

## CONSERVATION

# Citizen Involvement in the U.S. Endangered Species Act

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The U.S. Endangered Species Act (ESA) has been controversial since it became law nearly 40 years ago. One of its most-debated provisions is citizen involvement in selecting species that become formally protected under the law (“listing”). Citizens can petition the U.S. Fish and Wildlife Service (FWS) to list any unprotected species and can independently use litigation to challenge any FWS listing decision (1, 2). Some contend that these provisions interfere with the ability of FWS to prioritize scarce resources for species that most need protection (e.g., 3, 4).

Critics charge that most citizen-initiated listings are driven primarily by political motives, particularly to block development projects (5). A related argument is that citizens initiate listing of more subspecies and populations (as opposed to full species) (6), again out of political convenience (5, 7, 8). If such claims are true, citizen involvement may undermine the sole legislative criterion for listing; the ESA stipulates that species should be listed on the basis of biological threat alone, without regard to conflict with development (1). Such criticisms underlie, in part, a 2011 request by FWS to Congress to impose a cap on the amount of money that FWS could spend responding to citizen requests (9).

Although controversy surrounding citizen involvement in ESA listing is longstanding, there has not been an objective analysis comparing species listed by FWS of its own accord to those listed after petition or lawsuit by citizen actors (1). Biological threat provides a test for citizen involvement: If petitioned and litigated species are less biologically threatened, on average, than species selected by FWS, that would provide an argument for reducing citizen involvement in the ESA. Such an argument would be strengthened if citizen groups disproportionately focus on species whose selection might have been based on reasons other than threat, i.e., species that are in conflict with development



**The Desert Tortoise (*Gopherus agassizii*).** The Mojave Desert population of the Desert Tortoise was petitioned to be listed, but was originally not listed by FWS. The species was listed by FWS after subsequent litigation.

(5), or at “lower” taxonomic levels (subspecies or populations; (10, 11). By contrast, if nongovernmental actors are equally as good as (or better than) FWS at selecting species that are biologically threatened, that would provide an argument for maintaining citizen involvement provisions in the ESA.

Although proposals to constrain citizen petitions in 2001 and 2011 failed in Congress (3, 9), similar proposals are likely to return. To inform this debate, we conducted the first empirical analysis of ESA-listed species that compares FWS-initiated species with species whose listing process was initiated by citizen petition or involved litigation. We asked three sets of questions: (i) Do FWS-initiated species face greater biological threats than citizen-initiated species? (ii) Do citizen-initiated species show signs consistent with what critics deem politically-motivated listing: (a) more conflict with development than FWS-initiated species; and (b) a greater proportion of subspecies or populations as opposed to “full” species compared with FWS-initiated species? (iii) What is the relation between biological threat and both conflict with development and taxonomic status?

## Methods

We built a database of domestic terrestrial and freshwater species listed as “threatened” or “endangered” under the ESA (12, 13). Our response variables come from FWS’s recovery priority score, which includes three components: (i) biological threat of extinction; (ii)

Data on listed species refute critiques of citizen involvement in the U.S. Endangered Species Act.

taxonomic level, i.e., full species versus subspecies (including Distinct Population Segments and Evolutionarily Significant Units); and (iii) conflict with economic development (13). We used FWS data from the first recovery report published after each species listing, up until 4 years later; this limits our analysis to species listed from 1986 on. There are 913 species in this data set (14). We only included petitions or litigation whose goal was to list a species (i.e., we did not include lawsuits aimed at delisting species). We validated FWS threat scores with data from a nonprofit conservation organization and used logistic and ordinal logistic regression models. We only included species that were successfully listed under the Act because only these species have recovery priority scores. Exclusion of petitioned species that were never listed under the ESA creates a possible selection bias. To address that possibility, we examined the proportions of petitioned species and FWS candidate species that were actually listed for protection under the ESA (12).

## Results

Citizen-initiated species (petitioned and/or litigated) face higher levels of biological threat than species identified by FWS ( $P = 0.0005$ ) (see the figure) (Fig. 1) (table S1). Litigated species are more threatened than nonlitigated species ( $P = 0.0027$ ); we found no significant difference in threat between petitioned and non-petition-initiated species ( $P = 0.0930$ ) (table S1) (15). Citizen-initiated species are more likely to be in conflict with development ( $P = 0.0012$ ) and include a greater proportion of subspecies ( $P = 0.0053$ ) (see the figure) compared with FWS-selected species. This pattern holds in terms of conflict-with-development for petitioned species ( $P < 0.0001$ ) but not for litigated species ( $P = 0.1914$ ). Petitioned species are significantly more likely to be subspecies than non-petition-initiated species ( $P = 0.0006$ ); litigated species are marginally so, compared with nonlitigated species ( $P = 0.0567$ ).

Across all listed taxa (regardless of selection by citizens or FWS), species in conflict with development face greater biological threat levels than species not in conflict with development ( $P < 0.0001$ ) (fig. S1). There is

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no such pattern for taxonomic level: Subspecies and species face relatively similar threats ( $P = 0.481$ ). Of species in conflict with development, citizen-initiated taxa have greater threat levels than FWS-initiated taxa ( $P = 0.046$ ) (see the graph); citizen-initiated subspecies are marginally more threatened than FWS-initiated subspecies ( $P = 0.077$ ) (table S1). Within conflict-with-development and taxonomic-level groups, 11 of 12 comparisons trend toward greater threat for citizen-initiated taxa; 5 show significantly greater threat for citizen-initiated species (table S2).

In terms of the proportion of species that are eventually listed by FWS, we found no evidence of a selection bias in favor of petitioned species compared with non-petition-initiated species. Although we could not conduct statistical tests because of differences in data collection, a higher proportion of petitioned species are eventually listed, compared with species on the FWS candidate list (12). We also found no evidence of systematic divergence between threat scores for FWS and nongovernmental organizations.

## Discussion

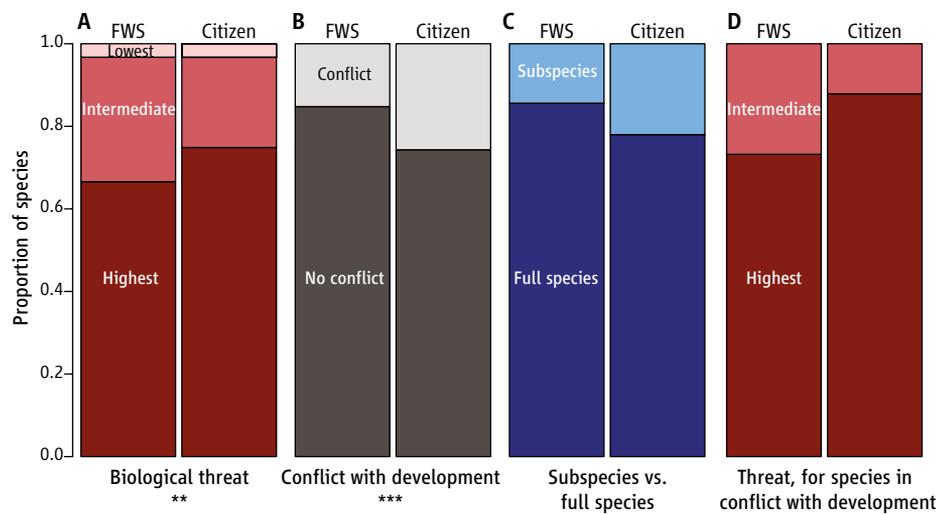
Citizen groups play a valuable role in identifying at-risk species for listing under the ESA. Indeed, citizen-initiated species are overall more biologically threatened than those selected by the FWS. Our findings thus do not support calls for reducing or eliminating citizen involvement in the ESA.

Our results are consistent with potential political motivation (as defined by critics) in species petitions and litigation. First, citizen-initiated species as a whole, and petitioned

species in particular, are more likely to pose conflicts with development relative to FWS-selected species. Second, citizen groups disproportionately propose subspecies, as opposed to full species, for protection under the ESA relative to FWS.

However, even if citizen groups act strategically in their listing proposals, this does not result in listing of species that are less deserving of protection. Petitioned species face levels of threat similar to those of non-petition-initiated species; litigated species face even greater threats than nonlitigated species. Among species in conflict with development, citizen-initiated species are significantly more threatened than FWS-initiated species. Among subspecies, the marginally significant result indicates that citizen-initiated subspecies are at least as threatened as FWS-initiated subspecies, if not more so.

Contrary to criticisms of citizen involvement in the ESA, petitions and litigation are potentially very important in selecting species worthy of protection (16). In many cases, outside groups could serve as the only impetus for protection of biologically threatened taxa that would otherwise be ignored because they conflict with development projects and related political pressures or because they are low-profile subspecies. This function is particularly important because across both FWS- and citizen-initiated taxa, species in conflict with development face significantly greater biological threat levels than species not in conflict with development. This is understandable given that human development projects are one of the largest threats to biodiversity (17).



**Comparisons of species selected by FWS versus citizens in terms of (A) biological threat, (B) conflict with development, (C) taxonomic level, and (D) biological threat for species in conflict with development.** Results from ordinal logistic (first and last bar pairs) and logistic (second and third bar pairs) regressions; \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

Citizen actors—including numerous scientists—have specialized knowledge about biological taxa and geographic locales (16). FWS is limited in its budget, staff size, and scope and is unlikely to ever contain enough expertise to identify all species most worthy of protection among the more than 100,000 plant and animal species in the United States, not including subspecies (18). There are structural barriers to listing of taxa that are not truly threatened. Because petitions and lawsuits are time-consuming and expensive relative to the limited resources of many citizen groups, such groups are unlikely to invest time and money in species that probably will not meet the criteria for formal listing by the ESA.

Calls to streamline the ESA and to rely exclusively on FWS to identify and list species might mean that a significant number of species that deserve legal protection—especially those that are politically unpopular because of the potential to obstruct development projects—would be left out in the cold.

## References and Notes

1. ESA 16 USC §§ 1533.
2. ESA 16 USC §§ 1539.
3. J. Pattis, *Tulane Environ. Law J.* **16**, 257 (2003).
4. M. Restani, J. M. Marzluff, *Bioscience* **52**, 169 (2002).
5. I. C. Sugg, *Cumberland Law Rev.* **24**, 1 (1993).
6. The listing of subspecies and populations as endangered or threatened is allowed under the ESA (19).
7. There are biologically important reasons for protecting subspecies and populations; see, e.g., (8).
8. G. Ceballos, P. R. Ehrlich, *Science* **296**, 904 (2002).
9. L. Hurley, *E&E Publishing*, 23 March 2011; <http://www.eenews.net/public/Greenwire/2011/03/23/2>.
10. D. Holthouse, *Denver Westword News*, 20 January 2005; [www.westword.com/2005-01-20/news/building-abetter-mousetrap](http://www.westword.com/2005-01-20/news/building-abetter-mousetrap).
11. M. A. Cronin, *Range Magazine* **2006**, 14 (2006).
12. Supplementary Materials are available on *Science* Online.
13. FWS, *Fed. Regist.* **48**, 43098 (1983).
14. We did not include species managed by the National Marine Fisheries Service (NMFS) because of data limitations and sample size. Including NMFS species and reanalyzing our data does not change any basic results (12).
15. Because petitions and litigations are legally independent actions, we also separately analyzed the effect of each, comparing petitioned species (P+) to unpetitioned (P-) species, and litigated (L+) to unlitigated (L-) species. The unpetitioned category includes both (P-, L+) and (P-, L-) species; the unlitigated category contains both (L-, P+) and (L-, P-) species.
16. E. Biber, B. Brosi, *UCLA Law Rev.* **58**, 321 (2010).
17. O. E. Sala *et al.*, *Science* **287**, 1770 (2000).
18. NatureServe (NatureServe Web Service, Arlington, VA, 2012); <http://services.natureserve.org>.
19. ESA 16 USC §§ 1532.

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## Supplementary Materials

[www.sciencemag.org/cgi/content/full/337/6096/802/DC1](http://www.sciencemag.org/cgi/content/full/337/6096/802/DC1)

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