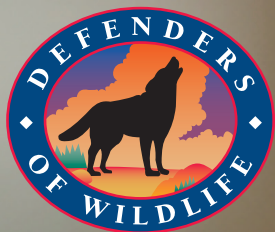
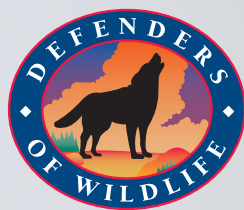




Emerging Trends
in Implementation of
Section 4(d) of the
Endangered Species Act:

A New Era of Opportunities
and Challenges





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Executive Summary

In recent years, species-specific rules under section 4(d) of the Endangered Species Act (ESA, or the Act) have become increasingly prominent tools for managing protections for threatened species. The 2019 rescission of the U.S. Fish and Wildlife Service's (FWS) blanket 4(d) rules (one for animal species and one for plant species) marked a major policy shift, further solidifying FWS's use of species-specific rules. Though the blanket rules were reinstated in 2024, no species listed as threatened since 2018 has received blanket rule protections.

When carefully crafted, science-based and designed to ensure net positive or minimal adverse impacts, 4(d) rules are powerful tools for preventing decline and supporting recovery. By authorizing low-impact activities, they can streamline ESA compliance without burdening agencies with unnecessary permitting. This in turn can improve support for the ESA in the regulated community and Congress. But some 4(d) rules have also weakened essential safeguards and diminished conservation outcomes. The opportunities and challenges lie in ensuring that 4(d) rules are used appropriately to incentivize beneficial actions for species and exempt impacts that are truly inconsequential to recovering a species.

Defenders of Wildlife previously released a comprehensive analysis of the 4(d) program, "Section 4(d) Rules: The Peril and the Promise." That report evaluated all 4(d) rules issued through May 2016 from FWS and the National Marine Fisheries Service (NMFS) (collectively, the Services), analyzing their historical use and offering guidance on leveraging species-specific rules to conserve listed species while streamlining activities with beneficial, neutral or minimal adverse impacts.¹ This analysis continues where Defenders' previous one left off, evaluating 4(d) rules issued from May 2016 through January 2026. We explore the landscape of 4(d) rules during these 10 years and discuss how future 4(d) rules can better align species conservation goals with practical considerations for the regulated community. We examined all 83 final

rules during this period that implemented some form of 4(d) protection for a threatened species, whether through species-specific 4(d) rules (67) or the blanket rules (16). We found that a majority of species-specific rules could result in an overall benefit to the species or neutral or minimal adverse impacts on the species, including through mitigation measures in the rule. However, among the remaining rules, we identified provisions that could undermine recovery, ranging from inadequate mitigation to overly broad exemptions for activities that threaten a species. Building on the previous report, we also suggest how the Services should develop and implement spe-



Longleaf pine habitat, Tall Timbers, Florida | Justin Grubb, Running Wild Media

cies-specific rules to better meet the goals of section 4(d).

While this report was being prepared for publication, the Trump administration adopted a significantly narrowed interpretation of what counts as "take" under the ESA that includes only affirmative acts directed immediately and intentionally against a particular animal. Based on this interpretation, the Services rescinded their long-standing regulatory definitions of "harm" that included habitat modification resulting in death or injury of an endangered (and some threatened) species. FWS separately explained that, outside of the habitat modification, other types of actions that do not intentionally target an animal are no longer considered take, even if it results in the death or injury of a listed species. If this interpretation survives judicial challenge and while it is still on the books, it will significantly affect how both existing 4(d) rules are enforced and how future 4(d) rules are developed.

Background on Section 4(d) Rules

The ESA, enacted in 1973, remains the nation's strongest environmental laws for conserving imperiled species. It is widely regarded as one of the most successful conservation statutes in the world, credited with preventing more than 99% of listed species from going extinct and safeguarding critical wildlife and natural resources. Central to the ESA is its prohibition on unauthorized take and trade, which is triggered when species are listed under the Act as endangered or, where a 4(d) rule applies, threatened. Endangered species are those that are at risk of extinction in all or a significant portion of their range. Threatened species are those that are likely to become endangered in the foreseeable future in all or a significant portion of their range.

Section 9 of the ESA prohibits the unauthorized take of or trade in endangered wildlife species within the U.S. or on the high seas. Section 4(d) allows any or all these prohibitions to be extended to threatened animals as well. Take is defined broadly, meaning to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct.”² Endangered plants receive more limited protections from various types of harm on federal lands, or in violation of state laws. Because Congress reasoned that threatened species are less imperiled, it did not extend full take protections automatically. Instead, it gave the Services more flexibility in extending protections to such species. Section 4(d) therefore plays a critical role in protecting and recovering threatened species by allowing the Services to extend to threatened species any or all of the prohibitions applied to endangered species. Section 4(d) also requires the Services to issue 4(d) rules they deem “necessary and advisable to provide for the conservation of such species.”³ As the D.C. Circuit Court stated, such rules can include “protective measures beyond those contained in [section 9].”⁴

When a species is listed as threatened under the ESA, that designation may arise under several circumstances: (1) the species is newly listed as threatened; (2) the species is downlisted from endangered status; or (3) the species is reassessed as a result of litigation or new information requiring regulatory revisions. Upon listing a species as threatened, the Services must first determine the application of section 9 take prohibitions, which may

apply in full, in part or not at all — a flexibility more frequently exercised by NMFS than by FWS. The next step is to determine whether the species will receive a species-specific 4(d) rule that tailors allowable exemptions to take. In the early years of ESA implementation, FWS issued species-specific 4(d) rules to determine which prohibitions and exemptions applied to each threatened species. But in 1975, FWS adopted a “blanket rule,” extending all section 9 prohibitions applicable to endangered animals to threatened animals by default, unless it created a species-specific rule.⁵ FWS expanded that approach in 1977 when it adopted a second blanket rule applying to threatened plants.⁶ In 2026, FWS rescinded the blanket 4(d) rules and now also requires a “necessary and advisable” finding analyzing, amongst other things, the economic impact of the 4(d) rule, before extending any species-specific protections to threatened species.⁷ Whether this change will survive judicial review remains in question.

FWS and NMFS have historically taken different approaches to implementing section 4(d). FWS generally establishes 4(d) protections at the time of listing — either through a blanket or species-specific rule — thereby providing immediate clarity regarding the scope of section 9 prohibitions. NMFS, by contrast, has never had a blanket rule and may issue species-specific 4(d) rules with tailored prohibitions, but often defers the application of protections to a subsequent rulemaking, or even determines that section 9 prohibitions are unnecessary based on the nature of the species’ threats. As a result, some threatened species under NMFS’s jurisdiction remain without clearly defined take prohibitions for extended periods, which can create uncertainty for conservation planning and regulated activities and fails to address threats to those species. While NMFS has never had a blanket 4(d) rule extending automatic protections to threatened species, several of its species-specific 4(d) rules effectively function as blanket protections, applying full take prohibitions to threatened animals (e.g., for the Guadalupe fur seal, humpback whale Mexico DPS and spotted seal).

Without a species-specific rule, NMFS-governed threatened species do not receive ESA-specific protections outside of ESA section 7’s consultation require-

ments. However, for some NMFS threatened species, the agency may protect the species through other laws. As one example, the oceanic whitetip shark is listed as threatened under the ESA but does not currently have any 4(d) protections.⁸ Still, NMFS has made it illegal in U.S. waters for both commercial and recreational fishers to retain any oceanic whitetip sharks caught.⁹ Other threatened species, however, may be more vulnerable to take when they are not similarly protected by fisheries or other laws.

Each species-specific rule is crafted with specific prohibitions, exemptions (allowed take) to those prohibitions and any other protective regulation as needed for the listed species. Historically, FWS recommends that threatened species be afforded the same section 9 prohibitions that apply to endangered species at the time of listing, while incorporating tailored exemptions to address species-specific conservation needs.¹⁰ We agree with this approach, as a consistent section 9 framework is easier to implement, enforce and understand. Moreover, for species in which limited information is available at listing, full section 9 prohibitions provide an important precaution until FWS better understands how various activities affect the species' survival.

Take exemptions under 4(d) rules can cover a broad range of activities, including conservation and non-conservation actions, as well as interstate and international commerce and trade. These determinations are often developed through a collaborative process involving Service biologists, species experts and state agencies. Public input also plays a key role; proposed rules are published in the Federal Register, and comments must be addressed before finalization. Our analysis found that stakeholders and expert input can meaningfully influence final outcomes, including the scope of exemptions and whether a blanket or species-specific rule was adopted. For example, in its 2018 final rule listing the hyacinth macaw as threatened, FWS expanded the species-specific 4(d) rule's exemptions in response to stakeholder input, permitting import, export and interstate commerce of certain captive-bred specimens where such trade complies with existing safeguards, including the Convention on International Trade in Endangered Species of Wild

Fauna and Flora (CITES) and the Wild Bird Conservation Act.¹¹

Until the rescission of the blanket 4(d) rules in August 2019, FWS used blanket and species-specific designations relatively evenly, with their use varying by administration. Some administrations made greater use of species-specific rules, most notably during the Obama administration, when adoption rates reached levels not seen since the Ford administration in the 1970s.¹² The increased use of species-specific rules reflected an interest in tailoring regulatory approaches to individual species. At times, these rules can require greater upfront effort to develop but can provide additional clarity for field, regional and state natural resource offices conducting day-to-day take consultations by identifying activities that are anticipated to have no or limited impacts on listed species. They may also reduce agency workload later by obviating the need for ESA incidental take



Humpback whale mother and calf, Maui, Hawaii | Jennifer Rogers

permits in some situations. This clarity may affect how agencies allocate limited staff time and resources.

At the same time, FWS has faced persistent funding and staffing constraints,¹³ which we assume have limited its capacity to develop species-specific 4(d) rules. Even after the reinstatement of the blanket rules in April 2024, FWS did not extend blanket rule protections to any species added to the list of threatened species, with the last such extension in 2018. Since then, every species listed by FWS as threatened has received a species-specific 4(d) rule. In July 2026, FWS again rescinded the blanket 4(d) rules, contending that this approach both

“brings [FWS] in line with the NMFS’s longstanding practice of developing species-specific 4(d) rules” and provides more certainty to the regulated community.¹⁴ This aligns with FWS’s practice since 2018 to refrain from applying the blanket 4(d) rule to newly listed threatened species. These provisions are currently being litigated.

In 2021, FWS drafted guidance on species-specific 4(d) rules, stating that exemptions to take must consider the threats contributing to species decline and recovery needs.¹⁵ Such exemptions are intended to either have minimal adverse impacts or to “encourage conservation.”¹⁶ For example, the elfin-woods warbler, listed in 2016, faces threats from habitat modification on private lands, particularly agricultural clearing. However, shade-grown coffee plantations can provide valuable habitat, nesting and foraging opportunities, supporting higher biodiversity than sun-grown systems.¹⁷ Accordingly, the species’ 4(d) rule allows limited “take” exemptions for converting sun-grown plantations to shade-grown coffee, as the impacts are minimal when combined with mitigation¹⁸. These exemptions reduce regulatory burdens for landowners who align their activities with existing conservation incentive programs.

Under the plain text and the stated intent of the ESA, as well as the 4(d) guidance promulgated by FWS, 4(d) rules should establish a clear, predictable baseline of protections that reduces impacts on threatened species while supporting their long-term recovery. Exemptions to take prohibitions can be crafted to reduce, where appropriate, regulatory burdens on the regulated community. Any exemptions to take, however, should be carefully justified and structured so they do not exacerbate existing threats or authorize activities that contribute to a species’ decline, particularly where those activities represent primary or well-documented risks to the species. Ideally, 4(d) rules should be routine and largely uncontroversial—providing clarity, consistency and conservation value without drawing attention to themselves. However, when exemptions are drafted too broadly or divorced from species-specific threat analyses, these rules risk functioning not as a foundation for recovery, but as a mechanism for diminishing statutory protections in ways that are inconsistent with the ESA’s conservation mandate. Here, we examine the structure, components and implementation of species-specific 4(d) rules and the



Elfin-woods warbler | USFWS

broader landscape of 4(d) practices over the past decade for FWS and NMFS. We then offer suggestions on how the Services can improve the decision-making process for 4(d) rules.

While this report was being prepared for publication, two things occurred that impact how the federal government approaches 4(d) rule development and enforcement. Effective September 14, 2026, the Services rescinded their longstanding regulatory definition of “harm” under the ESA, a form of “take” of protected species.¹⁹ This regulatory definition had defined “harm” to include habitat modification that results in the actual injury or death of the protected wildlife or fish. Further, when rescinding the regulatory definition of harm, FWS announced that it was adopting a significantly narrowed legal interpretation of the statutory term “take” from a three-justice minority dissent in *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon* authored by the late Justice Scalia. On the same day, the Services also issued memoranda explaining the effects of this reinterpretation of take. Going forward, the Services stated that they would only consider acts intentionally targeting a specific animal as potentially unlawful take under the ESA. Under this interpretation, many existing 4(d) rules governing threats like habitat loss will be eviscerated as the exempted activity would no longer result in take at all.

1. Emerging Trends: 2016-2026

We reviewed species final rules issued by the Services from May 2016 through January 2026. Our analysis included plant and animal species, and species listed based on similarity of appearance. Nonessential experimental populations were excluded, consistent with Defenders' previous analysis, due to their distinct treatment under the ESA. The data below were sourced from the Federal Register and included evaluations of species listing decisions, listing revisions and standalone 4(d) rules over nearly 10 years. This analysis identified several characteristics that were either absent or only rarely observed in earlier rules, but that now appear more frequently and merit attention. These emerging trends likely reflect a combination of factors, including the incorporation of recommendations from prior analyses, the implementation of FWS's 2021 4(d) rule guidance, FWS internal policy developments that are not fully transparent to the authors and the natural maturation and diffusion of agency practices over time. We summarize the key emerging characteristics

observed across these rules below.

In our analysis, 83 final rules implementing 4(d) protections (species-specific or blanket rules) were issued for 82 FWS and NMFS species (the African elephant had two 4(d) rule revisions). FWS species represented 81 of these rules, with only one NMFS species (the humpback whale Mexico DPS) receiving protections under 4(d). Eleven NMFS species were listed during our timeline but were not given protections through a 4(d) rule and were not included in the analysis. Of the 82 species, 10 were species designated as distinct population segments (DPSs) though the 4(d) rules for these DPSs often had exempted identical activities. Several species were listed due to a similarity of appearance, including four map turtles and two subspecies of scarlet macaw.

Vertebrates comprise half of these rules (52%), followed by plants (25%) and invertebrates (23%) (Table 1). A majority of the species-specific 4(d) rules were issued for new species listings (66%), followed by reclassification (26%), rule revisions (4%) and standalone species-specific 4(d) rules (4%). The last application of the blanket 4(d) rule to an animal species was for the yellow lance in 2018.

Of the 83 rules, 16 were for listings covered by a FWS blanket 4(d) rule. This report focuses on the remaining 67 species-specific rules. For threatened species, the Services have discretion to extend none, some or all the section 9 prohibitions that apply to endangered species. They also have the discretion to declare exemptions from those prohibitions. In some cases, staff scientists might determine that extending all section 9 prohibitions for endangered species to a threatened species at listing might be necessary to conserve the species, especially where human interaction increases the risk of extinction. Across the 67 species-specific 4(d) rules in our analysis, some or all section 9 prohibitions were extended to the majority of threatened species; 60 of these included exemptions to such prohibitions. The remaining seven species (the humpback whale Mexico DPS, western glacier stonefly, meltwater lednian stonefly

	Species total rules	Species-specific 4(d) rules	Species with application of a blanket rule
Amphibian	2	2	0
Bird	14	13	1
Arthropod/Crustacean	3	3	0
Fish	8	7	1
Arthropod/Insect	7	7	0
Mammal	9	7	2
Mollusk	9	7	2
Plants	20	11	9
Reptile	10	9	1
Invertebrates	19 (23%)		
Vertebrates	43 (52%)		
Plants	20 (25%)		

Table 1. Threatened species by taxon with species-specific 4(d) rules and application of the blanket rule (May 2016-January 2026)

and four map turtles) received species-specific 4(d) rules that mirrored a blanket rule designation, providing full section 9 prohibitions with no exemptions beyond generally applicable provisions such as section 10 permitting, which also apply to endangered species.

An Updated Snapshot of 4(d) Rules

Incorporating the data from Defenders' previous analysis provides a historical overview of how 4(d) rules have been used throughout the history of the ESA. At the time of our current analysis, 361 animal species were listed as threatened or as threatened due to similarity of appearance under the ESA. Roughly half (51%) of those had species-specific 4(d) rules. For FWS, of the 274 animal species listed as threatened or as threatened due to similarity of appearance through January 2026, 51% (139) had a species-specific rule, reflecting an increase from the 49% with such rules in the initial report. For NMFS, of the 87 currently listed threatened species, 44 (51%) had a 4(d) rule; the remainder did not have any section 9 protections (Table 2). This reflects a decrease from the 61% of NMFS-listed species with 4(d) rules found in the initial report.

Limited ESA Protections for Plants

Plants account for approximately 56% of all ESA-listed species. Despite this representation, plant species consistently receive fewer conservation resources and are less protected under the ESA compared to other taxonomic groups.²⁰ Section 9 prohibitions differ substantially between plant and animal species. For plants, prohibitions against malicious destruction apply only on federal lands, or when plants are removed, cut, dug up or

damaged in knowing violation of state law. These prohibitions are automatically applied to endangered plants. No plants receive the same take protections as animals, although several of the same trade protections apply. For threatened plants, FWS has discretion to extend those section 9 prohibitions through the relevant blanket 4(d) rule or to promulgate a species-specific rule under section 4(d). After the plant blanket rule was rescinded in 2021, the first plant to receive a species-specific rule was the Bartram's stonecrop, prohibiting import and export, removal and possession on federal lands and interstate or foreign commerce, while allowing standard permit and agency exceptions.²¹

Given these statutory limitations, plant prohibitions and exemptions have been largely uniform. Except for Furbish's lousewort and Wright's marsh thistle, all threatened plant species we examined received the same prohibitions as endangered plants. Seed cultivation with documentation of "cultivation origin" has long been exempted, and species-specific 4(d) rules consistently incorporated standard exemptions, including permit authorizations, reliance on other statutory provisions and allowances for FWS or state agencies acting under cooperative agreements.

The whitebark pine rule stands apart in scope, providing broader exemptions for federal land management activities such as forest management, restoration, and research and authorizing seed collection from federal or Tribal lands for ceremonial or traditional Tribal use.²² Because plant 4(d) rules generally exhibit minimal variation, they are included in the overall snapshot of this report but not examined in depth.

The Landscape of 4(d) Rule Exemptions

We evaluated all species-specific 4(d) rules during the nearly 10-year study period and categorized section 9 exemptions by the type of activity they authorize: (1) conservation actions; (2) non-conservation actions; (3) state, federal or Tribal actions; (4) trade and commerce and (5) captivity. These categories largely follow those in Defenders' previous analysis, with two exceptions. While the previous analysis categorized two 4(d) rules as containing exemptions for "Activities Authorized by a Voluntary Conservation Plan," we have not used that

	Animals listed as threatened or similarity of appearance	Species with a species-specific 4(d) rule
FWS	274	139 (51%)
NMFS	87	44 (51%)

Table 2. Number of threatened animal species that have been covered by a species-specific 4(d) rule as of January 2026

category here since there has only been one species-specific rule allowing exemptions associated with voluntary conservation plans (the lesser prairie-chicken northern DPS-grazing exemption). At the time that rule was promulgated there was little information on how these grazing management plans worked and they seemed far smaller in scope than the voluntary conservation agreements analyzed in the initial report. We therefore included that example in the broader non-conservation actions category. In any event, the entire lesser prairie-chicken listing and 4(d) rule was struck down by a federal district court in 2025.²³ We also expanded the category “Activities Regulated by State Law” to include federal and Tribal activities, given the similarities between such exemptions and the fact that collectively they represent a small number of 4(d) rules. The first three categories generally apply to species within the U.S. and its territories. In contrast, exemptions related to international trade, commerce, captivity and interstate transport were most common for foreign listed species. These provisions rarely authorize unrestricted trade; instead, they rely on protections in international or other federal laws such as CITES, the Antarctic Conservation Act or the Wild Bird Conservation Act.

Category (1), conservation actions, includes activities such as habitat restoration and enhancement, research and monitoring and propagation and reintroduction programs.

Category (2), non-conservation actions, includes

allowances for activities associated with development and land use, such as transportation and infrastructure projects, silviculture, forest management and agriculture. While these activities are not conservation-driven, some of them can nonetheless provide conservation benefits. For example, sustainable agricultural practices have supported species such as the elfin-woods warbler; compatible livestock grazing has been used in management of Stephens’ kangaroo rat habitat; and transportation projects, including bridge or culvert replacement and removal, have restored habitat connectivity for several freshwater species.

Category (3) includes exemptions for actions carried out by state, federal or Tribal entities, excluding the general exemptions provided under section 6(c), which apply to most species-specific 4(d) rules and were not included in this analysis. These agency-specific exemptions encompass activities such as state-regulated angling practices for freshwater species, prescribed fire conducted by state or federal agencies, and management activities on Department of Defense (DOD) installations, as seen with the red-cockaded woodpecker.

Categories (4) and (5) primarily apply to foreign species and govern trade, commerce and captivity. These exemptions commonly refer to international import and export laws rather than creating new trade allowances. For instance, several parrot species have identical provisions permitting import and export under CITES when individuals are demonstrably captive-bred and meet specific



Red-cockaded woodpecker on pine tree | Renee Bodine, USFWS

documentation and timing requirements. Similarly, the African elephant's 2024 rule allows for the import and export of certain trophies or ivory manufactured antiques when defined conditions are met. For some other species like the Egyptian tortoise, exemptions also permit inter-state transport for commerce and transfers between zoos.

Among the animal species in our analysis, 4(d) rule exemptions covered conservation actions (63%), non-conservation actions (67%) and a combination of both (49%). Nine foreign species had exemptions for trade and commerce (18%), and four rules covered captive care including at zoos and through educational outreach (8%) (Table 3). As noted previously, seven species were given a species-specific rule that mirrored the blanket rule and were therefore not represented in these data. Multiple exemptions were listed within these rules, and rarely was a species provided with just one exemption. For that reason, most of these rules had a combination of the above categories.

Because most exemptions analyzed involved domestic conservation and non-conservation activities affecting threatened animal species, we conducted a more detailed assessment of the activities most frequently exempted from section 9 prohibitions. Habitat restoration and enhancement represented the most common conservation-based exemptions (84%). This result is consistent with FWS's emphasis on facilitating recovery-oriented actions by reducing regulatory barriers and permitting requirements that might otherwise discourage restoration investments. Additional conservation-focused exemptions included threat removal (45%), stream bank stabilization (45%), research and monitoring, captive breeding, reintroductions and education activities, that similarly contribute to recovery objectives. While

4(d) exemption categories	Number	Percentage
Conservation Actions	31	63%
Non-Conservation Actions	33	67%
State, Federal & Tribal	12	24%
Trade & Commerce	9	18%
Captivity	4	8%

Table 3. Species-specific 4(d) rule exemptions categorized by activities

these actions may result in short-term disturbance or incidental impacts, their long-term ecological benefits are generally expected to yield a net positive outcome for the species (Table 4). By comparison, the most prevalent non-conservation or industry-oriented exemption was for land management activities (62%), a broad category encompassing forest management, landscaping, trail maintenance and pesticide application, among other practices. Fire management constituted the next most frequently identified exemption (41%) during the study period. Silvicultural activities were also commonly exempted (32%), but only when conducted in accordance with state-approved best management practices, particularly those designed to minimize impacts on waterways and protect aquatic species (Table 4).

Category 1: Conservation actions	Number of exemptions
Restoration & Enhancement	26 (84%)
Bank Stabilization	14 (45%)
Threat Removal	14 (45%)
Propagation & Reintroduction	8 (26%)
Monitoring & Research	12 (39%)
Educational Outreach	4 (13%)
Category 2: Non-conservation actions	Number of exemptions
Land Management	23 (63%)
Silviculture	12 (32%)
Transportation & Infrastructure	9 (24%)
Agriculture & Ranching	11 (30%)
Fire Management	15 (41%)
Recreation	6 (16%)
Energy	2 (5%)
Broad Development	3 (8%)

Table 4. Exemptions by activity across species-specific 4(d) rules for U.S. animal species

Mitigation in 4(d) Rules

Mitigation is a fundamental element of the ESA, as authorized activities on both federal and non-federal lands may result in adverse effects to listed species. Mitigation provides a framework to reduce and compensate for those impacts. Under the ESA, mitigation policy generally follows a tiered hierarchy intended to address impacts on the species.²⁴ Mitigation is defined as measures taken to avoid, minimize and compensate for impacts.²⁵ Compensatory mitigation addresses residual impacts that remain after avoidance and minimization measures have been applied and typically involve habitat restoration, or preservation. In our updated analysis, the Services did not use compensatory mitigation in any 4(d) rules to offset listed exemptions. Instead, the first two tiers of the mitigation hierarchy—avoidance and minimization—were the only ones present and were applied more frequently than observed in the previous analysis.

In our analysis, 63% of species-specific rules for domestic and foreign animal species included some form of mitigation. These rules most often rely on seasonal or spatial restrictions to limit impacts, such as prohibiting activities during breeding, spawning or nesting periods, or establishing buffers around active nests or broods. Avoidance measures were frequently implemented through prohibitions on activities in high-value or sensitive habitats. Examples include restrictions on activities in wetlands designated for the eastern black rail, avoidance of occupied habitat for the Louisiana pinesnake and limitations on ground disturbance near lupine host plants for the Fender's blue butterfly. In addition, our analysis also included state and federally administered programs that require or promote mitigation. These programs include state voluntary initiatives, such as silviculture best management practices to reduce nonpoint source pollution, and conservation programs administered by the U.S. Department of Agriculture, which incorporate established conservation standards and specifications for soil and water protection.

Defenders' previous analysis noted that while NMFS routinely incorporates mitigation requirements into its rules, FWS has not consistently required avoidance or minimization measures. To date, limited guidance exists on 4(d) rules. Nonetheless, avoidance and minimization measures are being applied, though with varying levels of clarity and consistency. In some cases,

mitigation language is highly specific, clearly identifying timeframes and conditions under which activities may occur, as demonstrated in provisions for the Fender's blue butterfly. In other instances, the language is vague, relying on general statements such as requiring activities to "include measures that minimize impacts," which provides limited direction for implementation. Similar ambiguity is evident in the rule for the northern DPS of the lesser prairie-chicken, where exemptions for prescribed grazing depend on the submission of site-specific plans to FWS.²⁶ While several plans have been approved to date,²⁷ the content and mitigation standards of those plans remain unclear, underscoring broader challenges in defining and applying effective minimization measures across 4(d) rules. The 4(d) rule has since been vacated, and therefore grazing management plans are no longer required. As noted in the previous analysis, additional clarity and formal guidance are needed on how FWS applies mitigation measures in 4(d) rules.

Providing Clarity, Advancing Knowledge and Streamlining Implementation

In addition to increased use of mitigation, we observed greater reliance on definitions to clarify the standards governing allowable exemptions. This added specificity improves transparency for both species conservation and regulated parties by clearly delineating eligibility and conditions for exemptions. Our analysis found that nine species rules incorporated definitions, representing a 55% increase since the previous analysis. These definitions can offer greater clarity on somewhat broad terms, such as "suitable habitat/estimated occupied areas" or "habitat management activities," and establish clear requirements for certain actions, including parameters for intentional harassment and qualifications for biologists conducting authorized activities. The Louisiana pinesnake 4(d) rule defines "suitable or preferable soils" as "soils in Louisiana and Texas that generally have high sand content and a low water table," as represented in Natural Resources Conservation Service soil survey categories A and B.²⁸ This definition helps clarify which activities are allowable or non-allowable within the species' estimated occupied habitat, particularly for landowners managing forested lands. This gives landowners

a concrete reference point when determining whether a given activity occurs on suitable habitat, a distinction that many 4(d) rules leave to broader ecological terms.

Historically, monitoring and reporting are rarely required in species-specific 4(d) rules. Instead, individuals are responsible for determining whether their activities qualify for allowable exemptions, creating an honor system with no formal mechanism for oversight or reporting activities to FWS and resulting in data gaps on use of these rules. While previous analyses identified limited monitoring and reporting requirements (most often for aquatic species), the use of reporting as an oversight tool has remained uncommon, particularly for evaluating mitigation implementation and effectiveness over time.

Our analysis found that 29% of animal species-specific rules included some form of reporting, ranging from simple coordination with field staff prior to restoration activities, as seen with the Big Creek and St. Francis crayfish, to annual or five-year monitoring and reporting requirements associated with grazing plans for the lesser prairie-chicken and DOD installation reports for the red-cockaded woodpecker. Reporting has also been used to improve estimates of some exempted take, including for the Mount Rainier white-tailed ptarmigan, Columbian white-tailed deer and harassment reporting for the Hawaiian goose (nene), as well as for recreational take through state-level angling, hunting or trapping programs. When designed appropriately, monitoring and reporting can support species recovery by identifying which exemptions or which mitigation measures are effective and which are not, while avoiding undue administrative burden on landowners or FWS.

FWS's 2021 guidance on section 4(d) notes that when crafting new rules, the agency may draw insight from existing 4(d) rules, particularly for species with similar biological or ecological characteristics. This approach has been applied to aquatic taxa. The 2021 guidance formalized a stepwise process for developing 4(d) exemptions, which has occasionally produced identical or similar rules across species, including jointly listed species, those designated by similarity of appearance or DPSs and select foreign and domestic species, such as seven parrot species, Ouachita and western fanshell mussels, sickle and trispot darters and Atlantic pigtoe and Neuse river waterdog. Modeling exemptions on similar species can streamline rule development and reduce duplication.



Columbian white-tailed deer | Jake Bonello, USFWS

Take Thresholds: Balancing Flexibility and Species Protection

Establishing quantified take limits is common in sections 7 and 10 of the ESA but remains rare under section 4(d). Our analysis identified only a limited number of species with explicit take restrictions, generally designed to allow low-impact activities when limits are observed and take is reported. For example, the Columbian white-tailed deer 4(d) rule authorizes up to 5% annual take of the DPS population, includes mandatory reporting and incorporates adaptive management.²⁹ The Utah prairie dog has a similar mechanism, allowing state-authorized take in certain limited circumstances but placing limitations on what percentage can be taken. Furthermore, if that permitted take affects the species in a way that is “inconsistent with the conservation of the [species],” FWS can immediately step in to prohibit or restrict such take.³⁰ Some rules allow limited habitat modification, such as the Panama City crayfish 4(d) rule, which exempts certain development activities within defined disturbance caps.³¹ Together, these examples illustrate how quantified take metrics can enable regulatory flexibility while supporting conservation, provided they are carefully designed, monitored and adjusted to ensure they advance recovery.

2. Opportunities for 4(d): Maximizing Benefits

As interpreted by FWS, the purposes of the 4(d) rule are to “establish regulations to provide for the conservation of a threatened species” and focus efforts “that incentivize known beneficial actions for the species, as well as rules that remove regulatory burden on forms of take that are considered inconsequential to the conservation of the species.”³² These protections should prevent the species from becoming endangered, promote recovery and offer flexibility to the regulated community.

Conservation Actions

Our analysis found that a substantial proportion of species-specific 4(d) rules exempted these actions from take prohibitions. Specifically, 63% of animal rules included one or more conservation-based exemptions that allow activities that may cause short-term adverse impacts but are expected to provide significant long-term net benefits to the species. Existing guidance clearly states that an exemption “should incentivize known beneficial actions” to the species.³³ Conservation actions such as habitat restoration and enhancement, and threat management (e.g., invasive species, predators, human-made) are well documented as beneficial, particularly for species where these outcomes are supported by scientific literature, recovery plans and other species-specific documents.

Beyond habitat restoration, captive propagation and reintroduction are long-recognized and often essential tools for recovering imperiled species and are routinely identified as such. Several species in our analysis exempted activities such as propagation or hatchery programs from section 9 prohibitions, reflecting the Services’ ability under section 4(d) to exclude activities that actively contribute to conservation, even prior to listing.³⁴ The Atlantic pigtoe illustrates this approach, as captive propagation has been a central recovery strategy for more than a decade before listing.³⁵ Without these programs, the species’ recovery potential would be limited.

Non-Conservation Actions

Not all exemptions within 4(d) rules are designed with direct conservation outcomes in mind; some instead

reflect activities that can be compatible with a species’ recovery, or may offer incidental benefits, while others are considered to have minimal impact on the species. These exemptions warrant closer scrutiny, particularly those involving habitat disturbance, which can result in adverse impacts. But some exemptions can support recovery when backed by science demonstrating long-term benefits. In our analysis, 67% of species-specific rules included non-conservation exemptions, several of which were justified at the time of listing as having insignificant or beneficial effects on the species. As noted below, these exemptions should not be applied broadly, but when tailored to a species’ specific conservation needs, they can produce outcomes that benefit both species and people. Below, we highlight examples of non-conservation exemptions that—based on scientific evidence—are known to provide conservation benefits or result in only minimal adverse impacts when carefully applied.

Bridge and Culvert Repair

Bridge and culvert replacement/removal projects that remove migration barriers (e.g., collapsing, blocked or perched culverts) improve habitat quality and movement both upstream and downstream for aquatic species. In our analysis, FWS has used this exemption for six aquatic species. For example, for the Kentucky arrow darter, stream restoration, riparian improvements, infrastructure upgrades and bank stabilization can enhance habitat quality and conservation outcomes. Because many populations are naturally disjunct and further isolated by anthropogenic barriers like dams and perched culverts, restoring connectivity of streams is critical to maintaining dispersal, genetic exchange and long-term population viability, and while “minimal levels or mortality, harm or disturbance” can happen, the action will provide a “net benefit effect on the species.”³⁶

Recreational Angling

Although presenting some risks to species from direct and indirect mortality, angling can be an effective conservation tool, particularly through direct funding of habitat restoration and management via license fees and excise taxes on equipment. It is also a primary way the

public engages with fish species and serves as an important communication pathway for wildlife conservation. Species-specific rules for several fish species exempt permitted recreational angling, including catch-and-release programs for humpback chub and incidental take associated with fishing for other species, as in the case of the June sucker. When overutilization is not listed as a threat to the species or when a species is not a target for recreational or commercial fishing, permitted angling can have minimal adverse impacts. For the humpback chub, state regulations historically prohibit targeting humpback chub and require the release of all incidental captures; accordingly, incidental take is allowed when angling activities comply with state and Tribal fishing regulations and do not target the species within the six core populations.³⁷



Stephens' kangaroo rat | USFWS

Livestock Grazing

Grazing, and the way it is conducted, can have varying impacts on different species; therefore, exemptions should not be applied universally. For some species, such as the Stephens' kangaroo rat, which prefers sparsely vegetated, disturbed grasslands, grazing can be beneficial. Species reports and scientific publications have documented the compatibility and benefits of cattle and sheep grazing in rat habitat.³⁸ Accordingly, exemptions were designated for grazing activities when conducted for "habitat management and restoration to benefit [the rat] or other native species in the grassland habitat, as approved by FWS."³⁹

Impact Reduction Through Mitigation Measures

Mitigation measures are essential to reduce or offset the impacts of activities exempted from take, including those offering greater flexibility to landowners. This is particularly important for covered activities that pose higher risks to species than conservation activities. Below are examples of exemptions that can result in minimal adverse impacts when appropriate mitigation measures are applied.

Silviculture: State Best Management Practices

Timber harvesting can affect wildlife habitat by altering vegetation composition and site conditions, and associated activities may increase nonpoint-source nutrient and sediment runoff to nearby streams, potentially degrading water quality and affecting aquatic species. For aquatic organisms, reducing sediment inputs is critical to species persistence. Silviculture-related exemptions accounted for approximately 32% of species-specific 4(d) rules in our analysis. To qualify for take exemptions, landowners must implement state-approved forestry Best Management Practices (BMPs). Although BMPs' requirements vary by state, particularly regarding streamside management zone width and spatial restrictions, all BMP programs emphasize avoidance and preventive measures to minimize sediment and nutrient delivery to waterways. While BMPs are voluntary, their implementation is effectively required through forest certification programs and wood procurement policies. As a result, BMPs are applied on approximately 93% of harvest operations across 13 states in the south and south-east.⁴⁰ BMPs can support the protection of water quality, riparian forests and aquatic species, and FWS has recognized BMP implementation on working forests as a scientifically grounded conservation approach.⁴¹ However, despite strong evidence that BMPs reduce the impacts of forest management, there remains a gap in large-scale data directly linking the two.⁴² In our analysis, 13 aquatic species (fish, crustaceans, mollusks and reptiles) received silviculture-related exemptions with BMPs.

Agricultural Usage of Mitigation

Of the 10 species granted agricultural exemptions, all but one of the species-specific rules included mitigation measures to reduce impacts on listed species. For example, for the silverspot butterfly, extensive agricultural conversion within its range has caused substantial habitat fragmentation; however, evidence shows that the timing and type of agricultural activity are critical in determining impact severity. Occasional mowing at specific times, particularly in early summer, can be beneficial by maintaining open canopy conditions, limiting woody vegetation and preserving food resources.⁴³ In contrast, multiple summer haying events are more harmful, as they destroy nectar plants and disrupt silverspot life stages.⁴⁴ The agricultural exemption for the silverspot butterfly reflects these findings by allowing for haying or mowing events before June 30 each year, with blade-height requirements designed to maintain the bog violet host plant.⁴⁵

Comparable measures were applied to other species receiving agricultural exemptions, generally restricting the timing and location of activities to reduce impacts to a minimal adverse level. For the Panama City crayfish and the lesser prairie-chicken, exemptions explicitly excluded take coverage for new agricultural conversion, while allowing continued use of previously converted lands, especially those providing habitat for the species



Silverspot butterfly | USFWS

using state BMPs and federal conservation programs (USDA Conservation Reserve Program).⁴⁶

3. Challenges for 4(d): Actions that May Undermine Species Recovery

4 (d) rules are intended to reduce regulatory burden for low-impact or conservation-compatible activities while focusing oversight on higher-risk actions. In practice, however, distinguishing insignificant from consequential risk is often challenging, particularly amid political opposition to listings and industry resistance to regulation. These pressures can create gaps in 4(d) rulemaking, resulting in protections that fall short of conservation needs. For example, a Center for

Biological Diversity (CBD) review found that 19 of 75 species-specific 4(d) rules included exemptions that posed threats to the species,⁴⁷ and our analysis similarly identified instances where limited protections persisted despite clear scientific evidence of risk. While we recognize the Services' difficult balancing role, it remains critical to flag cases in which activities deemed low risk may produce more than minimal adverse impacts and undermine recovery goals.

When 4(d) Exemptions Go Too Far: Case Studies of Industry-Wide and Geography-Wide Exemptions That Exceed Minimal Adverse Impact Thresholds

Streaked Horned Lark

In developing 4(d) rules, the Services must navigate a tradeoff between adaptability and conservation rigor; excessive specificity can limit responsiveness to new information, whereas overly broad provisions may weaken safeguards against activities already recognized as threats to the species. We found that although most species with broad industry exemptions also had measures to avoid or reduce the risk of those activities going past minimal adverse levels, a few did not, which limits their recovery potential. The streaked horned lark is one of those species; it faces multiple stressors, including agricultural practices, airport and military operations, dredged material placement and recreational activities. Its population dwindled to around 1,170 to 1,620 birds in 2016 due to the lack of large open areas with low vegetation and the increase of human activities within Oregon and Washington state, especially in Willamette Valley.

The lark's conservation has generated controversy since its threatened listing with a species-specific 4(d) rule in 2013. The rule exempted—among other activities—agricultural practices within Willamette Valley.⁴⁸ The lark responds well to agriculture dominated by grass seed, while other agricultural practices that have outpaced and replaced grass seed farming do not provide hospitable habitat. Five years after listing, a lawsuit brought by CBD challenged the adequacy of the significant portion of the range analysis and the 4(d) rule exemptions including agricultural activities in Willamette Valley. Rather than vacate the rules, in July 2019, FWS was ordered in agreement of the parties, to submit a new listing. In 2022, FWS finalized a new rule extending all agricultural exemptions throughout the entire species' range, even in parts where grass seed production is uncommon, while recognizing that continued conversion of grass seed fields to other crop types that do not support larks persists.⁴⁹ FWS stated the reasoning behind the 4(d) exemption was to reduce regulatory burden to farmers: “private landowners, out of concern for being subjected to regulation associated with



Streaked horned lark | Cheryl Baker, WDFW

the Act, may alter land management practices or restrict conservation activities to discourage attracting listed species to their lands. In the case of the streaked horned lark, given the importance of human-created habitat through ordinary agricultural management activities, this risk aversion would be detrimental to the conservation of the species.”⁵⁰ A new lawsuit brought by CBD and Bird Alliance of Oregon challenged this final listing and 4(d) rule. In 2025, the judge ordered FWS for a second time to complete a new listing determination within one year, while the current listing determination remains in place. The 4(d) rule was vacated, and the 2013 rule was reinstated exempting agricultural activities in the Willamette Valley. The court deferred to FWS's judgment that the exemption avoids incentivizing farmers to convert land to unsuitable habitat and accepting a broad exemption over a narrower one. However, the court struck down the exemption's expansion into Washington state as arbitrary and capricious, since the administrative record lacked evidence that larks use agricultural land there.⁵¹

As noted in the 2022 listing decision with 4(d) rule, FWS intended the agricultural exemption to reduce regulatory burdens, but that objective cannot come at the expense of species recovery. At times landowners can be reluctant to host listed species, and concerns about land use restrictions or habitat alteration following a listing are legitimate considerations that can influence the scope

of allowable exemptions as also seen with the Columbian white-tailed deer species-specific 4(d) rule. We recognize the political and practical challenges the Services face when promulgating 4(d) rules for threatened species, particularly the need to maintain private lands as potential habitat. Nonetheless, granting broad exemptions that exempt take for activities identified as threats and contributing factors to the listing decision should not be the purpose of a 4(d) rule. Experience with other 4(d) rules demonstrate that exemptions designed to promote or incentivize practices beneficial to both landowners and the species, such as focusing on incentivizing agricultural activities that work for the species, offer a more effective path forward. This underscores the importance of specificity and guardrails that encourage low-risk activities while advancing conservation outcomes.



American burying beetle | USFWS

American burying beetle and Hermes copper butterfly

Geographic considerations are a well-established tool in ESA implementation, particularly in the development of 4(d) rules, where prohibitions and exemptions may be tailored by location. For species with broad ranges, threats and conservation needs often vary geographically, allowing rules to be structured around recovery units or region-specific objectives identified in recovery plans. Although Defenders' previous analysis found limited use of geographic exemptions, a growing number of recent species-specific rules incorporated this approach following updated FWS guidance that introduced a tiered framework for considering geography in 4(d) design. Geographic tailoring can target higher-risk threats and focus conservation efforts, whereas broad removal of section 9 prohibitions across large geographic areas risks

undermining recovery.

These concerns are illustrated by the species-specific 4(d) rule for the downlisted American burying beetle (ABB). The rule notably departs from FWS's own 4(d) guidance, which recommends applying full section 9 take prohibitions as a baseline. Instead, the rule established regionally tailored prohibitions across three broad areas, namely the northern plains (South Dakota, Nebraska), southern plains (Texas, Oklahoma, Kansas, Arkansas) and New England. Protections are substantially weaker in the southern plains, where only 213,000 acres of conservation-managed land are regulated despite the presence of nearly 20 million acres of suitable habitat, leaving most habitat unprotected. By contrast, all soil-disturbing activities are regulated in the northern plains and New England. Although suitable habitat exists in both plains regions, the New England analysis area is comparatively small. ABB faces multiple threats, including habitat loss and fragmentation, climate change, reduced carrion availability, disease, invasive species and genetic isolation, with dominant threats varying by region but compounded by widespread development pressures and rising temperatures.

The broad exemption for the southern plains is based on the assessment that no more than 2% of habitat is at risk, with the conclusion that "large areas of suitable habitat, combined with low projected land use change and substantial protected lands, indicate that impacts are unlikely to affect species viability."⁵² This approach effectively removes protections for the southern plains by allowing broad exemptions for activities known to threaten the species, including agriculture, oil and gas and development. Long-term viability of the species in the region is projected to decline between 2040 and 2069 as temperatures exceed their tolerance thresholds due to climate change. The species-specific 4(d) rule implies that the analysis area holds limited recovery value, and without an updated recovery plan (last updated in 1991) it is unclear how these allowances will affect ABB over the long term.

The Hermes copper butterfly 4(d) rule also reflects this approach, providing full section 9 prohibitions but excluding take of fragmented and highly developed habitats, partly to reduce regulatory burdens on landowners, and because these areas lacked dispersal potential and had limited recovery value.⁵³ While the recovery plan outline states the need to "ensure conservation of disper-

sal corridor connectivity between the north and south portions of the range,”⁵⁴ certain regions of it are largely exempt from take prohibitions. These cases illustrate the difficult policy question of whether to reduce ESA restrictions in areas that do not contribute to recovery. If the answer is yes, the Services need to apply the approach carefully to ensure it does not identify populations as unimportant to recovery primarily to justify exempting them from section 9 protections.

Finally, 4(d) rules should not undermine other core components of the ESA, including section 10 permitting. Agency guidance explicitly discourages the use of 4(d) rules to circumvent section 10 requirements and cautions that they should not “exempt incidental take that is related to the primary or cumulative factors affecting the species for which a project specific permit is required.”⁵⁵ In the southern plains, the removal of protections for the ABB created uncertainty for the 71 exist-

ing section 10 permits, most of which address oil and gas development. Although the rule does not explicitly exempt oil and gas activities, take associated with these operations is no longer regulated in the region, effectively eliminating the need for conservation measures despite oil and gas development being identified as a threat. This regulatory shift also occurs against a backdrop of sustained industry engagement, including a 2015 petition submitted by the Independent Petroleum Association of America and other entities requesting that FWS delist ABB.⁵⁶ Furthermore, this shift places previously permitted activities in regulatory limbo, raising questions about the continued relevance and enforceability of existing conservation commitments. Ultimately, this outcome highlights the risk that overly broad 4(d) exemptions can weaken established ESA safeguards and disrupt the Act’s integrated permitting framework.

4. Recommendations for Future 4(d) Rules

Most species-specific 4(d) rules promulgated within the study period appropriately included exemptions that could result in conservation benefits or have insignificant impacts. In many cases, these impacts became insignificant only when mitigation measures were applied, a trend that was especially evident for land-altering activities such as agriculture, ranching, silviculture and infrastructure repair. However, in other cases, such rules may be undermined by overly broad exemptions, particularly for industry-specific exemptions where the exempted activity is associated with a primary threat to those species. Below we offer recommendations to strengthen the development of 4(d) rules for threatened species, including both approaches discussed earlier in the analysis and new opportunities to improve efficiency, communication, consistency and transparency.

As noted above, the Services’ recent rescission of the regulatory definition of “harm” and their attempt to restrict unlawful take solely to where an individual animal is intentionally targeted substantially changes how 4(d) rules will be developed and enforced moving forward. As described in the analysis above, 4(d) provisions that restrict or exempt incidental take from habitat modification are thoroughly woven into the corpus of

such rules for numerous threatened species developed over decades. Conservation groups have challenged the rescission in court, requesting the definition be reinstated. Furthermore, the legal impacts of the new memorandum seeking to further restrict take to the intentional targeting of an animal remain uncertain at the time of writing. Members of Congress have also introduced bills to overturn the definition of harm rescission.⁵⁷ While we acknowledge their utility will depend on how these legal and political uncertainties are resolved, our recommendations below are consistent with the historical regulatory environment for the ESA, and we offer them with the hope they can inform broader debates about what protections are necessary under the ESA.

Several of these suggestions mirror those set forth in Defenders’ previous analysis:

General Recommendations for the Services

1. Standardize and Expand Application of Avoidance and Minimization Measures. As discussed above, species-specific 4(d) rules can eliminate or reduce the need for incidental take authorization under section 10(a)(1)(B). Defenders’ previous analysis recommended

FWS develop best practices to incorporate such requirements into species-specific 4(d) rules. Since then, FWS has substantially increased the frequency of such avoidance and minimization measures, allowing some take so long as those measures are followed. However, at times these mitigation measures have lacked details as to what is required. For example, the species-specific 4(d) rule for the lesser-prairie chicken exempted take from agricultural practices on cultivated lands under a “grazing management plan developed by a Service-approved party.” At the time the rule was promulgated, there was no publicly available information as to how a party would be approved by FWS, or what such plans must contain. We recommend that the standards for such avoidance and minimization measures be set out in the species-specific rules themselves, or in separate documents or management plans so long as they are approved by the Services, available to the public, and standardized across the species’ range. Developing and standardizing mitigation measures is especially important where species are subject to multiple types of take exemptions. While such exemptions may provide minimal adverse impacts on their own, the cumulative impacts resulting from such exemptions can compound and exceed minimal adverse impacts. All exemptions should be based on measurable, species-specific conservation benchmarks and demonstrated biological outcomes to ensure they are meeting their goals.

2. Incorporate More Adaptive Management Provisions.

Adaptive management is a conservation management strategy incorporating flexible decision-making in a dynamic way as situations change or additional information becomes available. Adaptive management has gained widespread acceptance in managing natural resources, including at the Department of the Interior.⁵⁸ However, few species-specific 4(d) rules take advantage of adaptive management provisions, and those that do tend to rely on processes outside the 4(d) rule (e.g., exempting take under a state management plan). In some cases, incorporating adaptive management directly into 4(d) rules by conditioning prohibitions and exemptions based on species status and proximity to recovery objectives could save time and resources over waiting for separate federal or state management plans to be updated.

For species without a plausible path to recovery in the

foreseeable future, reducing restrictions when that species is meeting recovery goals could also incentivize landowners to contribute to recovery efforts. Incorporating such provisions into the 4(d) rule itself could provide greater certainty to landowners that actions they take could lead to reduced requirements on how they use their land. As with exemptions based on following minimization and mitigation measures, all such adaptive management provisions should be based on measurable, species-specific conservation benchmarks and demonstrated biological outcomes to ensure that adaptive management provisions promote recovery, or at the very least do not risk moving the species away from recovery.

3. Improve Monitoring and Evaluation. We encourage stronger monitoring and reporting across ESA programs and incorporating monitoring requirements where appropriate directly in species-specific 4(d) rules. This is particularly important where take exemptions are authorized and have the potential to accumulate to biologically meaningful levels. As highlighted in our report, the 4(d) rules for the Columbian white-tailed deer and the Hawaiian goose (nene) require reporting for allowable forms of take, such as intentional harassment. As another example, the species-specific rule for the red-cockaded woodpecker allows the DOD and federal land management agencies to take the red-cockaded woodpeckers incidental to activities covered by management plans. However, those exemptions are conditioned on those agencies reporting annually on their red-cockaded woodpecker populations.⁵⁹ Monitoring and reporting serve as essential accountability mechanisms and should be tied to adaptive management protocols, which offer the most reliable means of ensuring that regulatory flexibility does not outpace the Services’ ability to detect and respond to population-level impacts. To maximize their effectiveness, monitoring data and reported outcomes should be made transparent and publicly accessible, which can allow for early identification of implementation gaps and supports course corrections before impacts become irreversible. More broadly, the Services should pursue systematic improvements to program-level monitoring and reporting for all threatened species under the ESA, establishing consistent standards that enable meaningful cross-species and cross-program evaluation of conservation outcomes over time.

4. Appropriately Tailor Geographic, Temporal and Industry Prohibitions and Exemptions. As discussed above, some species-specific 4(d) rules incorporate different requirements based on geographic location, time periods (like seasons) and industries. These kinds of exemptions and prohibitions can ensure that species protections apply where they are needed but do not unduly burden activities where they are not. However, broad geographic, temporal or industry-wide exclusions from take prohibitions, particularly where the excluded activity represents a threat to the species or a threat that contributed to its listing, may inadvertently allow significant threats that could otherwise trigger section 10 permitting. Such exclusions should be applied cautiously, even in lower-quality habitats, as these areas may still be important to long-term species recovery.

5. Improve 4(d) Rule Transparency for the Public. Establish a centralized, “one-stop” platform to provide easily accessible and understandable public access to species-specific section 4(d) information. This platform should build on existing Services tools, such as the Environmental Conservation Online System (ECOS), and draw from successful models used by other federal agencies. Examples include the U.S. Environmental Protection Agency’s Bulletins Live! Two, which delivers location-specific, legally enforceable

requirements through interactive maps and searchable databases, and the Federal Highway Administration’s Environmental Review Toolkit. A similar tool would help landowners, developers, state, Tribal and federal agencies better understand the geographic scope, conditions and limitations with species-specific 4(d) rules. At present, there is limited information on how well these rules are understood by the public or how landowners apply the rules to their activities. Improved data-sharing tools could help address this gap by reducing confusion, increasing transparency and supporting more consistent compliance.

6. Provide Increased Clarity, Consistency and Detail in 4(d) Rules. There is significant variability in how 4(d) rules are drafted, organized and formatted. While FWS’s 2021 4(d) guidance discusses how to draft substantive provisions, it does not address style and formatting. Greater clarity should be built directly into 4(d) rules through more consistent structure and terminology. Broad or undefined terms, such as “necessary and advisable,” and “*de minimis*” can be confusing for practitioners and the public; clearer definitions and standardized language would improve interpretation and implementation and could be reinforced through the recommended platform. Although the Federal Register provides a repository of species-specific 4(d)

Management activity	Dates authorized for use in occupied habitat
Mechanical treatments	Outside of the flight period of April 15 to June 30.
Manual treatments	Year-round.
Mowing—tractors	Before February 15 and after August 15.
Mowing—handheld	Year-round, with a buffer of 8 meters (25 feet) between the mower and any individual lupine plant during the flight period of April 15 to June 30.
Herbicides—hand wiping	Year-round.
Herbicides—wicking	Year-round.
Herbicides—spot-spray	Year-round.
Herbicides—weed wiping	Outside of the flight period of April 15 to June 30.*
Herbicides—broadcast spray	Outside of the flight period of April 15 to June 30.*
Planting native vegetation	Year-round.

* Additional timing restrictions will apply based on the chemicals used. Contact the Oregon Fish and Wildlife Office for additional information.

Table 5. 4(d) rule exemption summary of authorized methods and timing of habitat restoration activities for Fender’s blue butterfly.

rules⁶⁰ and their exemptions, its reliance on technical terminology, cross-references to other regulatory text and inconsistent phrasing (e.g., “general exclusions” versus “exclusions”) can make these rules difficult to navigate or compare for a broad range of users. Additionally, maps incorporated into 4(d) rules should be high resolution and follow appropriate mapping standards. And for species with multiple exemptions and mitigation requirements, structured summary tables should be used within the rule. Tables that clearly outline authorized activities, exclusions and any associated conditions or mitigation measures can reduce confusion, particularly when multiple industries are addressed in a single rule. This approach has been used effectively in some species-specific rules, such as the Fender’s blue butterfly (Table 5), and should be applied more broadly.

7. Ensure that 4(d) Rules Covering Voluntary Conservation Plans Adequately Conserve Species.

Defenders’ previous analysis found two species-specific 4(d) rules exempted activities covered under voluntary conservation plans (specifically covering the California gnatcatcher in 1993 and the lesser prairie-chicken in 2014). Since 2016, no species-specific 4(d) rules have contained exemptions based on similar voluntary plans, other than those created under the standard ESA

permitting provisions of section 10. As noted in the previous analysis, such voluntary plans can provide more detailed requirements applying to covered activities, as well as monitoring, reporting and adaptive management measures that go beyond the reach of most 4(d) rules. However, improperly implemented voluntary plans can pose particular risk to species since they tend to cover large areas and exempt high-impact activities. It is possible the Services may decide in the future to allow exemptions in species-specific 4(d) rules based on such voluntary conservation plans. Should this occur, our recommendations for such exemptions are the same as in Defenders’ previous report:

- (1) Set minimum biological standards for the management plan that are tied to the take exemption, such that the failure to meet them would suspend the exemption;
- (2) Require Service approval of management plans based on whether the plan meets the biological standards of the rule and incorporate public notice and comment on draft plans.
- (3) Require monitoring, reporting and periodical evaluation of species status and take.
- (4) Ensure open data and transparency, placing all relevant documents online so that the public can help monitor implementation of those management plans.

5. Conclusion

Our analysis found that over the past decade, most species-specific 4(d) rules exempted activities deemed to have minimal adverse impacts—activities unlikely to impede recovery efforts for threatened species, particularly when mitigation measures were in place. This underscores a central finding: exemptions were most effective when they produced known benefits to the species or were supported by evidence demonstrating insignificant impacts. Consistent with prior analyses, however, we also identified instances where 4(d) rules may undermine recovery potential. Across administrations, exemptions have at times put species recovery at risk by authorizing activities linked to primary or cumulative threats that led to the species’ listing.

These findings underscore the need for greater use of guardrails to protect species, such as increased use of

mitigation, particularly where multiple exemptions create cumulative impacts for all categories of exemptions. Emerging approaches, including adaptive management strategies that incorporate provisions like take limits for exemptions and enhanced reporting, monitoring and periodic evaluation, offer additional tools to improve accountability while preserving flexibility. Finally, clearer communication and greater transparency are essential to effective implementation of 4(d). Because many exemptions function on an honor system, public understanding of these rules is critical to compliance and conservation outcomes. Looking forward, targeted reforms that strengthen mitigation, oversight and clarity can better align 4(d) rules with the ESA’s core objectives of supporting species recovery while maintaining appropriate regulatory flexibility.

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Defenders of Wildlife protects and restores America's wildlife at risk of extinction, advancing a vision of a future in which wildlife thrives, sustained by broad public support and a resilient network of healthy lands and waters.

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