Critical Habitat and the Role of Peer Review in Government Decisions

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With few exceptions, the US Endangered Species Act requires the designation of "critical habitat" for threatened and endangered species. This provides important protections, including a prohibition against adverse modification of designated habitat by federal agencies. Scientists with the US Fish and Wildlife Service develop critical habitat designations, which are then peer reviewed before being finalized by the secretary of the interior. We reviewed 169 peer reviews of 42 designations for 336 species finalized between 2002 and 2007 and determined whether there were changes in the area designated and whether those changes reflected the reviewers' advice. Thirty-four (81%) of the 42 designations were reduced by an average of 43%. Eighty-five of the reviews recommended adding areas, and 19 recommended subtracting areas. Areas were added in response to only four reviews and subtracted in response to only nine. These results highlight the limitations of peer review of government decisions, which lack an arbiter to ensure that reviews are adequately considered.

Keywords: endangered species, conservation, extinction

In passing the US Endangered Species Act (ESA), Congress recognized the fundamental importance of protecting species' habitat, stating that "if the protection of endangered species depends in large measure on the preservation of the species' habitat, then the ultimate effectiveness of the Endangered Species Act will depend on the designation of critical habitat" (US Congress 1982, p. 497). Accordingly, the ESA requires the US Fish and Wildlife Service (USFWS) to designate critical habitat for listed species in most cases and provides specific protections for this habitat (16 U.S.C. § 1533(a)(3)(A)(i)). The law requires federal agencies to consult with the USFWS to ensure that actions permitted, funded, or carried out by the agencies do not adversely modify critical habitat. These consultations result in substantial financial and human resources being dedicated to the avoidance and mitigation of impacts on habitat for endangered species. Taylor and colleagues (2005) found that species with designated critical habitat were more than twice as likely to be improving as those without, which suggests that critical habitat protections benefit species.

It is required that critical habitat include areas essential to the conservation of species unless it is determined that the benefits of excluding an area outweigh the benefits of its inclusion (16 U.S.C. § 1533(b)(2)). This balancing of benefits can include a consideration of the economic impacts of designation and affords the agency considerable discretion to exclude areas. This discretion, however, is not unbounded. The USFWS must base critical habitat designations on the best available information, it must have a rational basis for its decisions to exclude particular areas, and its exclusions cannot jeopardize the continued existence of the species.

The USFWS designates critical habitat using a two-stage process, beginning with a proposed rule that is sent to experts for peer review and submitted for public comment, followed by a final rule that describes any changes in the designation, including any exclusions, and responds to the peer reviews and public comments. Agency scientists with expertise particular to the subject species generally prepare the critical habitat designation. Before the designation is finalized, agency solicitors and political appointees with varying degrees of scientific training or experience with the particular species review it. Ultimately, the secretary of the interior signs the designations. In recent investigations, the Department of the Interior's inspector general documented several examples in which interference by political appointees resulted in reductions of critical habitat against the advice of agency scientists (US Inspector General 2007, 2008). Subsequently, dozens of critical habitat designations have been challenged in court, which has resulted in many of these designations' being reconsidered (e.g., *Center for Biological Diversity v. Salazar* [2007], *Center for Biological Diversity v. US Fish and Wildlife Service* [2008]).

In 1994, USFWS enacted a policy to seek independent peer review of listing decisions, critical habitat designations, and recovery plans (USDOI and USDOC 1994). The purpose of this policy was "to ensure the best biological and commercial information is being used in the decision making process, as well as to ensure that reviews by recognized experts are incorporated into the review process of

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rulemakings and recovery plans developed in accordance with the requirements of the Act" (p. 34271). Peer review of government decisions is fundamentally different from peer review of scientific studies, because there is no editor or other arbiter to ensure that the peer-review suggestions are considered and followed where appropriate.

To evaluate the degree to which the USFWS follows peer-review suggestions, we obtained the peer reviews of proposed critical habitat rules produced between 2002 and 2007 and determined whether the reviewer had advised a change in critical habitat by either adding or subtracting specific areas and whether the USFWS followed that advice in its final designation. To assess the degree to which political oversight and the ability to exclude areas results in changes to critical habitat, we quantified changes in critical habitat between proposed and final rules for all of the designations for which we received peer review. We also present two case studies highlighting the lack of consideration given to peer review and the influence of political oversight in the designation of critical habitat.

Evaluating the response to peer review of critical habitat

For critical habitats proposed between 2002 and 2007, we requested through the Freedom of Information Act (5 U.S.C. § 552) all peer reviews of the proposed designation. We then determined whether the reviewer recommended adding or subtracting specific areas to critical habitat and whether the final rule incorporated these recommendations, in whole or in part. In most cases, we were able to determine whether the recommendations were followed by reviewing the section of the final critical habitat rules dedicated to responding to the peer reviewers, but in a small number of cases, we were not able to determine whether they had noted and responded to a peer reviewer's recommendation. For each designation, we also tabulated the acreage proposed and finalized in order to provide insight into the overall direction and magnitude of the changes to critical habitat.

For our two case studies, we reviewed documents from the USFWS's administrative records for designation of critical habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*) and the Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*), with particular attention to any documents in which agency scientists were directed to change the designation of those species' critical habitat.

Recommendations from peer review were in most cases not followed

In response to our Freedom of Information Act request, we received a total of 169 peer reviews of 42 critical habitat designations, covering a total of 336 species. Thirty-four (81%) of the 42 designations were cut between the proposed designation and the final stage by an average of 43.2%, for a total cut of 12,061,037 acres. For 31 of these designations, at least one peer reviewer recommended adding additional habitat, with more than one reviewer recommending additions for 27 of the designations. At least one peer reviewer recommended subtracting areas for 12 of these designations, but for 5 of these, the USFWS's subtractions did not correspond to a peer reviewer's recommendation, and in 6 others, the subtractions went well beyond what the reviewers had recommended. For only one designation were the acres cut fully supported by a peer reviewer.

Of the 169 reviewers, 85 recommended adding areas to 36 of the 42 critical habitat designations, and 19 recommended subtracting areas from 14 of the 42 designations. There was no recommendation to add or subtract areas for four of the designations. The recommendations to add areas ranged from the identification of specific areas that were named and described to the identification of general habitat types, such as migration or dispersal habitat, and were focused on the need for further habitat to ensure a species' recovery, to connect existing populations, or to protect additional populations. The recommendations to subtract areas typically identified specific areas and, in a majority of cases, were based on the lack of the species or their habitats in these areas, but in some cases, they were based on the potential for a negative reaction from landowners or managers to a specific critical habitat designation.

In response to the 85 reviews recommending the addition of areas, the USFWS added areas to only three of the designations in response to four separate peer reviews; in three cases, the designations were partially added, and in one case, they were fully added. We could not determine whether the areas were added to three designations in response to three reviews. In response to the remaining 78 reviews (92%), including all 36 designations in which a reviewer recommended adding habitat, the USFWS did not follow the peer reviewers' recommendations.

The USFWS more often followed reviewers' advice to remove areas, subtracting areas from 8 of the 42 designations in response to nine reviews, subtracting the entire recommended area for 7 designations and part of the area for 2. The USFWS retained areas recommended for subtraction by nine reviewers for 6 of the 42 designations. We could not determine whether the area was subtracted for one designation.

Case study: Designation of critical habitat for the southwestern willow flycatcher

The southwestern willow flycatcher is a small songbird that is found in several states in the southwestern United States and that was protected as an endangered species in 1993. Critical habitat was first designated for the flycatcher in 1997 and included 961 river kilometers (USFWS 1997). This designation was challenged in court by the New Mexico Cattle Growers' Association, resulting in a new proposed designation in 2004, which included a total of 2054 river kilometers and which was focused on incorporating areas with more than 10 flycatcher territories either in one population or as a network of smaller populations in close proximity

(USFWS 2004). The final designation was cut by 53%, to 1176 river kilometers (USFWS 2005).

Even before the designation was finalized, there is evidence of interference by political appointees. The inspector general of the Department of the Interior found that a former deputy assistant secretary of the interior had directed the USFWS scientists to lower the radius at which flycatcher populations would be considered connected and thus considered for inclusion in critical habitat (US Inspector General 2007). A memorandum in the administrative record for the decision also shows this same official directing the USFWS to remove all unoccupied and migratory habitat from the designation. The record shows that these directives resulted in the proposal being cut from 4201 river kilometers to the proposed 2054 river kilometers, which was then cut again in the final rule.

The proposed designation was peer reviewed by three scientists. Two of these reviewers recommended adding habitat to the designation in order to meet specific distribution and population goals from a 2002 recovery plan for the flycatcher (USFWS 2002, 2005). One peer reviewer, for example, stated, "Overall, I expected the proposed critical habitat rule to better reflect the work accomplished in the 2002 SWWF recovery plan" (the reviews are available on request; please contact the first author of this article). The reviewers also faulted the proposed designation for excluding areas in southern California, despite the fact that those areas met the proposal's criteria for inclusion, and for not considering more recent survey information. Ultimately, these recommendations were rejected by the USFWS, which simply stated that it is not required to designate all areas where a species occurs and that recovery plans are not "regulatory documents" (USFWS 2005). In 2009, the critical habitat designation for the flycatcher was challenged by the Center for Biological Diversity and is now being reconsidered according to a settlement agreement (*Center for Biological Diversity v. US Fish and Wildlife Service* [2008]).

Case study: Designation of critical habitat for the Cape Sable seaside sparrow

The Cape Sable seaside sparrow is poorly named. Although it was discovered on Cape Sable, at the southwest tip of Florida, the population there is now extinct, and the majority of the birds almost surely lived elsewhere—in the freshwater marshes of the southern Everglades. Almost all of the population lives within Everglades National Park and Big Cypress National Preserve, in several subpopulations that straddle Shark River Slough, the system's main drainage basin (Curnutt et al. 1998, Nott et al. 1998). The Everglades seasonally flood as rains resume in early June at the start of hurricane season, and water levels start receding early in the year. The deepest part of the slough may remain flooded for years on end. Sawgrass and other water-tolerant plant species dominate these areas. Peripheral areas are dry from March to May and are floristically diverse, and the sparrow nests there (Boulton et al. 2009).

In 1981 and 1992, range-wide surveys found the majority of birds west of the slough. This changed in 1993, when water managers released historically unprecedented water flows across the water-control gates, which are due north of these western sparrows, flooding their habitats during the breeding season and destroying around 95% of the birds in the area (Curnutt et al. 1998, Nott et al. 1998).

The proposed critical habitat designation included all of the areas where surveys had found the birds (USFWS 2006). The final designation eliminated the populations in the west—where the majority of the birds and the potential habitat occurred (Jenkins et al. 2003, USFWS 2007).

In the proposed designation, the importance of the western populations was explicit: "The unit's spatial separation from the other areas occupied by sparrows increases its significance to the species. It is the only area west of Shark River Slough that can support a large sparrow subpopulation. Its distance from other sparrow subpopulations and the intervening slough make it unlikely to be affected by any large fire that impacts the subpopulations east of Shark River Slough and less likely to be subjected to any local detrimental hydrologic conditions that may affect the eastern subpopulations, either as a result of hydrologic management or meteorological events" (USFWS 2006, p. 63990). Moreover, an assessment of extinction risk stressed the need to maintain populations on both sides of the slough, because human-caused fires in the east have historically burned large areas of sparrow habitat, particularly in dry years (Pimm and Bass 2002).

The proposed designation was peer reviewed by four reviewers. Three of the four reviewers recommended increasing the critical habitat from what was proposed in order to include all areas where sparrows have been found, to include additional habitat for the introduction of sparrows to new areas, and to connect existing populations. One of the reviewers also specifically highlighted the inclusion of areas west of the slough, describing them as "an extremely important designation" (the reviews are available on request; please contact the first author of this article). These recommendations were rejected, with the USFWS removing critical habitat west of the slough and not adding any areas.

The exclusion of areas west of Shark River Slough against the advice of several peer reviewers is instructive. The USFWS provided several rationales for excluding these areas, among them opposition from other agencies and organizations, including the Army Corps of Engineers and the Miccosukee Tribe of Indians of Florida; limited palynological data that suggested that some of the area may not have historically supported the sparrow; and an assertion that designation of the area as critical habitat might limit the restoration of the Everglades (USFWS 2007).

Each of these arguments has problems. In relying on opposition to the designation as a basis for exclusion, the USFWS argues that designation will harm partnerships with entities that are participating in Everglades restoration and will thus not benefit the species (USFWS 2007). The

USFWS, however, provided no evidence that any of these entities would cease their participation were the area to be designated as critical habitat.

The USFWS is correct that limited palynological sampling did show that some areas were historically sawgrass marsh rather than marl prairie (citing Bernhardt and Willard 2006), but these samples were taken to the west of most of the sparrow habitat and, therefore, should not serve as a basis for excluding the entire area.

The USFWS's argument that the designation of this particular area as critical habitat would potentially conflict with Everglades restoration is based on an assertion that according to some hydrological models, restoration would make the western populations wetter. This would be remarkable, since the natural flow path of water in the system was to the east, which would mean that the western areas would remain drier and the eastern areas would become wetter. One of us (SLP) obtained the model output on which the decision rule was based. It showed restoration making the western populations drier—as one would expect, but contrary to the assertions in the rule.

The decision to exclude areas west of Shark River Slough was challenged in court but was upheld in deference to the USFWS's expertise in evaluating complex scientific problems, and it was left to their discretion to exclude areas when they determine that the benefits of exclusion outweigh the benefits of inclusion (*Center for Biological Diversity v. Salazar* [2011]).

Conclusions

In the first systematic examination of the use of peer review in government decisions, our results show that in the majority of cases, the USFWS did not follow the recommendations of expert peer reviewers to add or subtract areas from critical habitat for species protected under the ESA. Although we would not expect the agency to follow peer reviewers' advice in every case (and it is not required to do so), the fact that the peer-review recommendations were not followed in the vast majority of cases strongly suggests that the USFWS did not give serious consideration to peer reviews and that the stated purpose for peer review of critical habitat decisions—namely, ensuring the use of the "best biological and commercial information" and input by "recognized experts"—may not be being fulfilled (USDOI and USDOC 1994, p. 34271).

These results highlight the fact that unlike in the peer review of journal publications, there is no editor or other arbiter to ensure that government decisions consider—and if it is appropriate, follow—the peer reviewers' advice. When there is a conflict between the submitter to a journal and a peer reviewer, the editor acts as an independent judge who renders a decision to publish the article, to not publish the article, or to require changes. The editor does so by assessing the merits of the reviewer's assertions and the response of the submitter. For peer review of critical habitat designations, however, the USFWS is both the submitter and the judge.

Our results also show that a majority of critical habitat designations were reduced between the proposed and final designations. Based on investigations by the inspector general of the Department of the Interior and our two case studies, these reductions were in at least some cases at the direction of political appointees in the Department of the Interior and lacked scientific support or a solid rationale (US Inspector General 2007 and 2008). To the extent that political considerations enter into critical habitat decisions, our data show that at least for the period we considered, the impact was a reduction in the area of protected habitat for species. This may in part reflect the fact that our period of study (2002–2007) was encompassed by one presidential administration. Further study is needed to determine whether changes in administration affect the response to peer review.

Other studies have shown evidence of political interference in decisions concerning endangered species. Ando (1999) found that political opposition to protection by a member of Congress correlated to delays in a species' being listed as *threatened* or *endangered* under the ESA. Likewise, Greenwald and colleagues (2006) found that the presidential administration strongly influenced the numbers of species that were listed and that lawsuits by citizens shortened delays in species listings. A number of authors have inferred that political opposition is a likely factor in a species' not receiving critical habitat at all, and indeed, currently only 630 (45%) of the 1392 listed species have designated critical habitat (Salzman 1990, Senatore et al. 2003, Schwartz 2008). Such political intrusion into scientific decisions concerning endangered species highlights the importance of a robust peer-review process to ensure the scientific integrity of government decisions.

In the absence of an arbiter to ensure that expert peer review is followed and, more broadly, that decisions are based on solid scientific footing, the courts have become a de facto arbiter. Although the peer-review policy enacted by the USFWS does not require complete adherence to all of the peer reviewers' recommendations, a failure to rely on the best available information does violate the ESA. Conservation groups challenged some of the critical habitat designations we included in this review on this basis, and many have been or are in the process of being reconsidered, which has generally resulted in additional areas' being designated as critical habitat (e.g., *Center for Biological Diversity v. Salazar* [2007], *Center for Biological Diversity v. US Fish and Wildlife Service* [2008]). Hodges and Elder (2008) found further evidence that courts improved the scientific integrity of critical habitat designations, finding that court-ordered critical habitats relied on more biological criteria than did non-court-ordered designations. The courts, however, are a cumbersome, expensive, and time-consuming means of ensuring the scientific integrity of government decisions, and they generally eschew wading into scientific debate, as was the case with the Cape Sable seaside sparrow.

One potential solution to these problems would be to create a position in the US Department of the Interior, such as a science czar, who would review decisions and determine whether they were well supported and whether they incorporated peer-review suggestions. The person holding this position would need considerable independence for it to retain credibility. Another potential solution would be to separate agency scientists and policymakers, which would afford the scientists greater independence to make determinations on the basis of the best available information. The National Marine Fisheries Service follows this model; it has not been the focus of as much controversy or investigation. Either way, scientists within the USFWS need to be given leeway and clear direction in order to base their decisions solely on the best available scientific information. The loss of biodiversity is too serious a problem to let short-term political interests intrude. There has been some progress in this regard. The secretary of the interior recently issued an order intended to ensure scientific integrity, including broad language supporting the independence of scientists and affirming that their conclusions cannot be suppressed (US Secretary of the Interior 2010). The extent to which these principles can and will be enforced is yet to be determined. As a further encouraging sign, the USFWS recently added an area to a critical habitat designation for the Sonoma County population of the California tiger salamander (*Ambystoma californiense*) in response to peer review (USFWS 2011).

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