

CAST Commentary

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The Endangered Species Act: Interfacing with Agricultural and Natural Ecosystems

Authors: **Bernalyn McGaughey (Chair)**
Compliance Services International
Lakewood, Washington

Lars W. J. Anderson
USDA–ARS Exotic and
Invasive Weed Research
Davis, California

Michael J. Bodenchuk
Texas Wildlife Services
San Antonio

Reviewers: **John J. Jachetta**
Dow AgroSciences, LLC
Indianapolis, Indiana

David C. Volz
University of South Carolina
Columbia

T. Bently Wigley
National Council for Air and
Stream Improvement, Inc.
Clemson, South Carolina

CAST Liaison: **Phillip Stahlman**
Kansas State University
Hays

Introduction

The Endangered Species Act (ESA) was enacted by the U.S. Congress in 1973 for the purpose of protecting and recovering imperiled species and the ecosystems on which they depend.

The Endangered Species Act (ESA) was enacted by the U.S. Congress in 1973 for the purpose of protecting and recovering imperiled species and the ecosystems on which they depend. The Act is administered by the Department of Interior’s U.S. Fish and Wildlife Service (FWS) and the Department of Commerce-National Oceanic and Atmospheric Administration’s National Marine Fisheries Service (NMFS) (collectively, “the Services”). The FWS has primary responsibility for terrestrial and freshwater organisms, whereas the NMFS principally is responsible for marine species and anadromous fish (those that return from the sea to breed in the rivers where they were born) such as salmon (USFWS 2009).

Legal and administrative modifications to the ESA have failed to remove the polarity this law seems to evoke. Scott (2004), an independent science writer based in Albuquerque, New Mexico, notes:

Progress toward achieving the goals of the ESA has been slowed by litigation from all sides, consuming agency resources in response to legal actions rather than meaningful protection of species.

What all of this fails to achieve is . . . a restored sense of trust and cooperation between agencies, regulated groups, and environmental interests. One prerequisite for restoring trust is clarity. . . . The challenge is in striking an appropriate balance between the need for procedural clarity, agency flexibility, and positive incentives on the one hand, and the need for regulatory authority and recognition of the inherently uncertain nature of conservation science on the other. . . . Programs need to be coordinated, simplified, and streamlined. Stakeholder participation in ESA decision-making should be increased, and the science underlying decisions should be more transparent.

Progress toward achieving the goals of the ESA has been slowed by litigation from all sides, consuming agency resources in response to legal actions rather than meaningful protection of species. Using pertinent examples of conflicts, litigation, and delays resulting

from lack of procedural clarity and coordination, this Commentary (1) introduces the intersections between the ESA and management of agricultural and natural ecosystems within the United States and (2) explores ways those intersections might be addressed not only to restore a process to protect critically imperiled species but also to establish process and rebuild lost trust among all affected parties.

The ESA places burdens on lands in agricultural use, construction and maintenance of rights-of-way, grazing permits and invasive weed control, and forest harvest and reforestation.

Section 7 of the Act governs most interactions between the Services and an applicant for a federal action.

Section 9 of the ESA prohibits any person or entity from engaging in “take” of a listed species and includes prohibition of other actions such as possession, transportation, and selling of listed species.

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The Regulation

Requirements for compliance with the ESA impact agricultural and natural ecosystems by placing burdens on:

- Lands in agricultural use, access to registered pesticides, permits for construction, and irrigation;
- Construction and maintenance of rights-of-way where power lines, railroad tracks, roadways, or pipelines pass through public and private lands;
- Grazing permits and invasive weed control on public grazing lands;
- Forest harvest and reforestation on private and public lands; and
- Water use and quality, exercise of water rights, and invasive aquatic pest control.

Section 7 of the Act governs most interactions between the Services and an applicant for a federal action (an applicant is either the agency granting a permit or the entity seeking a permit from the “action agency”). Section 7 directs all federal agencies to use their existing authorities to conserve threatened and endangered species (“listed species”) and, in consultation with the Services, to ensure actions do not jeopardize the continued existence of listed species or destroy or adversely modify critical habitat. This section applies to management of federal lands as well as any other federal actions that may affect listed species, including private activities through the issuance of federal permits, licenses, or other actions (USFWS 1998). Permitted actions in some circumstances may result in an acceptable and permitted loss of the protected species.

Section 9 of the ESA prohibits any person or entity from engaging in “take” of a listed species (a term defined by the ESA as “means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct”). It also includes prohibition of other actions such as possession, transportation, and selling of listed species. It applies both to applicants for federal actions and actions by nonfederal entities. “Harm” is defined by FWS regulation as “an act which actually kills or injures wildlife.” The regulation notes that “Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impacting essential behavioral patterns, including breeding, feeding, or sheltering.”

What the Act does not provide is (1) clear guidance on assessment, consultation, and enforcement processes; (2) consideration of the complexities of ecosystems; (3) implications of proposed actions on affected stakeholders; and (4) a mechanism for embracing sound science from nonfederal agencies or between agencies having differing regulatory drivers. Once enacted, the ESA was quickly tested in court by the Tellico Dam/Snail Darter conflict (U.S. Supreme Court 1978), establishing early in the maturity of the law a pattern of action–litigation–action–litigation that dominates it today. Congress ultimately exempted the Tellico Dam Project from the ESA and allowed its completion, and other populations of the snail darter were discovered (Plater 2008), but many of the financial resources that might have gone into restoring those populations were expended in dispute. This initial litigation decision was the first of many that have shaped how the ESA is now interpreted and enforced. The Tellico Dam is the first example of the polarity that can occur in, and endure after, resolution of ESA-related disputes. Although many potential conflicts between human activities and the protection of endangered species are resolved through Section 7 consultation and Section 10 permits, they often are not resolved as efficiently as might be wished.

Harmonizing Agricultural Practices and Species Protection

In some habitats, listed species and their critical habitats may benefit from removal of invasive species through use of herbicides. In other habitats, use of herbicides may pose potential risk to listed or nontarget species.

The Services must weigh actions that avoid or mitigate for short-term (acute) risks to listed species against actions that might benefit a species for the long term.

Unclear policy and uncertainties about outcome promote divergent agendas and can inhibit trust and derail process when listed species are the subject of ESA evaluation and consultation, hindering cooperation among stakeholders and prolonging final decisions.

To increase the quality and timeliness of endangered species assessments and biological opinions, all stakeholders must have a mutual understanding of the proposed action and the risks and benefits of all alternative actions.

The objective of the ESA is to prevent loss of rare or imperiled species so that ecosystems remain sustainable. Management goals are aimed at species recovery, and recovery goals are unique for each species. In some habitats, listed species and their critical habitats may benefit from removal of invasive species through use of herbicides. In other habitats, use of herbicides may pose potential risk to listed or nontarget species. Inaction may pose even greater risk to listed species, further complicating the issue. There is no requirement for benefit analysis per se in the ESA, a circumstance that can present challenges for stakeholders when alternatives for species management and action mitigation are evaluated.

Additionally, in many cases, the Services must weigh actions that avoid or mitigate for short-term (acute) risks to listed species against actions that might benefit a species for the long term (e.g., multiyear or multidecade). Irwin and Wigley (2005) note that “In this ‘relative risk’ assessment process, thresholds for unacceptable short-term risks are not commonly defined or understood, whereas tools and procedures for assessing long-term effects of no restoration management are generally lacking. As a result, decisions are frequently based on the precautionary principle, in which short-term risk-averse positions prevail.” Thus, long-term benefits that may require higher short-term risks (including “take”) may not be understood in the context of alternative actions having lower short-term risk but fewer long-term, sustainable benefits.

Management practices such as crop production and silviculture (the study, cultivation, and management of forest trees) can have variable and often complex impacts on species diversity—including benefits and risks to listed species. For example, in permanent-plot studies conducted within managed and unmanaged forests of the Pacific Northwest, Halpern and Spies (1995) found that changes in understory diversity were short-lived after clear-cut logging and slash burning, with populations of most vascular plant species recovering to original levels before canopy closure. But these authors reported that diversity may remain depressed for more than two decades on severely burned sites, and some species may experience local extinction. Likewise, development of irrigated agricultural areas may attract new species (e.g., endangered song birds) while displacing other species that depend on desert habitat or aquatic ecosystems that supply water to arid areas.

As Scott (2004) noted, unclear policy and uncertainties about outcome promote divergent agendas and can inhibit trust and derail process when listed species are the subject of ESA evaluation and consultation, hindering cooperation among stakeholders and prolonging final decisions. Consistent and rigorous science-based characterization of potential impacts to listed species ultimately will support a predictable and reliable consultation process between a federal action agency and the Services. A predictable process would move smoothly and include (1) a clearly defined proposed action; (2) informal consultation to familiarize all participants with the action and its specific provisions; and (3) agreement on “no effect” or “not likely to adversely affect” or, in absence of this, initiation of formal consultation. To increase the quality and timeliness of endangered species assessments and biological opinions, all stakeholders must have a mutual understanding of the proposed action and the risks and benefits of all alternative actions to focus consultations on appropriate endpoints and issues.

In the absence of a transparent and predictable process, stumbling blocks inevitably emerge and can include (1) no common understanding of the “action,” (2) conflicts related to short-term versus long-term view, (3) disagreement on risk evaluation methods, (4) no consideration of benefits, (5) failure to engage all stakeholders early in the process, (5) lack of adequate resources, or (6) a poorly understood baseline.

As an example of lack of transparency to stakeholders, in 1995 the Bureau of Indian Affairs (BIA), responsible for ESA Section 7 compliance on behalf of the various tribes, completed an Environmental Impact Statement and Section 7 consultation for livestock grazing and prairie dog management for two tribal reservations in South Dakota. The two tribes

proposed diametrically opposed solutions to prairie dog population management. Following Section 7 consultation on prairie dog management proposals, a procedural requirement for the BIA, the FWS found “jeopardy” regarding impacts to black-footed ferrets for one reservation and “no jeopardy” for the other. The tribes—the most directly affected interests in the proposed actions—had no defined role or clear voice in the process (USBIA 1995).

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When the utility and positive impacts of a given action are poorly understood, subsequent benefits to listed species may be lost or diminished, thereby impeding recovery. For example, good agricultural management practices can create habitat or control invasive species, but when considered in isolation may be viewed as threats to species recovery. Prairie dog management, for example, may be necessary to preserve permanent vegetation in Conservation Reserve Program (CRP) fields, but control of prairie dogs is restricted when the prairie dogs are a listed species or when listed species such as black-footed ferrets are associated with prairie dog towns. Under the ESA, endangered species management lacks flexibility to support implementation of a time-honored medical prescription: Immediate intervention that adversely affects mobility or general well-being can result in curative action that prolongs vibrant life or increases reproductive capacity.

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The largely court-determined primacy of the ESA presents challenges for other federal, state, and local programs meant to benefit the environment, some of which programmatically, if not procedurally, already address ESA goals. The Oregon Invasive Species Action Plan acknowledges that “in light of climate change, invasive species management allows for native species to be reestablished and ecosystems to be restored. Preventing the introduction of invasive species requires proactive planning and strengthening of rules and regulations” (Oregon 2005). Yet the Oregon plan contains many actions that require an advanced evaluation under the ESA, slowing its ability to cope effectively with its mission.

The *Egeria densa* Control Program (EDCP) in the Sacramento–San Joaquin (California) Delta provides a good example of both how programmatic adaptive management and flexibility in implementation of the ESA can foster success and how success often “takes too long.” With the U.S. Department of Agriculture’s (USDA) Agricultural Research Service acting as the federal liaison to the California Department of Boating and Waterways for Section 7 compliance, a multiyear project was developed to decrease the economic and ecological impact of the aquatic weed *E. densa* (Brazilian waterweed) on this critically important water resource. In this instance, Brazilian waterweed control requires early spring application of the most efficacious systemic herbicide, fluridone. Yet the presence, movement, and potential exposure of salmon (and other listed fish species) to fluridone during spring raised concerns by the Services. Applications specified under the initial Biological Opinion (BO) were allowed only after July 1, well past the season to control the invasive weed species effectively.

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Through a series of technical discussions, jointly planned research, data review, and refinements of application methodologies, however, the desired early April start date subsequently was approved in a modified BO. The change in start date resulted in an 80% reduction in target weed cover and biomass with a concomitant resurgence of some native aquatic plants such as *Stuckenia pectinata* (sago pondweed). The key to this success was an exchange of concerns and ideas that resulted in concrete, testable questions raised by NMFS staff regarding the toxicity of fluridone to listed fish. Open dialog resulting in mutual understanding of the limitations of surrogate testing, demonstrable exposure risks, and extensive monitoring data—together woven into a cohesive regulatory position—achieved both management of a highly invasive aquatic weed and protection of a listed species (California 2006; NOAA 2005).

Common Points of Controversy and Contributing Causes

Many natural resource uses and typical agricultural practices are questioned by the public and regulatory agencies because of the potential impact on endangered species. In some instances, these concerns arise because the public may not understand fully or appreciate rela-

tionships between land uses and listed species, the rigor of regulatory programs such as the registration process for pesticides, or the implications of no management (e.g., proliferation of an invasive species if herbicides are not used).

Oversimplistic Evaluations of Management Impacts

Public Land Use Programs, such as those that issue grazing permits in the western United States, often face opposing views on whether grazing on open lands is beneficial or detrimental to listed species. Broad or simplistic evaluations might conclude that decisions are “good” or “bad” for endangered species protection or land use, when in reality the subject is often much more complex and variable. For example, Middleton, Holsten, and van Diggelen (2006) found that grazing can be beneficial to fens in some circumstances and detrimental in others; there was not a “one-size-fits-all” conclusion. The benefits of cattle grazing to fen biodiversity are highly dependent on the amount of grazing, a complicated factor alone. As Bergamini and colleagues (2009) note, the amount of cattle grazing is dependent on productivity and food requirements of the cattle breed, number of cattle, life stage of the animal, duration of the grazing period, and productivity and energy content of the vegetation. Overgrazing can induce soil erosion or other adverse changes. Given these variables and the expectation that the owner of a grazing permit is seeking to maintain a sustainable grazing situation, the goals of the permit holder and ESA-listed species recovery indeed may be identical when (1) best management practices (BMPs) are applied and (2) complexities are understood relative to long-term impact and benefits.

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Failure to Consider Actions that Lessen Impacts on Listed Species

The benefits of landowner and agency actions to lessen impacts on listed species sometimes are not fully recognized by the public or the Services. For example, in its pamphlet titled, “Protecting Water Quality from Agricultural Runoff,” the Environmental Protection Agency (EPA) notes that the 2000 National Water Quality Inventory identified agricultural nonpoint source pollution as a leading source of water quality impacts on surveyed sites, and further recommends management practices that can decrease pollution (USEPA 2005). Whereas grower education and incentive programs have resulted in implementation of agricultural BMPs that decrease impact on water quality, ESA evaluations of permitted actions such as pesticide registration have no access to data from those programs even though such data would be helpful in quantifying the decreased potential impact of agricultural practices on listed species.

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Similarly, even though national water monitoring programs such as the National Water Quality Assessment Program (USGS 2006) in most instances demonstrate a trend of decreased concentrations of pesticides, there currently is no mechanism for incorporating these findings into endangered species assessments. This is partly because the environmental baseline—on a national level—is impossible to define, and sometimes BMPs are not recognized by agencies as effective strategies for water quality protection. Lack of a central data source on the specific benefit brought by these practices also inhibits interagency understanding of their benefits. Likewise, even USDA programs such as CRP lands, the Wildlife Habitat Improvement Program, or the Environmental Quality Improvement Program are not given proper recognition as benefiting listed species. Consequently, a grower who implements BMPs is not credited by a Services assessor who may not be aware or understand how these practices may mitigate species exposure.

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Impact on Agriculture by Listed Species

An additional challenge is that the recovery of species sometimes may have unintended impacts on agriculture, thereby resulting in controversy. The return of endangered predators—both naturally and through human reintroduction—can have measurable impacts on livestock grazing. For example, grizzly bear (*Ursus arctos horribilis*) recovery in the Yellowstone ecosystem has resulted in direct livestock mortality in Wyoming and Montana. Similarly, as gray wolf

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(*Canis lupus*) populations have grown in Minnesota, Wisconsin, and Michigan as a result of ESA protection, livestock losses also have increased. Reintroduced wolf populations in Wyoming, Montana, Idaho, New Mexico, and Arizona have caused conflicts, with livestock destruction the primary reason wolves in New Mexico and Arizona have not recovered further. Additionally, restrictions on traditional predation management techniques were implemented as a result of “reasonable and prudent alternatives” required by Section 7. Although these alternatives serve to protect endangered predators from incidental “take,” they also restrict methods aimed at more common—and more costly—nonlisted predators (e.g., coyotes [*Canis latrans*]), and in essence make predation management difficult to implement and more expensive. Means for offsetting the cost of documenting livestock losses caused by listed species are available in some instances, but options to handle other costs are not. For example, losses caused by listed wolves or bears are compensated with livestock compensation funds operated by Defenders of Wildlife or the states of Wyoming and Montana.

Lack of Data Specific to Listed Species

Management of invasive species is critical to the protection of habitat for certain listed species, and management in many instances requires the use of certain EPA-registered products.

Management of invasive species is critical to the protection of habitat for certain listed species, and management in many instances requires the use of certain EPA-registered products (e.g., herbicides). But EPA and Services biologists responsible for ESA implementation and assessments have difficulty reaching conclusions in the absence of toxicity data on listed species because there are no standards for bridging data from surrogate species to listed species. This dichotomy has resulted in a 2- to 3-year delay in implementing programs designed to benefit listed species and recover their habitat. These delays—while the invasive species is proliferating—highlight the need for a streamlined ESA approval process allowing rapid response to thwart newly introduced invasive species. Moreover, delays also underscore a need for quick evaluations and a reasonable acceptance level of short-term risks to facilitate early eradication and avoid larger impacts later.

Successfully dealing with lack of specific toxicity data on listed species is exemplified in the 2007 Federal Bureau of Land Management (BLM) “Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement.” This comprehensive environmental impact statement includes detailed biological, human health, and environmental assessments for a range of weed control options and applies “Toxicity Reference Values” by taxa. Under Section 7 of the ESA, the BLM entered into a consultation agreement with the NMFS and the FWS, who concurred with the BLM’s findings of “may affect, but not likely to adversely affect,” through specified standard procedures and protective measures. Although the BLM has local vegetation control consultation streamlining agreements in place to conclude consultations rapidly, the process still is hindered by disputes.¹

The Section 7 process would benefit from specific instruction on engaging broader participation by affected stakeholders early in the assessment and consultation process.

Potential Remedies

Better Communication

The Section 7 process would benefit from specific instruction on engaging broader participation by affected stakeholders early in the assessment and consultation process. For example, as described previously, tribal lands and economies were important to the multiribbe Section 7 consultation regarding livestock grazing and prairie dog control. The tribal community had no defined avenue for contributing meaningful data to the consultation process, but was affected directly by resulting consultation action. Similarly, in the EDCP involving invasive weed species, lack of knowledge of practices and needs, accompanied by the fact there was no process to allow input and review of these details, delayed a program important to the protection of listed species and critical habitat.

¹ One local program was withdrawn after it was appealed by the Center for Biological Diversity and WildEarth Guardians because the “BLM decided that the best way to clarify the intent and scope of our EA [Environmental Assessment] would be to withdraw and revise the current document” (USBLM 2009).

Clear Policy and Agency Coordination

In the absence of scientific process, it sometimes is difficult to differentiate between requirements of the Act and procedures implemented based on the outcome of litigation.

In the absence of scientific process, it sometimes is difficult to differentiate between requirements of the Act and procedures implemented based on the outcome of litigation. Clear agency guidance is simply not available, so litigation—even single decisions—sometimes drives implementation and the Service’s policies. Court decisions may be problematic because they focus on procedures rather than on sound science in many instances. The court shapes policy because thorough scientific definition and boundaries are missing for many components of the Act (such as “reasonably expected to occur,” specific standards defining “best available data,” etc.). For example, an initial court decision expanded the definition of “take” to include “take of habitat” (*Palilia v. Hawaii*, 1979, et seq.) and directed the Services to find jeopardy in actions that cause the loss of a habitat component, regardless of the improvement that might ultimately occur as a result of the overall action. A subsequent Supreme Court decision (*Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 1995) upheld the FWS definition of “harm,” including 1981 amendments emphasizing that actual death or injury of a protected animal is necessary for a violation to occur. In such cases, the courts are construing the statute and congressional intent, not creating the standard on their own, but the court decision often serves as a standard that was not reached through scientific definition.

Assessment needs to focus on the analytical tools and decision-making procedures that help managers assess and display the short- and long-term risks and benefits of actions that might benefit listed species.

Recognition and Consideration of Long-Term Impacts

Currently there seems to be no separation between short- and long-term impacts, and the ESA does not provide flexibility to apply such consideration easily. This situation results in biological opinions based largely on avoiding or minimizing short-term risks, whereas temporary impacts to habitat ultimately might benefit the long-term recovery of the species. Assessment needs to focus on the analytical tools and decision-making procedures that help managers assess and display the short- and long-term risks and benefits of actions that might benefit listed species. For example, controlling invasive species can have long-term benefits even though there is a risk that some individual listed species may be affected in the short term. Many states have implemented “Aquatic Nuisance Species Plans,” and each plan has an early detection/rapid response component (Aquatic 2009). For these rapid response actions to be effective, a clearly defined “fast-track” procedure needs to be available through the ESA so that weeks—not months or years—are required for approval of very specific, highly focused containment and eradication actions. Given the requirements of the ESA, guidance published in peer-reviewed journals (e.g., *Forest Ecology and Management* 2005) could be adopted formally for use in consultation procedures.

The interface between agricultural practices or natural resource use and the ESA needs to involve a simplified, coordinated, fully defined process that leads to implementation of transparent and sound science supported by strong stakeholder involvement.

Balanced and Consistent Implementation

There are many instances in which long and difficult processes resulted in enlightenment that made later decisions more realistic and informed. Delays often come from the entrenchment of polarized “sides” that address any ESA matter with a predisposed argument, a practice encouraged by some processes that surround ESA implementation. To move from polarized, nonscientifically based arguments, the interface between agricultural practices or natural resource use and the ESA needs to involve a simplified, coordinated, fully defined process that leads to implementation of transparent and sound science supported by strong stakeholder involvement.

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