



Endangered Hawaii: Assessing Threats That Impact Federally Listed Species in this Biologically Unique Area

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Introduction

The identification of threats that have caused species to become federally listed is important when determining national scale recovery strategies. Wilcove et al. (1998) and Evans et al (2016) looked at threats that were impacting federally listed species and both concluded that habitat loss/degradation, alien/invasive species, and pollution were the top threats.

The objective of our study was to determine the current threats that impact federally listed species at time of listing in Hawaii and compare these threats to the continental US.

Methods

- A checklist of all US federally listed threatened and endangered species was compiled using the 'Species Listings By Year' search tool on ecos.fws.gov.
- Federal Registrar* final listing documents were used to identify threats to threatened and endangered species at time of listing.
- Threats that impact federally listed species in Hawaii were then compared to the continental United States.
- Only species listed from 2006 through 2015 were included in this analysis.

Figure 1

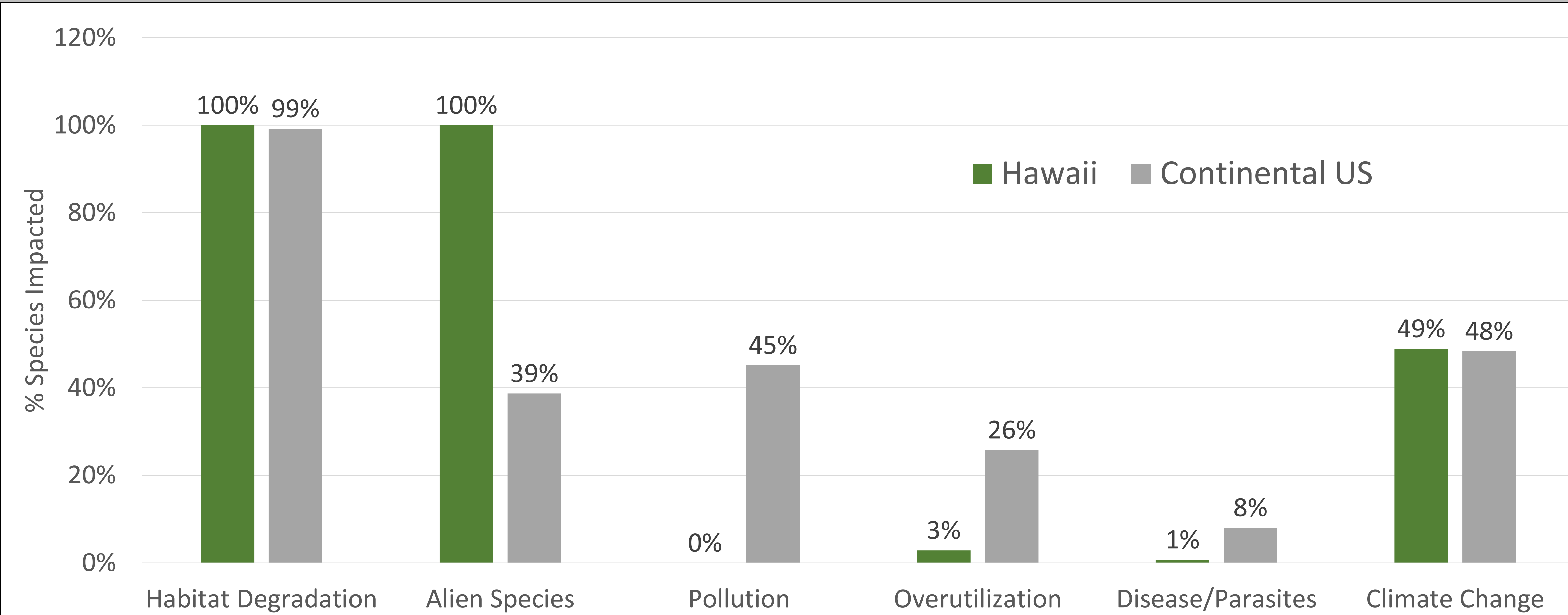


Figure 1. Comparison of the percentage of federally listed species impacted by human threats between Hawaii and the continental US at the time of listing from 2006 through 2015.

Figure 2

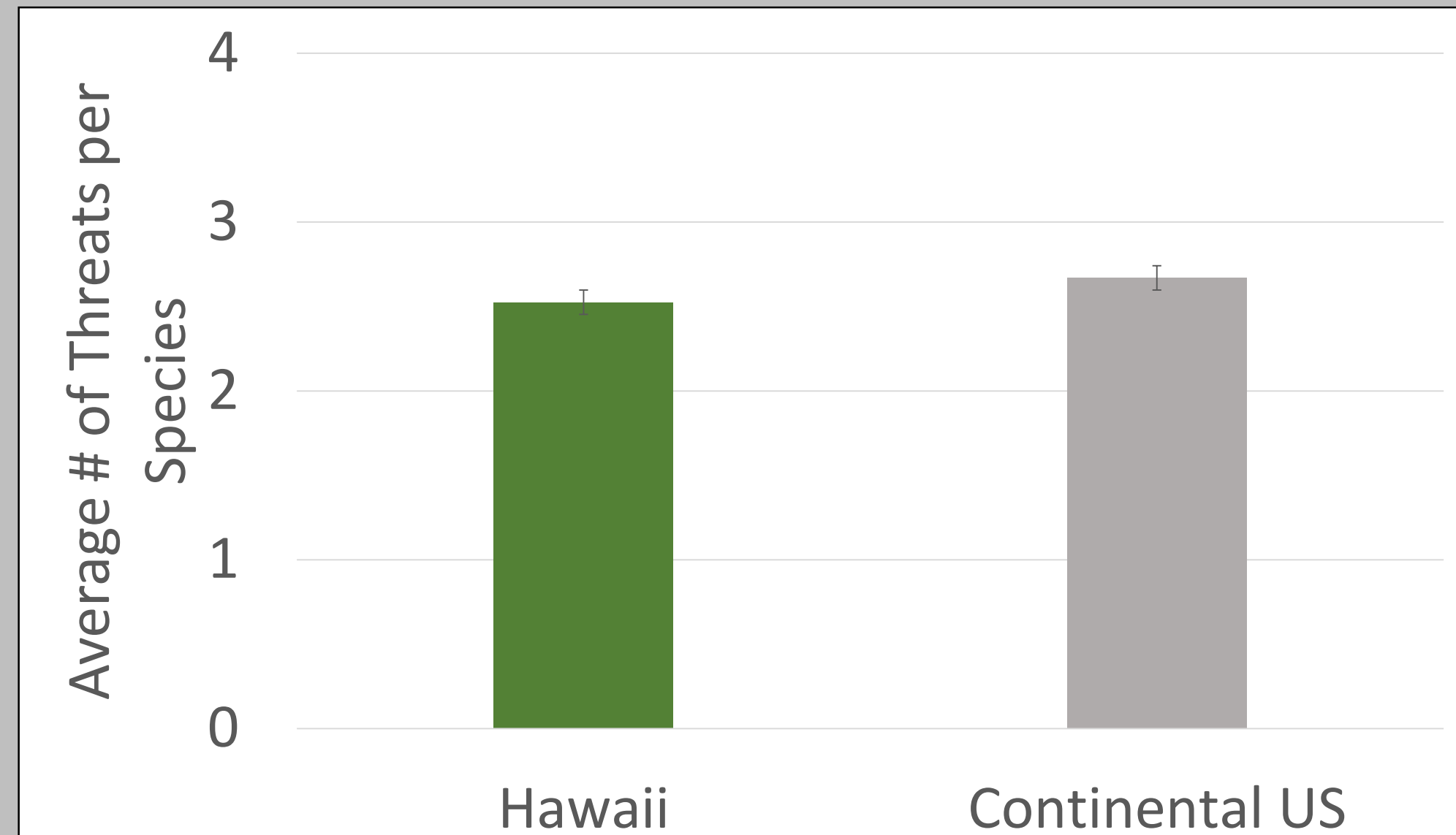


Figure 2. Average number of threats affecting Hawaiian species vs continental US species a time of listing from 2006 through 2015 with standard error bars.

Results

- Habitat loss and alien species are the top current threats to threatened and endangered Hawaiian species.
- Alien species are a significantly larger threat to Hawaiian species with 100% of species affected ($p < 0.05$, Figure 1).
- Climate change has since emerged as a leading threat to federally listed species and is affecting approximately 49% of Hawaiian listed species (Figure 1).

Management Implications

- Our results allow researchers to better anticipate future threats to Hawaiian species, especially when managing for climate change.
- Climate change has now become one of the top threats impacting threatened and endangered species, and it currently affects approximately 49% of Hawaiian species. Recovery plans will have to account for this new threat and the fact that, on average, all listed species are impacted by multiple threats (Figure 1 & Figure 2).

Literature Cited

Evans, D.M., Che-Castaldo, J.P., Crouse, D., Davis, F.W., Epanchin-Neill, R., Flather, C.H., Frohlich, K., Goble, D.D., Li, Y., Male, T.D., Master, L.L., Moskwik, M.P., Neel, M.C., Noon, B.R., Parmesan, C., Schwartz, M.W., Scott, J.M. and B.K. Williams. 2016. Species recovery in the United States: increasing the effectiveness of the Endangered Species Act. *Issues in Ecology* 20.

Wilcove, D.S., Rothstein, D., Dubow, J., Phillips, A. and E. Losos. 1998. Quantifying threats to imperiled species in the United States. *BioScience*. 48: 607-615.



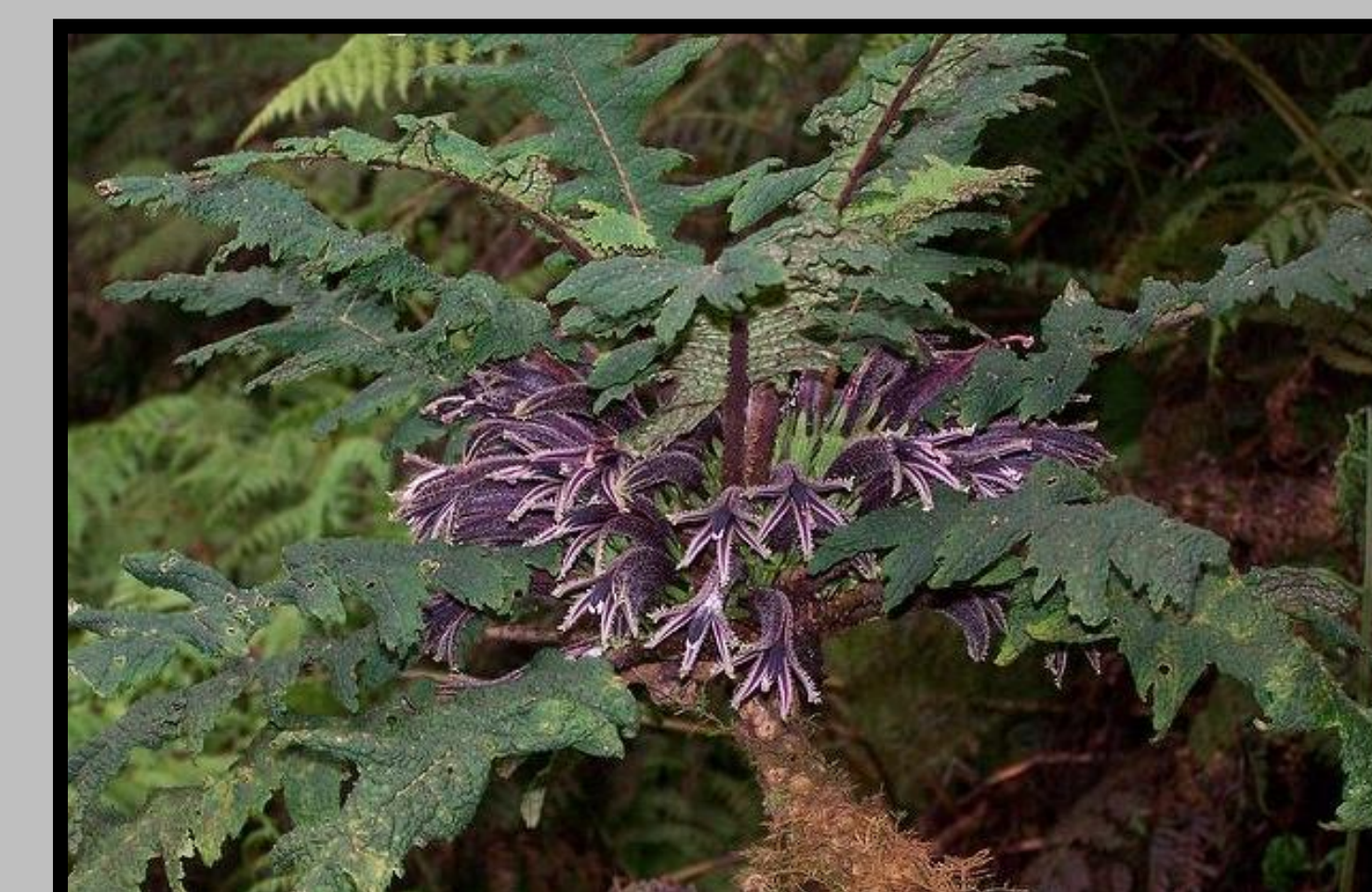
Megalagrion leptodemas
(crimson Hawaiian damselfly)
Habitat Degradation and Alien Species



Loxops caeruleirostris
(Akekee)
Habitat Degradation, Alien Species and Climate Change



Figure 3. Map of Hawaii with five examples of federally listed Hawaiian species and the human threats that impact them.



Cyanea horrida
(nui haha)
Habitat Degradation and Alien Species



Vetericaris chaceorum
(Anchialine Pool shrimp)
Habitat Degradation and Alien Species



Partulina variabilis
(Lanai Tree snail)
Habitat Degradation and Alien Species

