

Advancing Science in the Endangered Species Act

A Toolkit for Scientists



The strong scientific foundation of the Endangered Species Act (ESA) has made it one of the most successful public interest laws of the modern age. But the law is often a target of political interference and special interest influence.

Its continued effectiveness depends on our collective ability to keep political interests from superseding scientific judgment in species conservation efforts. As a scientist, you are uniquely positioned to use your expertise to ensure that policy decisions on species conservation are rooted in the best available science.

The Endangered Species Act is the United States' primary science-based safeguard against threats to biodiversity. Pro-



The bald eagle was one of the first species to receive federal protection as an endangered species. Thanks to decades of conservation efforts, the bald eagle recovered enough to be removed from the list of endangered animals in 2007.

tection often means the difference between extinction and survival for plant and animal species facing environmental or human-caused threats. These threats include habitat loss and fragmentation, overharvesting, pollution, climate change, and nonnative invasive species—conditions that also threaten human health and safety. To take the most effective action possible against these threats, we must use the best available science—and that means we need your help.

Application of the Act can become contentious when protective regulations are perceived as hindering economic activity. It is crucial that the law remains grounded in science and enforced by the government to prevent needless extinctions of plants and animals.

This toolkit provides the information you need to participate more effectively in discussions about and application of the Endangered Species Act. It will help you support the Act in the following ways:

- **Understand how the Act works, how decisions related to the Act are made and who makes them, and where science fits into the process**
- **Recognize the ways in which endangered species policy can be harmed by political interference**
- **Build collaborative relationships with other stakeholders involved in conservation policy decisions, and take action to advocate science-based endangered species protections free from political interference.**
- **Access a wealth of resources on species conservation and science communication**

For additional information and supportive resources, visit the UCS website at www.ucsus.org/esa.

Understanding the Endangered Species Act

The Endangered Species Act of 1973, adopted under President Richard Nixon, is the leading piece of environmental legislation used in the United States to protect and recover biodiversity.

Under the law, species at risk of extinction are identified and protected. The Act currently protects more than 1,400 animal species and 900 plant species (FWS n.d.). It complements other US environmental laws and multiple international treaties to enable more comprehensive conservation planning.

Under the Act, a species (defined to include subspecies and “distinct population segments”) receives federal protection if scientific evidence indicates its continued existence is at risk. A species can be listed as either **endangered** or **threatened**. This protection includes designation of **critical habitat**, development of recovery plans, and prohibition on **take**. (Bolded terms defined in the box.)

The Success of the Endangered Species Act in Effect

While very few protected species have recovered to the point that they can be “delisted”—the threats underlying many species’ decline (e.g., habitat loss) cannot easily be reversed—the Act’s success is clear when you consider how many species still exist today because of the law’s protections.

Some species have recovered enough since passage of the Endangered Species Act to be removed from the list of threatened and endangered species, including the iconic bald eagle. But the law’s success also includes the many species whose decline the Act has slowed or halted. While still listed as either threatened or endangered under the Act, species such as the El Segundo blue butterfly, southern sea otter, and Hawaiian goose have made significant steps toward recovery (PIFWO 2012; Weagley 2009; FWS 2008). In total, 99 percent of all species listed since the law’s enactment still survive today, a remarkable record given that these species were on the brink of endangerment or extinction before being listed. The Act has also led to restoration of essential aquatic and terrestrial ecosystems that benefit myriad other species, including humans.

Helpful Definitions

Endangered species: A species in danger of extinction throughout all or a significant portion of its range.

Range: The geographical area within which a species can be found during its lifetime, including areas of migration or hibernation.

Threatened species: A species with a population or subpopulation that is likely to become endangered in the foreseeable future.

Candidate species (the term used by the US Fish and Wildlife Service [FWS]); **species of concern** (the term used by the National Marine Fisheries Service [NMFS]): Species that have not been listed but face immediate, identifiable threats. These species are not a priority for listing activities but can be proposed as endangered or threatened under the Endangered Species Act.

Critical habitat: Designated areas of habitat deemed essential to a species’ conservation and which may require special protection or management measures. Some of the features considered essential to species conservation include space for individual and population growth and normal behavior; cover or shelter; food, water, air, light, minerals, or other nutritional or physiological requirements; sites for breeding and rearing offspring; and habitat areas that are protected from disturbances or are representative of the historical distributions (both geographical and ecological) of a species.

Take: To attempt to or actually harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect. Anyone charged with illegal take of a member of an endangered species is in violation of federal law and subject to prosecution.

How Does the Act Work?

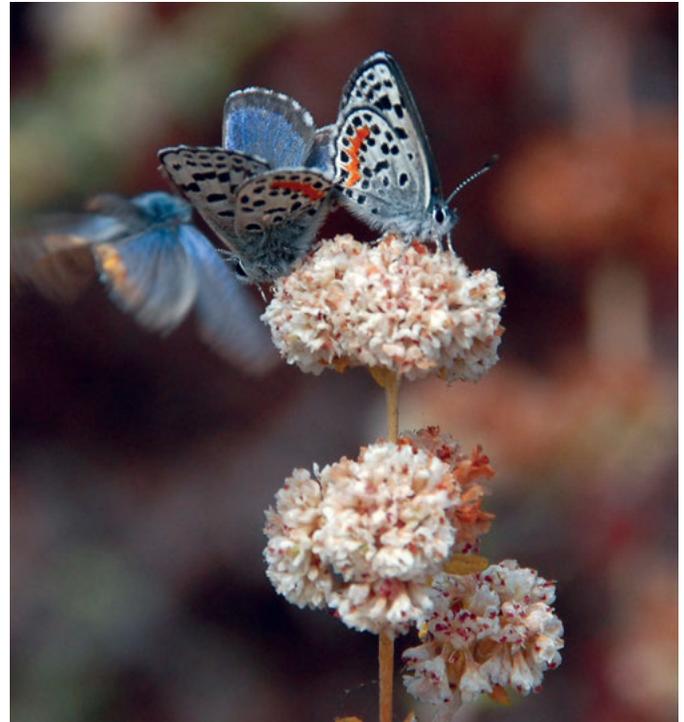
Two federal government agencies implement the Endangered Species Act: the FWS, within the Department of the Interior (DOI), which oversees terrestrial and freshwater species; and the NMFS, an office of the National Oceanic and Atmospheric Administration (NOAA) within the Department of Commerce (DOC), which oversees marine species. At the same time, the law requires all federal agencies to take steps to protect endangered species that might be affected by their actions. Implementation of the Act includes coordination between federal agencies and state and tribal governments.

Under the Act, the process for considering whether a species should be listed is initiated via two main routes. Either the FWS or the NMFS initiates a status review of a species, or—much more commonly—concerned citizens petition the agency to list a species. Under Section 4 of the law (see Table 1), species are listed if they are deemed threatened or endangered due to any of **five factors**:

1. **Threats to habitat**
2. **Overutilization for commercial, recreational, scientific, or educational purposes**
3. **Disease or predation**
4. **Inadequacy of existing regulatory mechanisms**
5. **Other natural or human-caused factors affecting survival**

The decision whether to list (or delist) a species must be made “solely on the basis of the best scientific . . . data available.” This is why it is so critical for scientists—who have access to and can properly interpret the best available data—to weigh in on listing decisions.

Much of the implementation and management of species fall to the states (see the box, p. 6). Section 6 of the Act lays out a framework supporting DOI and DOC cooperation



The Endangered Species Act has helped the El Segundo blue butterfly make significant strides toward population recovery.

with state agencies to conserve species that have been listed as endangered or threatened. The FWS and the NMFS are authorized to enter into cooperative agreements with states that maintain “adequate and active” species management programs.

How a Species Becomes Legally Protected

The candidate assessment process and the petition process for species listing (Figure 1, p. 6) are the two main paths for

(continued on p. 8)

“As scientists, we are often the first and sometimes the only people that see a species in decline. When we can bring that information to policy makers, and help them to begin the process of protecting threatened organisms, we help make our research useful to preserving the biodiversity that is the birthright of all humanity.”

— Ken Sweat, senior lecturer, School of Mathematical and Natural Sciences, Arizona State University

TABLE 1. Decoding the Act: The Core Components of the Endangered Species Act and What They Do

Section	Description
1-3: Table of Contents; Findings, Purposes, and Policy; Definitions	Lays out the reasons for creating the Endangered Species Act and expands on terms crucial to understanding the law.
4: Determination of Endangered Species and Threatened Species*	The cornerstone of the Act; describes the five factors that determine listing needs and details procedures for listing, delisting, and recovery planning.
5: Land Acquisition	Authorizes the secretaries of the interior and agriculture to acquire land necessary for conservation.
6: Cooperation with the States*	Describes the types of agreements between the federal government and states and authorizes the relevant secretary to provide financial assistance to states.
7: Interagency Cooperation	Requires all federal agencies to consult with the relevant secretary to ensure that actions the agencies take are not likely to jeopardize listed species. The US Forest Service, for example, may coordinate with the FWS in issuing a permit for recreational use of areas within a listed species' range.
8: International Cooperation; 8A: Convention Implementation	Details particulars related to funding, encouraging, bolstering, and investigating uses of the Act abroad and details implementation of a recent multilateral treaty adopted to protect endangered species.
9: Prohibited Acts	Prohibits various actions, including the taking of listed species.
10: Exceptions*	Provides exceptions to Section 9, including permits to allow taking species for scientific purposes or incidental to otherwise lawful activity.
11: Penalties and Enforcement*	Details fines and other punishments related to violation of the Endangered Species Act and the process for filing citizen suits.
12-16: Endangered Plants; Conforming Amendments; Repealer; Authorization of Appropriations; Effective Date	Outlines practical technical applications of the law, including the repeal of the Endangered Species Conservation Act of 1969.
17: Marine Mammal Protection Act of 1972*	Clarifies that no provision of the Act takes precedence over more restrictive provisions of the Marine Mammal Protection Act.
18: Annual Cost of Analysis by the FWS	Mandates that the secretary of the interior provide Congress with an annual report accounting for species-by-species expenditures made primarily for conserving species pursuant to the Endangered Species Act.

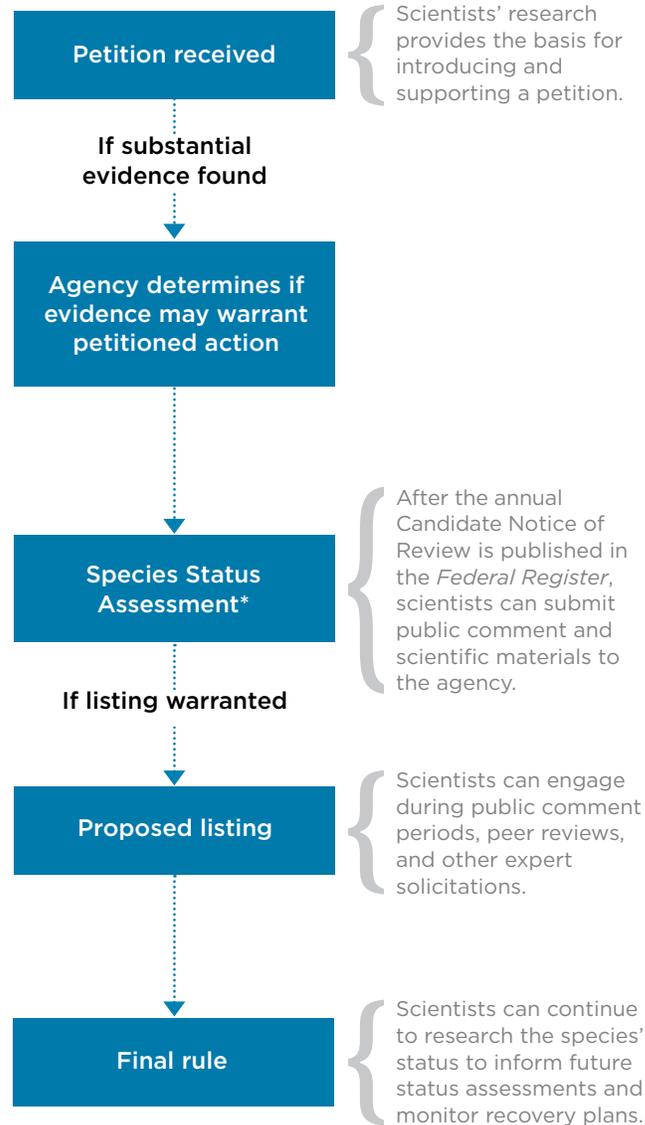
The role of science in the Endangered Species Act is to inform the process of listing decisions, and there are specific sections of the Act that mandate the use of science. The sections marked with an asterisk are those that describe pieces of the process that scientists can best inform; see pp. 14-16 to learn more about these engagement opportunities.



SUCCESSFUL COLLABORATION AMONG INTEREST GROUPS: THE CALIFORNIA CONDOR RECOVERY PLAN

The California condor (*Gymnogyps californianus*) is the largest land bird in North America, and its habitat once ranged from California to Florida. Several threats led to a huge drop in population numbers, including lead poisoning caused by scavenging carcasses containing hunters' ammunition; microtrash consumption; and habitat modification. The FWS listed the condor as endangered in 1967. Condor recovery efforts under the Endangered Species Act involve collaboration between many partners, including the FWS; the National Park Service; the Bureau of Land Management; and Arizona, California, and Utah agencies that breed and raise condors in captivity for release in the wild, track and monitor survival rates of free-flying condors, and educate the hunting community about the impacts of lead-based ammunition on condors. This successful collaboration has helped increase the population of California condors from 23 in 1982 to 435 as of 2015 (FWSPSW n.d.).

FIGURE 1. The Listing Process and Opportunities for Scientists to Engage

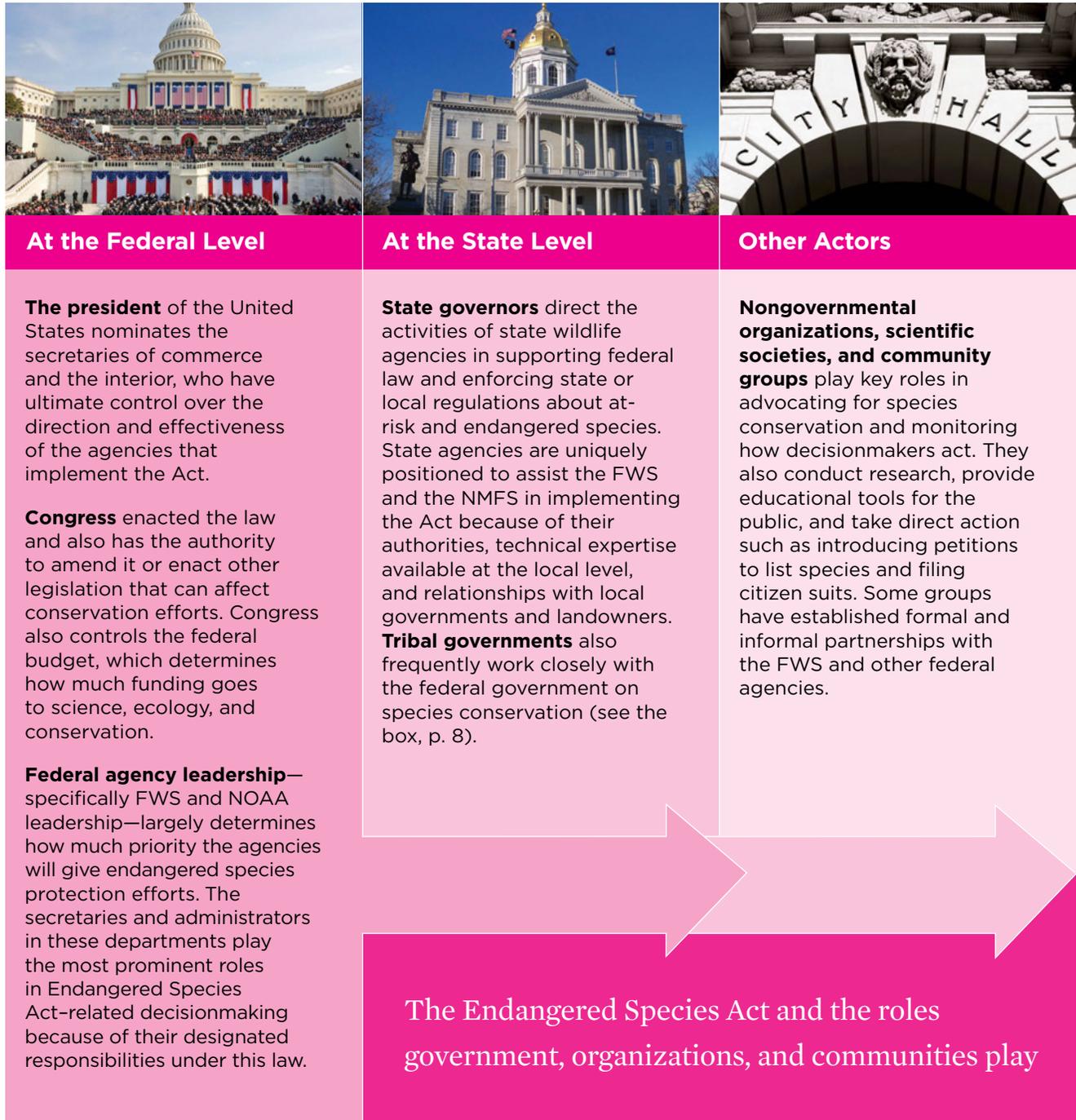


*For already listed species, Species Status Assessments happen annually.

In total, 99 percent of all species listed since the law's enactment in 1973 still survive today.

Who Is Involved in Species Conservation

There are many stakeholders in the species conservation process, and there are constant attempts to change the content and implementation of the Endangered Species Act. Preserving the Act requires the careful attention of citizens, experts, and advocates in Congress. Here is a list of relevant decisionmakers or influencers on the Endangered Species Act and related policies:





THE BLACK-FOOTED FERRET: A JOINT CONSERVATION EFFORT BETWEEN FEDERAL AND TRIBAL GOVERNMENTS

Endangered Species Act implementation frequently intersects with indigenous and native peoples' rights. The federal government and various tribal governments implement and negotiate adherence to the Act together. The FWS works closely with tribal governments to consider historical land uses, traditional ecological knowledge, ethnomedicinal practices, and hunting rights when considering species listing and delisting.

The survival of the black-footed ferret (*Mustela nigripes*), for example, relies on tribal, state, and federal cooperation. The species is a small, wide-ranging mustelid native to the western prairies of the United States. The conversion of native prairies to croplands, the decline of prairie dogs (the ferret's primary food source), and simultaneous canine distemper and sylvatic plague epidemics all contributed to the species' decline. Black-footed ferrets were known to be endangered as early as 1967, and they were one of the first species protected under the Act. By working closely with state agencies and tribal governments, the FWS reintroduced the ferret to five reservations, through partnerships with the Cheyenne River, Lower Brule, and Rosebud Sioux (South Dakota) and the Gros Ventre, Assiniboine, and Northern Cheyenne Sioux (Montana) Tribes and 10 of the 12 states spanning the ferret's historic range (FWS 2013).

species to become candidates for legal protection under the Endangered Species Act.

CANDIDATE ASSESSMENT PROCESS

Through the Candidate Conservation Program (FWS) or the Proactive Conservation Program (NMFS), the respective agency identifies species for which the best available data indicate that a proposal for listing is appropriate. Agency staff prepares a species assessment document, which summarizes the scientific understanding of the species' current and future needs and risks to determine whether the species should be added to a list of candidate species. Candidates do not receive statutory protections. One of the goals of the candidate listing process is to raise public awareness of the status of candidate species before they are officially listed, in order to encourage proactive conservation efforts.

Many species have been listed through the candidate conservation process. The New England cottontail rabbit, for example, was first identified as a species for potential listing by members of state and federal wildlife agencies as early as 2006 (FWSNE 2006). In 2008, a formal plan was created, and by 2009 conservation funding was flowing to projects to preserve the species (FWSNE 2009). The rabbit remained a candidate species until 2015, when renewed studies of its range and population showed that collaborative conservation efforts had been successful and the rabbit did not merit protection under the Act (FWS 2015a; Fuller and Tur 2012).



Conservation efforts for the New England cottontail rabbit started after it was identified via the candidate assessment process.



Conservation groups collaborated on a petition to add the rusty patched bumble bee to the endangered species list.

PETITION PROCESS FOR SPECIES LISTING

Anyone may file a petition for a species to be considered for listing under the Endangered Species Act: petitions can come from individuals or organizations. Petitions to list a species require a variety of information, including information on current population status and trends, identification of factors that may cause the species to be endangered or threatened, and information on the effectiveness of state conservation activities. Before conducting a “status review”—an assessment of the plight, population trend, and threats of a petitioned species—the Act requires the FWS and the NMFS to make and publish, within 90 days of receiving the petition, specific findings as to whether there is “substantial information” available to potentially warrant listing. This decision—that the species will be a candidate for listing or that the petition has been denied—is then published in the *Federal Register* (see the box).

The FWS and the NMFS have a year from receipt of the petition to make further findings to decide whether listing is warranted. The proposed listing rule may still be deferred,

however, and subsequent one-year determinations must be made in each year until either a proposed listing rule is published or a “not warranted” finding is made. The FWS and the NMFS must also designate critical habitat for a species concurrently with the listing determination, but often this designation is delayed. When designating critical habitat, economic impacts must be considered alongside scientific information, which is not a requirement during the listing process.

The petition process led to the listing of the rusty patched bumble bee (*Bombus affinis*), for example. In 2013, the Xerces Society partnered with the Natural Resources Defense Council to petition the FWS to add the rapidly declining bee species to the endangered species list (Xerces Society 2013). The bee is endemic to North America and an essential pollinator of both domestic and wild crops. By 2015, the petition had garnered enough evidence and public support for the FWS to make a ruling of “substantial information” (meaning that the petition provided enough information to suggest that listing the species might be warranted) and to propose the bee for protection under the Act. In March 2017, following two years of analysis, comment, and review, the rusty patched bumble bee became federally protected under the Act (FWS 2017).

What Is the *Federal Register*?

Any proposed rule (or change to an existing rule) that an agency wishes to make must be published in the *Federal Register*, a free, publicly available listing of all proposed rules and changes that is updated daily by the federal government. You can access the *Federal Register* by visiting www.federalregister.gov.

{ *“As a university-based scientist, I know that all universities have much the same mission statement—to teach, to research, to provide community service. As such, there is no prohibition on my teaching students beyond my university, political leaders, the media, faith groups. Nor does it prohibit research into environmental issues that affect society, nor prohibit engagement with communities that suffer the effects of our damaging the environment. Indeed, ethical concerns demand that I should do all these things.”*

— Stuart Pimm, Doris Duke Professor of Conservation at the Nicholas School of the Environment, Duke University; former board member, Union of Concerned Scientists }

Threats to Science-Based Endangered Species Policy

The Endangered Species Act was designed to allow the best available science to determine species protection decisions—and that is why it works. But the Act’s scientific foundation is under constant threat.

Various interests—from oil and gas companies to large landowners—push legislation and administrative changes that would allow greater political control over endangered species determinations. In practice, several challenges hinder the Act’s implementation and make information and engagement from independent scientists all the more important.

Capacity and budget constraints faced by federal and state agencies place limits on the Act’s implementation (Figure 2). Historically, Endangered Species Act implementation has been underfunded, and, as a result, there is often a multiyear delay for the consideration of a species. The consequences of such delays include the extinction of at least 40 species, such as the

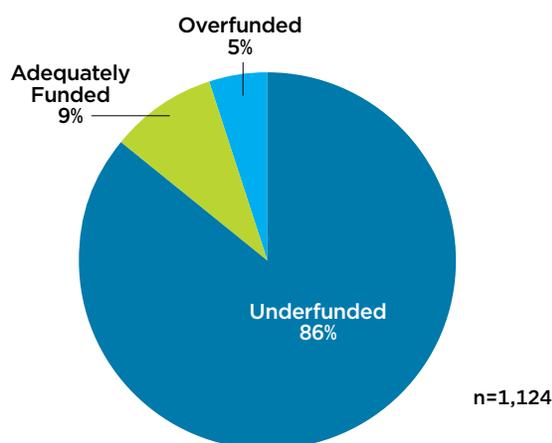
Amak Island song sparrow of Alaska (*Melospiza melodia amaka*) (CBD 2017; Puckett, Kesler, and Greenwald 2016; Suckling, Slack, and Nowicki 2004). Currently, there are more than 500 species awaiting candidate consideration.

The FWS has maintained a similar budget for many years, even as more species are added to its purview and more of those funds are allocated to endangered species protection (Goldman et al. 2015; Platt 2013). Some evidence suggests that the FWS is particularly underresourced compared with other federal agencies. One study found that the lack of funding for the FWS limits its ability to use the best available science (Lowell and Kelly 2016). A 2015 survey of federal scientists by the Union of Concerned Scientists (UCS) found that 59 percent of FWS scientists surveyed (536 respondents) and 28 percent of NOAA scientists surveyed (568 respondents) thought their agencies only occasionally, seldom, or never collected the scientific and monitoring information needed to meet their missions effectively (Figure 3) (Goldman et al. 2015).

Because science plays such a key role in the law, the Act is also vulnerable to political interference in that science. Political and commercial pressures have led to the manipulation, misuse, or sidelining of science at the expense of species protection (see Table 2, p. 12). This has occurred at the federal level when decisions about species protection were being made and at the state and local levels when wildlife protection plans were being implemented. Such abuses of science have come from elected officials, political appointees, and private interests that stand to be affected by Endangered Species Act decisions.

The case of the wolverine (*Gulo gulo*) demonstrates the interplay between science, courts, and federal and state governments. In April 2016, Dana Christensen, chief judge of the US District Court of Montana, ordered the FWS to reconsider its withdrawal of the proposed rule listing the North American wolverine as “threatened” under the Act. Christensen noted that “no greater level of certainty is needed to see the writing on

FIGURE 2. Species Recovery Is Vastly Underfunded



From 1980 to 2014, the majority of recovery plans for listed species received less than 90 percent of proposed budget funds.

SOURCES: DEFENDERS OF WILDLIFE 2017; GERBER 2016.

Scientists can closely monitor agency actions and policies that would affect both the process and decisions made concerning endangered species.



Political interference has affected efforts to protect the endangered wolverine.

the wall for this snow-dependent species standing squarely in the path of global climate change” (*Defenders of Wildlife v. Sally Jewell* 2016).

Christensen concluded that the FWS unlawfully ignored the best-available science regarding the danger wolverines face from climate change. North American wolverines—of which there are no more than 300 remaining in the lower 48 states—live only in high-elevation areas in the western United States, and Christensen speculated that the FWS had issued its withdrawal because of “the immense pressure that was brought to bear on the issue, particularly by a handful of western states.”

The FWS had withdrawn the proposed rule despite expert recommendations. Comments from five of the seven peer reviewers on the proposed rule supported the listing. Yet the FWS noted this as “substantial disagreement,” something Christensen found was a “mischaracterization.” The FWS also convened a nine-person panel of experts to weigh in, and Christensen found that the FWS’s interpretation of the panel’s findings cast “an unacceptable amount of doubt” on the best-available science.

Another problem was that the FWS appeared to demand better science instead of relying on the best-available science, as the law requires. When the FWS withdrew the rule, it noted that the main scientific study regarding wolverines was still the “most sophisticated analysis of impacts of climate change at a scale specific to the wolverine.” But the agency still decided to withdraw the listing. As Christensen ruled, “quite simply, the

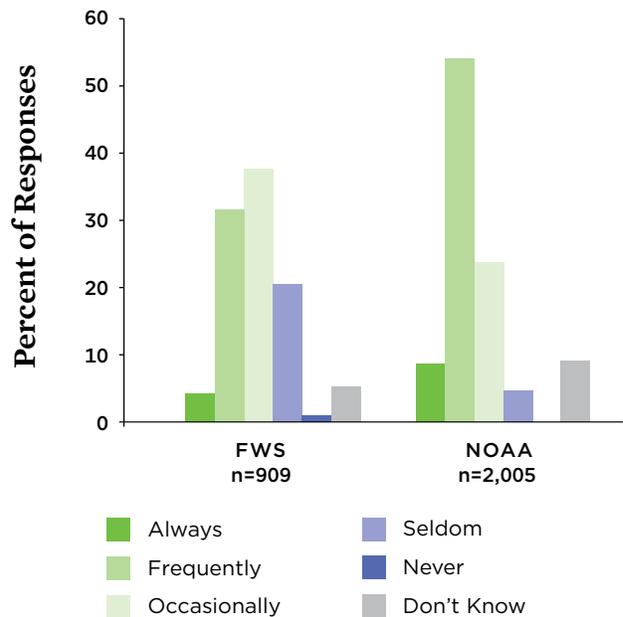
Service cannot demand a greater level of certainty than has been achieved in this field to date.”

On October 18, 2016, the FWS complied with the court order and reopened the public comment period on the proposed rule (FWS 2016). As of June 2017, the FWS has not yet announced its final decision.

Scientists can play a key role in safeguarding against such abuses. They can closely monitor agency actions and policies that would affect both the process and decisions made concerning endangered species. They can also identify, expose, and advocate against attempts to misuse or disregard science when scientific input is legally required.

FIGURE 3. Federal Scientists Survey on Monitoring Data Collection

[The agency] collects the scientific and monitoring information needed to effectively meet its mission.



These results suggest that, of the two federal agencies implementing the Act, the FWS could benefit most from outside expertise that would support its scientific and monitoring efforts.

SOURCE: ADAPTED FROM GOLDMAN ET AL. 2015.

TABLE 2. Types of Political Attacks on the Endangered Species Act

<p>Attempts to Dismantle the Endangered Species Act Process</p>	<p>Legislators have introduced proposals to alter fundamentally how the Act uses science in the listing and delisting processes. For example, the Listing Reform Act (H.R. 717) would allow decisionmakers to factor in economic considerations when determining whether a species should be protected. Currently, agency officials are required to use only the best available science to determine whether a species should be protected, and economic considerations are made only after a species has been listed.</p> <p>The president can issue executive orders that affect how federal agencies regulate. President Donald Trump’s “two for one” executive order, for example, may mean that the FWS would have to remove two listed species before they could adopt protections for a new species.</p> <p>Another attempt to undermine the Act’s spirit is S. 935, the Endangered Species Management Self-Determination Act. If passed, this legislation would require listing to undergo congressional approval, bringing politics into a scientific assessment of species’ needs, and would define “best available science” as any science provided by the state in which the species is located, rather than adhering to the already high federal standards of scientific research in the Act. In addition, it would require cost accounting, eliminate federal management of intrastate species, and get rid of citizen petitions for listing (which have helped the funds-strapped FWS determine candidates for listing).</p>
<p>Harmful Riders</p>	<p>Amendments called riders are sometimes attached to must-pass spending bills. Inappropriate riders can undermine the integrity of the science used in the Act. They can also allow members of Congress to target individual protected species.</p>
<p>Funding</p>	<p>Congress can use annual spending bills to limit funding for federal agencies in charge of implementing the Act. The FWS has dozens of species on the waiting list for listing consideration, and that number could increase if the necessary funding is not appropriated.</p>
<p>Legislative Delistings</p>	<p>Delisting species that need continued protection also threatens the integrity of the science used to make decisions under the Endangered Species Act. For example, the gray wolf has long been a target of this tactic. In the 115th Congress, Senator Ron Johnson of Wisconsin proposed a bill (S. 164) that directs the secretary of the interior to reissue the final rules related to the listing of the wolf in the western Great Lakes and Wyoming. This misguided proposal circumvents FWS scientific determinations and would cherry-pick where species are protected.</p>
<p>Tampering with Species Status Assessments</p>	<p>Political appointees and agency staff can manipulate, remove, or otherwise alter the science in Species Status Assessments to undermine the evidence for protection (see the box, p. 13). Legislation introduced in the past would amend the Act to establish a procedure for approval of certain legal agreements and would limit access to courts for the public.</p>
<p>Ignoring Evidence for Listing Decisions</p>	<p>Because the service directors and department leadership have the final say in listing decisions, they can choose to ignore the science supporting a listing, even though the Act mandates that decisions must be made based on the science.</p>

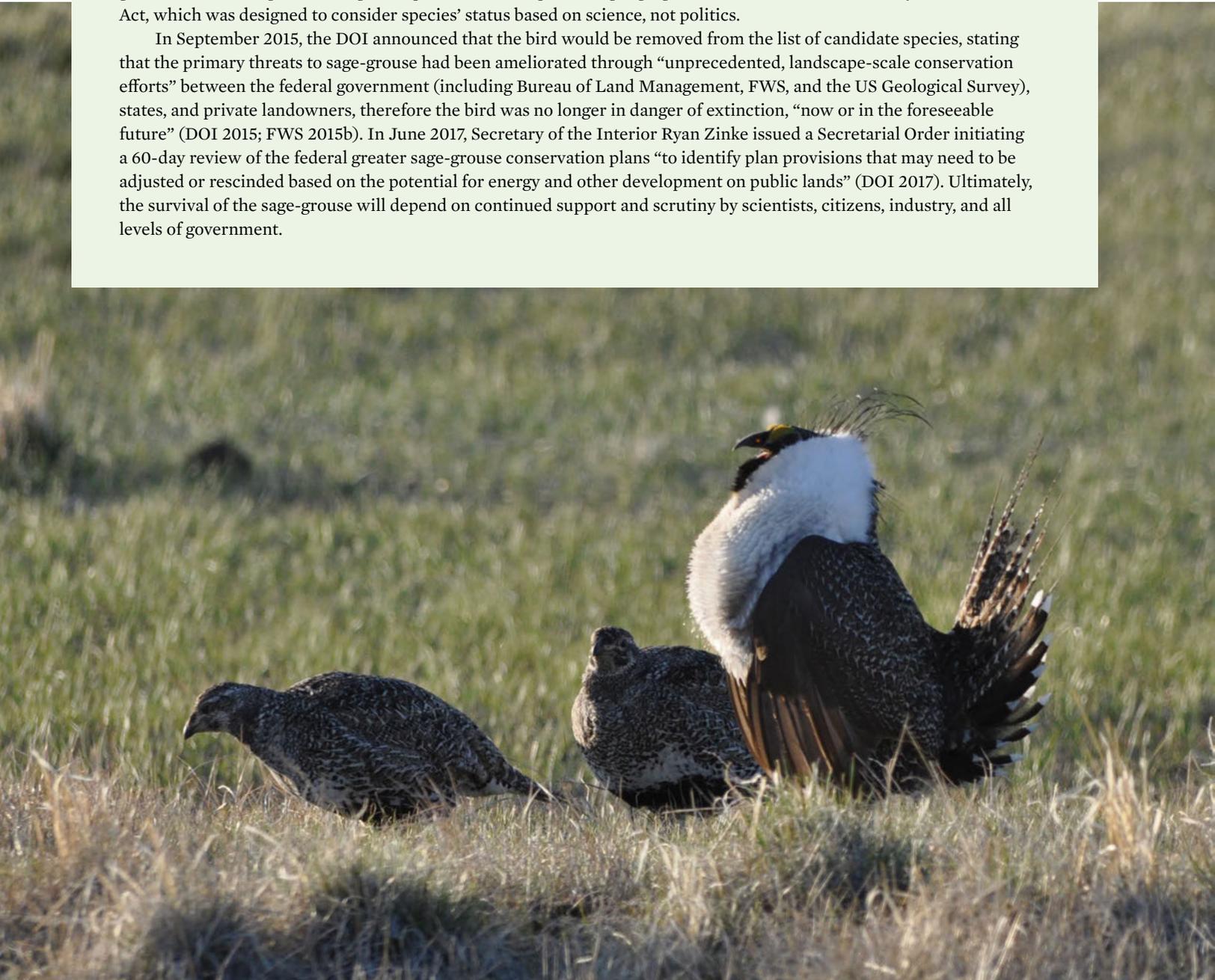
SAGE-GROUSE: CALLING FOWL

Both species of sage-grouse, the greater sage-grouse (*Centrocercus urophasianus*) and the Gunnison sage-grouse (*Centrocercus minimus*), live exclusively in the sagebrush steppe of the intermountain west, which is land prized by energy developers. Habitat loss and fragmentation resulting from both human activities and nonnative plant invasion have reduced the sage-grouse population; one study found that the total population of male greater sage-grouse dropped an estimated 55 percent from 2007 to 2013 (Garton et al. 2015).

The sage-grouse is at the center of tensions between conservation and development, and local and federal control. During the George W. Bush administration, the politics surrounding sage-grouse became increasingly public: a political appointee at the DOI interfered with the species' 12-month review, harassed the field biologists, and edited documents for an expert panel (Goldman 2014).

The sage-grouse was quickly caught up in politics again, with Congress attaching an amendment to a bill banning government funding for Endangered Species Act rules protecting sage-grouse. This amendment directly undercut the Act, which was designed to consider species' status based on science, not politics.

In September 2015, the DOI announced that the bird would be removed from the list of candidate species, stating that the primary threats to sage-grouse had been ameliorated through “unprecedented, landscape-scale conservation efforts” between the federal government (including Bureau of Land Management, FWS, and the US Geological Survey), states, and private landowners, therefore the bird was no longer in danger of extinction, “now or in the foreseeable future” (DOI 2015; FWS 2015b). In June 2017, Secretary of the Interior Ryan Zinke issued a Secretarial Order initiating a 60-day review of the federal greater sage-grouse conservation plans “to identify plan provisions that may need to be adjusted or rescinded based on the potential for energy and other development on public lands” (DOI 2017). Ultimately, the survival of the sage-grouse will depend on continued support and scrutiny by scientists, citizens, industry, and all levels of government.



Leveraging Your Voice as a Scientist to Protect Species at Risk

As a scientist, there are multiple opportunities to put your expertise to work, from research to engagement to collaboration with other experts and advocates.

Conduct Research

The scientific community plays a crucial role in identifying species and habitats at risk. This scientific information can help motivate or support petitions, inform Species Status Assessments, and provide valuable information about the effectiveness of state management plans.

- **Help identify species and habitats of concern.** Species of concern are those for which more information is needed before they can become candidates for listing under the Act. Action cannot be taken on species of concern until sufficient information exists on their biology, their ecology, and the threats they face. Research in these areas can make a big difference in our ability to act quickly to help species at risk. Social scientists, not only natural scientists, can contribute because the five-factor analysis (explained on p. 4) requires the secretary of the interior to consider human actions that threaten species and the adequacy of regulatory mechanisms in place.
- **Gather and submit evidence for candidate species.** Candidate species are those for which enough evidence has been collected to support a proposal for listing but that have not yet received any protections under the Act. Identifying candidate species is a collaborative effort and requires scientists to work closely with FWS officials; tribal governments; private landowners; businesses; state, municipal, and local governments; conservation organizations; and citizens' groups.
- **Inform state-level processes.** The Act is a federal law, and states' management plans cannot override or supersede federal law. However, the states play an important role in protecting species. Scientists can help inform the ongoing consultations between state and federal agencies concerning species protection.

Inform Endangered Species Decisions

Elevate the role of evidence-based decisionmaking in the Endangered Species Act process by lending your technical expertise and the voice of independent science to policy considerations. Taking your scientific expertise straight to elected leaders and regulators can help to inform their decisionmaking. Call, write, or visit their offices to share your knowledge concerning biodiversity preservation.

- **Submit comments related to endangered species determinations.** When an agency proposes a new rule, such as a proposed listing or delisting of a species, it must give notice in the *Federal Register* and hold a period of public comment. This is an opportunity for you to speak with decisionmakers to clarify the science behind the proposed rule. Although bulk comments (via letter-writing campaigns) are helpful, individualized expert advice is a valuable tool for encouraging science-based decisions by agency officials. Both the FWS and the NMFS list open public comment periods on their home pages, www.fws.gov and www.nmfs.noaa.gov.
- **Peer review scientific assessments.** The FWS and NMFS rely on external peer review to determine the best available science to use in their listing decisions. Peer review can open up meaningful discourse about the best path forward for protecting species—and can bring increased attention to the species at risk. The FWS recently introduced a new policy that enhances its guidance on use of independent experts in its peer reviews (see the box, p. 16).
- **Provide expert testimony.** Federal, state, and local agencies as well as regional offices of federal agencies often hold public hearings about conservation issues. Expert testimony is also useful in lawsuits. Voices from

the scientific community are crucial at such junctures to ensure that science informs agency decisions and court proceedings. Reach out to regional offices of the FWS and the NMFS and share information or ask about future opportunities to provide input.

- **Participate in a panel on listing/delisting of species.** Independent panels of experts are sometimes convened to address specific issues related to listing or delisting species. In cases such as the wolverine (p. 10), independent panels of experts have been crucial for determining the state of the science. Building your expertise and scientific contributions to decisionmaking through hearings, public comments, and other venues can help demonstrate your utility on panels. If asked by a federal agency to serve on an expert panel, consider lending your time and expertise.

Advocate for Science-Based Decisions

You can use your voice as both a constituent and expert to tell your representatives what decisions you would like them to make about protecting biodiversity and how their state and districts benefit from science-based policies on endangered species.

REACH OUT TO YOUR REPRESENTATIVES

Get to know personally the elected officials and their staffs who represent and speak on behalf of your community, city, county, and state. Talk to them about the importance of science-based policies to you, to their constituents, and to your community. Some ways to accomplish this include:

- **Schedule an in-district (local) meeting with your legislators and/or their staffs.** Provide relevant information and ask them to support or oppose one issue of concern to you; focusing on just one issue will make your argument more effective.
- **Build a relationship with their state director or chief of staff.** Meet them in person or have a conversation over the phone and offer to be a resource on matters related to biodiversity.

- **Write a letter about your issue.** Write a concise, focused letter about your issue and why it is important and deliver it personally, through the mail, or by email. You can also write a group sign-on letter.
- **Call in to the local office** (you can do this alone or organize a group call-in day). Be specific about what you would like the legislator to support or oppose and why.

More detailed information on these and other engagement efforts is on the UCS website at www.ucsus.org/watchdogtoolkit.

PROMOTE PUBLIC EDUCATION AND COMMUNITY ACTION

The public plays an important role in species conservation. Being active in your local community can help inform and engage the public regarding the science of conservation issues. By speaking out on the issue, you can educate landowners about species and how to handle their presence, and help sway public opinion toward supporting conservation efforts. Share your scientific knowledge on species, the risks they face and their unique needs, and how people can support them.

- **Participate in town halls, public lectures, and other local venues.** Use your voice to raise awareness about endangered species issues and organize others to join you and have greater impact. Mobilizing and building a base of informed and active people is essential to an influential and sustainable effort. Sign up for your legislators' email lists—upcoming events and appearances are typically announced by email. For updates on town halls, regularly check www.townhallproject.com. Come equipped with a few talking points and questions, and, if you feel comfortable, consider bringing some signs.
- **Write a letter to the editor of your local newspaper or offer support to a local reporter.** Bring your perspective as a member of the local community and a scientist to talk about the importance of endangered

{ “Scientist engagement in the ESA process can appear daunting to those unfamiliar with the process. Engagement can take many forms, from signing onto letters, to preparing written comments, to participating in litigation. Every scientist can find a niche, a way to engage that feels comfortable.”

— Kristin Carden, staff scientist, Earthjustice }

WORKING TOGETHER: SCIENTISTS PUSH FOR INDEPENDENT SCIENCE AT THE FWS

Scientists working together to advocate for better use of science in species listing and delisting decisions can lead to real change in Endangered Species Act implementation.

In 2015, a group of scientists, working with UCS and Project Coyote, launched a petition asking the DOI and DOC to follow a process for obtaining independent scientific advice on listing and delisting decisions under the Act (Treves et al. 2016). Following the petition launch, the FWS issued a new and improved peer review policy. The new policy is a step forward in safeguarding the science that informs endangered species listing. It provides a clear and consistent agencywide framework that improves the separation between scientific status assessments and policy decisions, provides more clarity concerning agency procedures when decisions are controversial, and increases transparency (Goldman 2016). While the provisions could be stronger in a few areas, the new policy takes large steps toward more robust and transparent peer review at the agency.

species protections in your state. In the letter, speak directly to your senators, members of your community, and local businesses, and speak from the perspective of a concerned scientist, parent, educator, etc. The more personalized and state-relevant you make it, the more impact it will have.

- **Harness the power of social media.** The fast-paced flow of information, and ability to reach people at all levels and in all places in society, makes social media an important tool. Social media can offer opportunities for you to listen and learn about the latest news and dialogues on key issues you care about, as well as to join the discussion, offer new information, and connect with others on issues concerning endangered species.

For more instructions and tips on effective communication, download our fact sheets at www.ucsusa.org/watchdogtoolkit. In addition, the UCS Science Network has a suite of practical tools and workshop webinars on science communication; visit www.ucsusa.org/scinetworkshops.

Collaborate with Endangered Species Advocates

Collaborations increase your chance of creating change by building power in numbers, influence, and resources. Joining forces with other individuals or groups will allow you to bring your unique assets together to find effective ways to conserve species.

- **Work with state and tribal wildlife managers.** The survival of a threatened species depends not only on federal protection, but also on effective implementation of protection practices. Successful implementation relies on effective management plans and processes that take place at a local, state, or tribal level. Learn about the local

actions being taken near you and reach out to your local, state, or tribal wildlife managers to offer your assistance with implementation.

- **Collaborate with other scientists,** and join professional societies or scientific coalitions involved with endangered species listings. Working with others in the scientific or civic community can amplify your message (see box above). See the list of additional resources on pp. 17–19 for specific organizations and opportunities.
- **Build community support to protect vulnerable species.** By partnering with communities, scientists have a tremendous opportunity to advance democracy by improving community access to technical information. Scientist–community partnerships can help level the playing field for communities shut out of important policy discussions due to insufficient access to scientific information or ability to evaluate and interpret technical findings.
- **Start a petition to protect a species.** If you believe the science warrants protection for an at-risk species under the Act, become a conservation champion. Collaborate with other scientists, citizens, and advocacy groups to draft a petition for the FWS or NMFS to list a particular species. Remember, petition success depends on strong scientific evidence for the risks to a species.

Find more on collaboration on the UCS website at www.ucsusa.org/coordinateforimpact, and learn more from our toolkit on how to create scientist–community partnerships at www.ucsusa.org/scientistsandcommunities. Find more information on submitting a petition at www.fws.gov/endangered/esa-library/pdf/petition_guidance_for_internet_final_for_posting.pdf.

Additional Resources

UCS has a wealth of information for scientists interested in ensuring that the best available science informs endangered species and other policies. In addition to an electronic version of this toolkit, you can learn about other endangered species under attack by political interests as well as find tools for defending science and being a strong science communicator.

- **Join the UCS Science Network.** The UCS Science Network comprises roughly 20,000 scientists who use their expertise to advance the public good. We also encourage technical and issue area experts to defend and strengthen science for policy. In addition to the social media platforms of LinkedIn (www.linkedin.com/groups/8540478) and Twitter (@scinetucs) as well as UCS emails and monthly calls, UCS has a number of print and video resources to keep you informed and engaged, as well as skills-building and informational webinars. For the full suite of offerings, or to sign up, go to www.ucsusa.org/sciencenetwork.
- **Become a watchdog for science.** When you sign up to help UCS watchdog for science, we will provide you with information on threats to science and opportunities to support science-based decisionmaking. From there, you and your colleagues customize the message to be most meaningful and influential to your communities and elected officials. Find more at www.ucsusa.org/watchdogtoolkit.
- **Sign on to our letter to Congress.** Scientists have united to defeat efforts to undermine the law in the past. Now UCS needs your help in ensuring that a chorus of relevant experts add their names to our letter to support the Endangered Species Act. Join a group of leading biologists, ecologists, and wildlife experts in signing onto a letter urging Congress to reject efforts to weaken the law. Learn more at www.ucsusa.org/esaletter.



North Dakota's Chase Lake National Wildlife Refuge is home to one of the largest white pelican nesting colonies in North America. Collaborative conservation works, as demonstrated by efforts that have helped restore populations of American white pelicans across the continent.

Advocacy How-To Webinars and Guides

UCS

- **Using Your Expertise to Influence the Policymaking Process**
www.youtube.com/watch?v=3xmsbMHYjrk
- **Testifying in Public Comment Periods and Local Hearings**
www.youtube.com/watch?v=B7ZDIz6l6NE
- **Tips and Tricks for Communicating with Policy Makers**
www.youtube.com/watch?v=nZX03b2f-dsk
- **How to Write and Offer Effective Testimony**
www.youtube.com/watch?v=rMR7JAZ1_NE

OTHER ORGANIZATIONS

- **How to Become an Advocate for Science**
www.faseb.org/Science-Policy-and-Advocacy/Become-an-Advocate/Advocacy-Tool-Kit.aspx
- **How to Participate in a Town Hall**
<https://townhallproject.com>
- **How to Write a Letter to the Editor**
www.coalitionforlifesciences.org/be-an-advocate/advocacy-tools/how-to-write-a-letter-to-the-editor
- **How to Call Your Representatives**
<http://advocacy.apascience.org/call-your-representatives>
- **How to Meet Your Representatives**
www.nationalpriorities.org/take-action/meet-your-representative
- **How to Engage in Advocacy as a Foreign Scientist**
www.ascb.org/ascb-post/science-policy/how-international-scientists-can-advocate-and-how-u-s-scientists-can-support-them
- **How to Engage in Advocacy as an Undocumented American**
www.bolderadvocacy.org/wp-content/uploads/2015/08/FAQs-about-Nonprofits-Engaging-in-Advocacy-with-Undocumented-Activists.pdf



“As a scientist, you should not be afraid to engage your representative, senator or any other politician. They are human, just like us. And they really do want to do the right thing to preserve the beauty of our planet. Often, they just need some encouragement and help as to how to protect the biodiversity we study and treasure.”

— Ken Sweat, senior lecturer, School of Mathematical and Natural Sciences, Arizona State University

Further Learning

- **How a Bill Becomes a Law**
faculty.washington.edu/jwilker/353/howabillbecomesalaw.pdf
- **How to Understand Referenda, Initiatives, and Recalls**
www.ncsl.org/research/elections-and-campaigns/initiative-referendum-and-recall-overview.aspx
- **Requirements for a Petition for Endangered Species Act Listing**
www.fws.gov/endangered/esalibrary/pdf/petition_guidance_for_internet_final_for_posting.pdf
- **All about State Legislatures**
www.ncsl.org/research/about-state-legislatures.aspx
- **International Endangered Species' Agreement: CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora)**
www.cites.org/eng

Scientific Societies and Partner Organizations

- **Ecological Society of America**
www.esa.org
- **Carnivore Coexistence Collaborative**
<http://faculty.nelson.wisc.edu/treves/CCC.php>
- **Project Coyote Science Advisory Board**
www.projectcoyote.org/programs/science-stewardship
- **Endangered Species Coalition**
www.endangered.org
- **Earthjustice**
<http://earthjustice.org/the-wild/wildlife/biodiversity>
- **Defenders of Wildlife**
www.defenders.org/endangered-species-act/endangered-species-act
- **Center for Biological Diversity**
www.biologicaldiversity.org/programs/biodiversity

Fellowships

- **Wilburforce Foundation Fellowship in Conservation Science**
www.wilburforce.org/grants/fellowship
- **Leopold Leadership Fellowship**
<http://leopoldleadership.stanford.edu/fellowship-information>
- **Society for Conservation Biology Smith Fellowship**
<http://conbio.org/mini-sites/smith-fellows>
- **American Association for the Advancement of Science Science and Technology Policy Fellowship**
www.aaas.org/program/science-technology-policy-fellowships

ABOUT THE AUTHORS

Charise Johnson is a research associate in the Center for Science and Democracy at UCS. **Gretchen Goldman** is the research director in the Center. **Alexandra Sutton** is a PhD candidate at the Nicholas School for the Environment at Duke University and a consultant for UCS. **Jessica Thomas** is the outreach and program coordinator in the Center. **Emily Berman** is a research assistant in the Center. **Amy Gutierrez** is a legislative associate in the Center. **Genna Reed** is a science and policy analyst in the Center.

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Advancing Science in the Endangered Species Act

A Toolkit for Scientists

As a scientist, you are uniquely positioned to use your expertise to ensure that policy decisions on species conservation are rooted in the best available science.



Gary Peoples/USFWS

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NATIONAL HEADQUARTERS

Two Brattle Square
Cambridge, MA 02138-3780
Phone: (617) 547-5552
Fax: (617) 864-9405

WASHINGTON, DC, OFFICE

1825 K St. NW, Suite 800
Washington, DC 20006-1232
Phone: (202) 223-6133
Fax: (202) 223-6162

WEST COAST OFFICE

500 12th St., Suite 340
Oakland, CA 94607-4087
Phone: (510) 843-1872
Fax: (510) 451-3785

MIDWEST OFFICE

One N. LaSalle St., Suite 1904
Chicago, IL 60602-4064
Phone: (312) 578-1750
Fax: (312) 578-1751