cumulative take of the species, he believes developing such a method would be both feasible and useful. He suggested it would be particularly useful for the goby because much about the species' biology and its status is uncertain. The biologist further noted that coordination was lacking across the several field offices consulting on the goby and that a more systematic process for tracking cumulative take would enhance the offices' degree of coordination, as well as their overall knowledge of the species and the cumulative effects of consulted-on actions.

We found that in the absence of a systematic method for tracking cumulative take, the Service is exposing itself to vulnerabilities, including the threat of litigation and the danger that it may have an inaccurate picture of the collective effects consulted-on actions have had on species. As previously mentioned, the Service developed two take-tracking databases (for the northern spotted owl and the bull trout) after litigants

challenged how the Service calculated the environmental baseline and cumulative effects for biological opinions related to those species; the Service has also been sued over similar issues concerning other species over the past several years.[22] Additionally, Service staff expressed concern that without cumulative take information for some species, they may not have a complete understanding of the past effects that consulted-on actions have had on the species. As when monitoring reports are missing, staff turnover can mean the institutional loss of knowledge about the effects on species from past consultations, and this lack of information could in turn result in a miscalculation of the environmental baseline for future consultations and an insufficient analysis of the total effects on the species in the action area. Service staff said that although the effect of any single consulted-on action may be small, over time the effects of multiple actions may accumulate, and to accurately conduct its consultation analyses, the Service needs to be aware of this accumulation. If the Service is unaware of the cumulative effects on a species of consulted-on actions, over time it could miss important declining trends in the species' status.

Development of New Electronic Databases Shows Promise

As a part of its larger efforts to bring different database applications on line—intended, among other things, to improve the consultation process—the Service has been developing various databases for more systematically tracking cumulative take. The development of take-tracking databases for widespread use is in early stages, however, and depends on resources not yet available in the Service's budget. For instance, the Service is currently developing a new take-tracking database—the Consulted-on Effects Database, the same database being developed for the bull trout—for the northern spotted owl and marbled murrelet. A Service biologist familiar with this database said that it is especially suited to wide-ranging species, and because the bulk of the database programming has already been done for the bull trout, owl, and murrelet, it could easily be adapted for other aquatic and terrestrial species. Further, the database is able to capture take in various ways, making it potentially useful for species for which

[22]See, for example, *Defenders of Wildlife v. Babbitt*, 130 F. Supp. 2d. 121, 126 (D.D.C. 2001) (biological opinions prepared by the Service failed to take into account cumulative effects of all federal activities in action area affecting species); *Natural Resources Defense Council v. Kempthorne*, 506 F. Supp. 2d 322, 375-76 (E.D. Cal. 2007) (failure of biological opinion to include qualitative and quantitative analysis of cumulative effects of nonfederal actions violated the act); *Heartwood v. Kempthorne*, Civ. No. 05-313, 2007 WL 1795296 (S.D. Ohio 2007) (Service's biological opinions properly evaluated the cumulative effects of several timber harvest projects and potential private harvest activities on the endangered Indiana bat).

measuring take is not simple. The development of this database for species other than the bull trout, northern spotted owl, and marbled murrelet has not formally begun, however, and would depend on resources not currently available in the Service's budget.

The Service is also exploring efforts to include capabilities for tracking cumulative take in its online database called Tracking and Integrated Logging System (TAILS). The system tracks information about consultation-related activities, including dates that certain activities are completed, action agency or agencies involved, and affected listed species. Service staff explained that as they were developing TAILS over the past several years, they recognized the need for also tracking cumulative take but quickly realized that such a component would be complex to build, especially if it were to be customized for different species. So in rolling out TAILS for nationwide use, the Service included an optional field for Service biologists to enter narrative about anticipated take from the pertinent biological opinion. TAILS cannot synthesize such information, although staff could do so by hand with information that had been entered. The Service is continuing to make improvements to the TAILS database, however, including an analysis of how to capture take and then synthesize it by geographic area. Like expanding the Consulted-on Effects Database, however, further development of cumulative take-tracking components in TAILS is likely to depend on future funding.

Conclusions

Given the potential harm to threatened and endangered species from many federally authorized actions, especially in the western states, the Service plays a key role in consulting with action agencies to ensure adequate protection of imperiled species. As it stands now, the Service lacks systematic means of tracking monitoring reports or cumulative take resulting from consulted-on actions, relying instead almost exclusively on its individual biologists to maintain crucial species information. This approach exposes the Service to vulnerabilities: for certain species, for example, the retirement or loss of just one biologist could deprive the Service of fundamental institutional knowledge, thereby crippling the Service's ability to effectively manage these species.

Monitoring reports can play a critical role in the consultation process because they provide an evaluation of and a feedback loop on the effects actions have on listed species and the effectiveness of protective measures taken to minimize the impact of take. Without the information contained in monitoring reports, Service staff would be unable to confirm the actual effects of actions on listed species or to determine whether the protective

measures were effective and, therefore, whether the measures required in subsequent biological opinions should be modified. In contrast, better tracking of monitoring reports could bring a triple benefit: (1) a more accurate picture than the Service now has of the extent of compliance with reporting requirements in its biological opinions; (2) a clearer picture of what types of reporting requirements best elicit compliance; and, most important, (3) the actual information about effects of particular actions on species, including the effectiveness of required protective measures. While we agree that the Service cannot force action agencies to comply with reporting requirements, knowing the level of compliance and what works and what does not would be useful information to have for future consultations, both to maximize protective benefits to species and to minimize requirements for action agencies.

Without cumulative take information, the Service may not be able to effectively evaluate the collective impacts of federally authorized actions over time, across multiple offices, and across species' ranges. Although one action may not unduly harm a listed species, cumulative effects over time and across landscapes could lead to a species' demise without the Service's knowledge or ability to respond. And although it is important to develop a systematic method for tracking take of all species subject to formal consultations, cumulative take information would be most beneficial for certain wide-ranging and frequently consulted-on species, and thus, development of a take-tracking system for these types of species could be the highest priority. Setting priorities, taking such a strategic approach, would expand the Service's capabilities of tracking take in a way that would maximize the benefit received from the resources invested. Because the vulnerabilities or risks are lower for not having a systematic method for tracking take of species that are not consulted on frequently or are handled by one biologist or office, such species could be a lower priority. Nevertheless, developing a systematic and cost-effective method for tracking take of these species is important for maintaining institutional knowledge and ensuring continuity of operations.

Recommendations for Executive Action

To increase the Service's institutional knowledge and understanding of the effects on species of actions subject to formal consultations under the Endangered Species Act, we recommend that the Secretary of the Interior direct the Director of the U.S. Fish and Wildlife Service to take the following two actions:

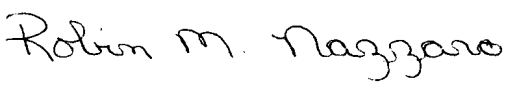
- develop a simple and cost-effective method for systematically tracking all required monitoring reports, such as adding an additional field to the existing TAILS database; and
- continue to develop existing databases, in as strategic and expeditious a manner as possible, to enable systematic tracking of cumulative take for all species affected by formal consultations.

Agency Comments

We provided the Department of the Interior with a draft of this report for review and comment. The Department of the Interior concurred with our findings and recommendations. Appendix II contains the department's comment letter.

We are sending copies of this report to the Secretary of the Interior, the Director of the U.S. Fish and Wildlife Service, relevant congressional committees, and other interested parties. In addition, the report will be available at no charge on the GAO Web site at http://www.gao.gov.

If you or your staff members have any questions about this report, please contact me at (202) 512-3841 or nazzaror@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix III.



Robin M. Nazzaro
Director, Natural Resources and Environment

Appendix I: Scope and Methodology

To address the extent to which the U.S. Fish and Wildlife Service (Service) tracks monitoring reports that may be required under section 7 of the Endangered Species Act, as well as the cumulative take of species resulting from consulted-on actions, we reviewed the Endangered Species Act and relevant regulations, Service policy, and litigation. We also interviewed Service managers from headquarters and the four regional offices (Region 1, Region 2, Region 6, and Region 8) that oversee the Ecological Services Field Offices located in the 11 contiguous western United States to document and obtain their perspectives on and expectations for tracking monitoring reports and cumulative take of species.[1] Additionally, we conducted structured telephone interviews with Service staff from all 18 field offices in the 11 states: Albuquerque, New Mexico; Arcata, California; Boise, Idaho; Carlsbad, California; Cheyenne, Wyoming; Helena, Montana; Klamath Falls, Oregon; Lacey, Washington; Lakewood, Colorado; Phoenix, Arizona; Portland, Oregon; Red Bluff, California; Reno, Nevada; Sacramento, California; Spokane, Washington; Ventura, California; West Valley City, Utah; and Yreka, California.

To carry out our structured telephone interviews with field office staff, we developed a set of structured interview questions with the assistance of a GAO survey specialist. Our open-ended interview questions covered a range of topics, including field office processes for tracking and using required monitoring reports, the priority for ensuring that monitoring reports are being received, field office processes for tracking anticipated and actual cumulative take for species subject to consultations, and the Service's means of determining the cumulative impact on listed species from consulted-on actions. We pretested our structured interview questions over the telephone from October 3 to October 21, 2008, with field office staff from four field offices. Our pretest participants were judgmentally selected to represent a range of office sizes and locations. We revised the structured interview questions, as appropriate, on the basis of the pretest results. We conducted our structured telephone interviews from October 27 through December 1, 2008, with Service field office

[1]In addition, in identifying and assessing monitoring and reporting requirements for the action agencies that frequently consult with the Service, we spoke with officials from the Service, the U.S. Army Corps of Engineers, the Department of the Interior's Bureau of Land Management and Bureau of Reclamation, and the Department of Agriculture's U.S. Forest Service at their respective headquarters and a variety of field office locations in six states. At these locations, we reviewed available biological opinions and monitoring reports, as well as other relevant documentation, to learn more about their consultation actions and to gain a greater understanding of the consultation process specific to monitoring, reporting, and tracking take of species.

managers, biologists, and other staff identified as knowledgeable about consultations.

To determine the extent to which the Service tracks required monitoring reports, we reviewed a random sample of consultation files from five field offices that we visited: Arcata, California; Carlsbad, California; Lacey, Washington; Lakewood, Colorado; and Phoenix, Arizona. We selected these offices on the basis of Service jurisdictional region, geographic location, staff size, and consultation workload. To determine consultation workload, we used 2008 data on the number of completed formal consultations from the Service's Tracking and Integrated Logging System (TAILS). We spoke to various Service staff to learn how data were entered into this system and by whom and how confident Service staff were with the data's completeness and accuracy. At each of the five field offices, we obtained a list of all biological opinions completed from fiscal years 2003 through 2006. We then randomly selected 128 biological opinions out of the 831 completed at these offices during this time frame—at least 20 from each field office—to review. We determined that the data the Service provided were sufficiently reliable for the purpose of our review. We reviewed the information available in the file for each selected biological opinion and documented the extent to which required monitoring reports were present in the consultation files. Of the 128 biological opinion files that we reviewed, 45 files did not contain reporting requirements,[2] and 19 biological opinions were for actions that had not been carried out or reports were otherwise not due. When determining the proportion of files containing required monitoring reports, we therefore based our calculations on the 64 files on completed actions that contained reporting requirements with reports due. In instances where required monitoring reports were not contained in the file, we interviewed Service biologists knowledgeable about the biological opinion (generally the author of the biological opinion or a designated species lead if the author was unavailable) to determine if the monitoring reports might be located elsewhere (e.g., available electronically).

To determine the extent to which the Service tracks the cumulative take of species, we judgmentally selected a sample of 23 listed species occurring in the 11 western states. First, in our sample we included all species

[2]These biological opinions did not contain reporting requirements beyond standardized language in the incidental take statement stating that the action agency must notify the Service and reinitiate consultation if any of the thresholds for reinitiation are reached.

identified by the Service as having a process to track cumulative take, which totaled 10. For these species, we obtained supporting documentation and interviewed Service biologists to gain a better understanding of the way in which take is measured and summed, the time frame covered, how the data are entered and by whom, and how the information is used within and across Service field offices. Second, we selected 13 additional species to capture a range of variability among species characteristics to determine how biologists track take and what other information they use to determine the impact of formal consultations on the species. We based our selection of these species on scientific classification (taxonomy), species range (occurring in one state or multiple states), and the Service's recovery priority for the species (see table 3). For the species selected, we reviewed relevant documentation and a sample of biological opinions. We also interviewed Service field staff knowledgeable about the species to learn how frequently consultations are done for that species, the types of actions and key action agencies that consult with the Service on that species, how take is typically measured for the species, how take is tracked cumulatively, and other information sources staff use to determine the impacts to species from consulted-on actions.

Table 3: Listed Species Selected for Review

Species	Taxonomy	Species' range in the western states[a]	Recovery priority number[b]	Take-tracking process
Behren's silverspot butterfly (*Speyeria zerene behrensii*)	Insect	California	3c	No
Bighorn sheep, peninsular California population (*Ovis canadensis*)	Mammal	California	3c	No
Bull trout (*Salvelinus confluentus*)	Fish	Idaho, Montana, Nevada, Oregon, Washington	9c	Yes
Canada lynx (*Lynx canadensis*)	Mammal	Colorado, Idaho, Montana, Oregon, Utah, Washington, Wyoming	15	Yes
Chiricahua leopard frog (*Rana chiricahuensis*)	Amphibian	Arizona, New Mexico	3	No
Coastal California gnatcatcher (*Polioptila californica californica*)	Bird	California	3c	No
Desert tortoise (*Gopherus agassizii*)	Reptile	Arizona, California, Nevada, Utah	8c	Yes
Grizzly bear (*Ursus arctos horribilis*)	Mammal	Idaho, Montana, Washington	3c	No

Species	Taxonomy	Species' range in the western states[a]	Recovery priority number[b]	Take-tracking process
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)	Mammal	Arizona, New Mexico	8	No
Marbled murrelet (*Brachyramphus marmoratus marmoratus*)	Bird	California, Oregon, Washington	3	Yes
Mexican spotted owl (*Strix occidentalis lucida*)	Bird	Arizona, Colorado, New Mexico, Utah	9c	Yes
Northern spotted owl (*Strix occidentalis caurina*)	Bird	California, Oregon, Washington	6c	Yes
Pecos bluntnose shiner (*Notropis simus pecosensis*)	Fish	New Mexico (Pecos River only)	3	Yes
Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*)	Plant	Arizona	3	Yes
Point Arena mountain beaver (*Aplodontia rufa nigra*)	Mammal	California	9c	No
Preble's meadow jumping mouse (*Zapus hudsonius preblei*)	Mammal	Colorado	9c	Yes
San Diego fairy shrimp (*Branchinecta sandiegonensis*)	Crustacean	California	2c	No
Southwestern willow flycatcher (*Empidonax traillii extimus*)	Bird	Arizona, California, Colorado, Nevada, New Mexico, Utah	3c	Yes
Stephens' kangaroo rat (*Dipodomys stephensi* [incl. *D. cascus*])	Mammal	California	2c	No
Tidewater goby (*Eucyclogobius newberryi*)	Fish	California	7c	No
Uinta Basin hookless cactus (*Sclerocactus glaucus*)	Plant	Colorado, Utah	14c	No
Western snowy plover, Pacific coastal population (*Charadrius alexandrinus nivosus*)	Bird	California, Oregon, Washington	3c	No
Yuma clapper rail (*Rallus longirostris yumanensis*)	Bird	Arizona, California	6	No

Sources: U.S. Fish and Wildlife Service data and GAO analysis.

[a]This range represents the states where the species is both listed and found within the 11 western states included in our review; a species may also occur in states besides those listed in the table.

[b]The Service assigns each listed species a recovery priority number, ranging from 1 to 18, based on the degree of threats, recovery potential, and taxonomic distinctness. Species with a high priority rank (e.g., 1, 2, or 3) are those that are the most imperiled and have the highest potential for recovery. Species with a low rank (e.g., 16, 17, or 18) are the least imperiled and have low recovery potential. A species' rank may be elevated by adding a "c" designation to its numerical rank to indicate that it is, or may be, in conflict with construction or other development projects or other forms of economic activity.

To learn about the Service's efforts to develop consultation related-databases, we reviewed relevant documentation about each database and interviewed Service managers from headquarters and the regions knowledgeable about the databases. Service staff described their efforts to develop each database, including time frames and available funding, and also demonstrated how the systems work.

We conducted this performance audit from July 2008 through May 2009, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Comments from the Department of the Interior

United States Department of the Interior
OFFICE OF THE SECRETARY
Washington, DC 20240

TAKE PRIDE IN AMERICA

APR 28 2009

Robin M. Nazzaro
Director, Natural Resources and Environment
Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548-0001

Dear Ms. Nazzaro:

Thank you for providing the Department of the Interior the opportunity to review and comment on U.S. Government Accountability Office Draft Report "*Endangered Species: The U.S. Fish and Wildlife Service Has Incomplete Information about Effects on Listed Species from Section 7 Consultations,*" (GAO-09-550).

The Department concurs with the findings and the two recommendations for executive action.

We hope these comments will assist you in preparing the final report.
If you have any questions, please contact Katherine Garrity at (703) 358-2551.

Sincerely,

Will Shafroth
Acting Assistant Secretary for Fish
and Wildlife and Parks

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Robin M. Nazzaro at (202) 512-3841 or nazzaror@gao.gov

Staff Acknowledgments

In addition to the individual named above, Jeffery D. Malcolm, Assistant Director; Eric Bachhuber; Mark A. Braza; Ellen W. Chu; Justin Fisher; Richard P. Johnson; Alyssa M. Hundrup; Trish McClure; Laina Poon; Jena Sinkfield; Kyle Stetler; and Joshua Wiener made key contributions to this report.

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