

# The Endangered Species Act at 50

*A Record of Falsified Recoveries Underscores  
a Lack of Scientific Integrity in the Federal Program*



ROB GORDON  
WESTERN CAUCUS FOUNDATION  
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Cover: Monito gecko, courtesy USFWS (<https://www.fws.gov/node/70116>, accessed 11/4/23).

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## *A Record of Falsified Recoveries Underscores a Lack of Scientific Integrity in the Federal Program*

### **Executive Summary**

On December 28th, 2023, it will be 50 years since the Endangered Species Act (ESA) first became law. Recovering endangered species is the ultimate measure of success under the ESA. The U.S. Fish and Wildlife Service (USFWS) recently touted its work towards this end, stating: “... more than 100 species of plants and animals have been delisted based on recovery or reclassified from endangered to threatened based on improved conservation status.”

Unfortunately, at the half century mark, with the listing of 1,667 threatened or endangered species, there are only 62 officially ‘recovered’ species.<sup>1</sup> Of these, 36—nearing 60%—are not real conservation ‘success stories.’ These ‘recoveries’ are hollow, as they are inaccurate proclamations attributable to an erroneous original determination that the species was endangered or threatened. The ESA’s poor showing is compounded by the fact that for some species that have recovered, the recovery is not primarily or even substantially attributable to the ESA. Of the species currently proposed for delisting on the basis of recovery, at least 5 of 12 appear more likely to owe their improvement to original data error. About 20 of 40 of the downlisted species (lowered from endangered to threatened status) pointed to by USFWS as recovering, appear to primarily owe their improved status to data error as well. To support these conclusions, this report relies, with few exceptions, on the federal government’s own data, and is the most in-depth, up-do-date, and complete assessment of delisted endangered and threatened species available.

This review shows:

- More than half of the 62 ‘recoveries’ are not legitimate and primarily owe their delisting to the use of erroneous data or analysis to list these species.
- Disguising species added to the list in error as ‘recovered’ has been a long-standing practice.
- The same deception has occurred with many species that are proposed for delisting or that have been downlisted and claimed as evidence of the ESA’s effectiveness.
- USFWS ceased reporting other measurements (in its biannual Report to Congress) that could have provided an additional yardstick for measuring progress and, instead, substituted bureaucratic fluff.
- The listing standards, the process, or both, have led to more than twice as many wrongly listed species as recovered species.
- Continuously mislabeling species as “recovered” reveals a serious scientific integrity problem in the implementation of the ESA.

These errors are not without consequence. Each mistake consumes money and time through required bureaucratic actions. Many of these mistakes remained on the List for decades and resulted in regulatory burdens and economic costs. Not only does misreporting these species as “recovered,” hide the ESA’s true conservation record, but it also obscures the waste of conservation resources, and that economic impacts and regulatory burdens on private property owners were imposed on the basis of bad data. Officially proclaiming these errors as recoveries resulted in even more waste than would have occurred if the species had been properly delisted on the grounds of original data error. The deceptive record hinders Congressional oversight and misrepresents the program to the public.

While we are often reminded that ‘recovery takes time,’ a recovery record that is inflated by more than 100% after fifty years should trigger profound concern and a demand for an honest discussion about the conservation effectiveness of the law. The dishonest claims of recovery should not only set off alarm bells about the ESA’s effectiveness at the half century mark, but also about the lack of scientific integrity in the implementation of one of the Nation’s most powerful environmental laws.

Congressional oversight committees should take a hard look at the data and science used in listings and delistings. This dismal recovery record further reinforces the need to modernize the Act so that it may be focused on effectively conserving legitimately threatened and endangered species.

## Some of the ‘Recovering’ Species

The misleading practice of mislabeling species as successful “recoveries” has been going on for decades. As far back as 1988, the Government Accounting Office reported this regarding three birds found on the islands of Palau. GAO reported, “*although officially designated as recovered, the [Palau owl, dove and flycatcher] owe their ‘recovery’ more to the discovery of additional birds than to successful recovery efforts.*”

The misleading process has continued to this day, to highlight just a few examples:

- The **Hawaiian hawk** was added to the list given a perceived low population, threats from invasive species, habitat loss, and environmental contaminants. Almost five decades later, when delisting the bird as “recovered” in 2020, USFWS reported that the new data indicated that the bird “...**was, and continues to be, stable**” (emphasis added). USFWS also found Hawaiian hawks use both native and nonnative habitats for breeding and hunting; invasive species were a substantial part of the bird’s diet, and that there was “*no evidence of threat from environmental contaminants.*”
- When listing the **running buffalo clover** in 1987, FWS reported that it was “*one of the rarest members of the North American flora,*” with just four known individual plants in one county, in one state. By the time it was delisted as a “recovered species” in 2021, 175 populations, in more than 80 counties and in six states—with one population numbering more than 60,000—had been found.
- **Bradshaw’s lomatium**, a plant, was added to the *List* when it was believed there were just 25,000 to 35,000 individuals in 11 known populations. Later discoveries revealed 71 sites with a gigantic one on a golf course—approximately 10.8 million plants. FWS proclaimed the plant a recovery in 2021, and reported that “*even without formal protections, the regular mowing that occurs at [the golf course] on a consistent basis year after year has provided for the most vast and robust population of the species known.*”
- Around the time it was listed as endangered, the **Monito gecko** was assumed to be extremely rare—one survey revealed only 18 of the one and a half inch lizards. The presumed threat was predation by invasive rats but FWS could later find no evidence rats ate the gecko. It also discovered the lizard was nocturnal. While the count of 18 had been done during the day, nighttime surveys yielded an estimated population of 7,661. The gecko was declared a “recovery” in 2019.

- When added to the *List*, FWS estimated there were around 500 **lesser long-nosed bats**. When declaring the bat a “recovery” in 2018, FWS reported an estimated population of 200,000–400 times more, and reported that while the big number may in large part reflect better data, it did make it easier to determine the bat was no longer ‘endangered.’
- The year before delisting the “**San Clemente sage sparrow**” in 2023, FWS said “*we continue to consider the Bell’s sparrow... on [San Clemente Island] a subspecies.*” Research indicates it is not. Even the Integrated Taxonomic Information System’s “*authoritative taxonomic information*”—which FWS partners in maintaining—considers the subspecies unique to San Clemente Island invalid. It is the same as other sparrows that are plentiful.

Just the above species account for almost 15% of the ESA ‘success stories’ over the last half century. Similarly, several species proposed for delisting as having “recovered” really did not.

- **The Puerto Rican boa** was proposed for delisting as recovered in July of 2022. That same month a FWS assessment reported that the boa “*is probably less abundant now than it was in Pre-Columbian times...*” and that a “current initial population size of the [Puerto Rican] boa could range from 37,903 to 189,515 boas” (emphasis added).

Some of the downlisted species USFWS has pointed to as evidence of improvement are also substantially attributable to erroneous data.

- **The beach layia**, a plant, was downlisted in March of 2022. A prior FWS analysis reports “based on our current population estimate (likely in excess of 10 million), the 1998 estimate” of 300,000 “*may have been a gross underestimate*” (emphasis added).

## I. Introduction

Today, there are approaching 1,700 officially threatened and endangered species in the United States.<sup>2</sup> The vast majority of the public is undoubtedly supportive of *actually recovering actual species* that are *actually endangered*. The belief that this is what the Endangered Species Act (ESA) does, is undoubtedly responsible for much of the support the law receives. The half century mark is an appropriate milestone to review the ESA's conservation record.

The ESA defines conservation as bringing a listed species to the point at which the law's provisions are no longer necessary. When this occurs, the species is supposed to be removed from the endangered list as 'recovered.' The obvious measure of the law's success at reaching its definition of conservation—of 'saving species'—is the number of recovered species.

After a half century, both the agencies responsible for implementing the law and the advocates of the ESA claim 62 domestic species have been recovered. They also further claim it has been an effective tool for conservation, and that while this number may not seem large, the law needs to be given more time to work. While some of the ESA's costs and effects on both public and private land are evident and large, some have posited that whatever the costs are, they are the price of conserving endangered species—of 'saving' them from extinction. At the same time, the law's impact on public lands and private property, its growing economic impacts and regulatory burdens, and the number of recovered species relative to the growing number of listed species, are also often cited by the law's critics as evidence of its shortcomings.

This report includes an analysis of the species that have been officially declared "recovered," with a focus on those for which this is an inaccurate description of the reason the species were removed from the *List of Endangered and Threatened Wildlife and Plants (List)*. This review reveals that the official number of 'recovered species' after a half century of implementation is grossly inflated. Over half of the officially 'recovered species' owe their removal from the federal rolls to the recognition that the initial official determination that these species were endangered was wrong. Despite this, the US Fish and Wildlife Service (USFWS or Service) declared that these species have "recovered."

This actual record of recovered species is revealed by reviewing the regulatory filings by the agencies that implement the law, the USFWS and the National Marine Fisheries Service (NMFS), as well as other documents associated with a species being included on the *List*. These sources demonstrate that the actual record is not what has been asserted in the *Federal Register*, and that in a majority of the cases in which USFWS has claimed a species "recovered," it is inaccurate. Those implementing the ESA apparently either suffer from profound collective amnesia or have chosen to misrepresent the law's actual record.

In reality, the endangered species program and inclusion on the *List* may be likened to a hospital where patients check in but rarely check out. Of the relatively few that do, some are heralded as recovered. More often than not, the reality is the species should never have been listed. When such species are declared ‘recovered,’ it could be likened to a doctor claiming to have cured a patient upon discovering the patient had been misdiagnosed as in poor health. Such patients would be no more cured than some of these species have ‘recovered.’ Like doctors engaged in this malpractice, federal officials have repeatedly made claims over decades that are devoid of scientific integrity. Without an accurate accounting, the Endangered Species Act cannot be intelligently implemented by the Executive Branch, overseen by Congress, or understood by the public. This misleading record is a discouraging result after a half century of implementation, reveals an alarming lack of scientific integrity, and it must be corrected.

## II. Background

The Endangered Species Act or ESA became law on December 28, 1973, so this year will mark the half century milestone. The ostensible purpose of the ESA is to conserve endangered species which means using “all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary.”<sup>3</sup> When this point is reached, a species is considered to have recovered.

Most simplistically, to achieve the ESA’s goal of conserving species, animals and plants are determined to be endangered or threatened. Endangered essentially means the threat of extinction is considered more imminent than it is for ‘threatened’ species. (For ease, both endangered species and threatened species may be generally, collectively referred to as *endangered* herein.) When determined to be endangered, a species is added to the official *List*. Once listed, the ESA’s powers and resources are then used to ‘conserve’ the species and, when this has been achieved, the species is removed from the *List*. When this cycle has been successfully completed the species is legally “recovered,” and the purpose of the ESA has been met for the species in question.

Before examining the ESA’s record of recovering endangered species, the terms *species* and *endangered* require further elaboration. In addition, we need to examine the following concepts carefully as well: the time required to recover endangered species, the claim that the ESA has ‘saved 99% of listed species,’ as well as the specific measures of the recovery program that were previously included in legally required Reports to Congress on the Recovery Program (*Report to Congress*).<sup>4</sup>



### III. What does “Species” Mean Under the ESA?

The word species in the context of the ESA is defined specifically in its relation to the ESA. It is a legal term, not a biological term.

When discussing concepts such as the number of ‘endangered species in the US,’ such figures are typically drawn from the *List*. The ESA requires that the *List* be published in the *Federal Register*.<sup>5</sup> Information on listed species is maintained and accessed from a USFWS website known as ECOS, an acronym for the Environmental Conservation Online System.<sup>6</sup>

While species are on the *List*, they are, dependent upon the kind of species, regulated by USFWS or the NMFS.<sup>7</sup> USFWS regulates listed terrestrial species including birds and freshwater species. NMFS regulates marine species including most marine mammals. Both agencies have defined roles for anadromous fish and listed sea turtles.<sup>8</sup>

When commonly referenced, the ‘number of US endangered species’ is *not* a count of species as that term is used in biology. This is a count of the number of distinct entities included on the *List* by a formal rule-making. The term *species* is being used in a legal sense, as it has been defined in the ESA.

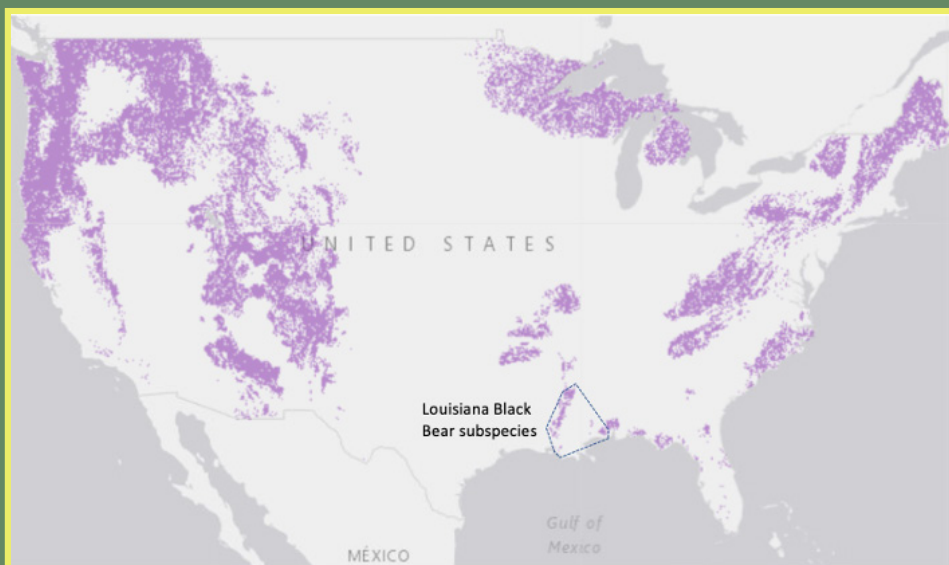
For purposes of the ESA, the term *species* is legally defined to include species, subspecies and, for vertebrates, something called a distinct population segment. Species, a term most are familiar with, is the most basic unit of taxonomy. While uniform agreement on what constitutes a species is somewhat elusive, two organisms are generally agreed to be of the same species if they are potentially capable of interbreeding and producing fertile offspring, and are denoted as species by a two-part scientific name or “binomial.”

For example, *Ursus americanus* is the binomial name for the black bear where *Ursus* (the genus) includes all bears (e.g. polar bears, brown bears, black bears, etc.) and *americanus* specifies the black bear. Thus, the scientific name for the American black bear is *Ursus americanus*. This is the most plentiful bear on Earth and has greater numbers than all other bears on Earth combined. According to the *Washington Post*, “black bear populations across the country have risen dramatically over the last 50 years... As a result, bears are moving into areas they haven’t frequented for, in some cases, centuries.”<sup>9</sup> The *Post* quotes a Minnesota Department of Natural Resources official as reporting, “We have bears throughout Massachusetts, and that didn’t used to be the case. We have bears showing up in Ohio, in western Minnesota and pushing out into the Dakotas. There are recovering bear populations in Arkansas, Missouri and Louisiana.”<sup>10</sup> While the black bear was so depleted in New England that it was extirpated from neighboring Connecticut by the mid-1800s, the Massachusetts Division of Fisheries and Wildlife reports that “the statewide population of bears is estimated to be over 4,500 animals and is growing and expanding eastward.”<sup>11</sup>

Subspecies are subsets of a species. Subspecies may be different from one another based upon geographic range, morphological features (varying bodily measurements, coloration, patterns etc.) or DNA. Subspecies is a much more subjective grouping and, consequently, the validity of many subspecies is in question. Subspecies have a three-part scientific name, or trinomial. For example, *Ursus americanus luteolus* was a designation given to some black bears found in Louisiana, eastern Mississippi, and eastern Texas. Some believe or believed the black bears occurring in this area should be considered a subspecies being differentiated from other black bears due in part to comparative skull measurements.<sup>12</sup>



Left: Black bear at Great Dismal swamp refuge in Virginia. Courtesy USFWS.<sup>13</sup>  
Right: 'Louisiana black bear' and cub. Courtesy USFWS.<sup>14</sup>



Predicted range of black bear, *Ursus americanus*, from a US Geological Survey (USGS) map. Added blue dashes are the approximate range of the 'Louisiana black bear,' from another USGS map.<sup>15</sup>

When the USFWS's ECOS report of listed mammals is reviewed, mammals listed as subspecies (by trinomials) account for 55 of 80 listed animals.<sup>16</sup> In a recent working paper, Robert Zink and Lukas Klicka state that "there is no agreed-upon list of subspecies, even for taxonomically well-studied groups such as birds and mammals, because (1) there is no agreed-upon general definition of subspecies and (2) many subspecies have been found to be invalid upon modern reanalysis..."<sup>17</sup> Further, the authors state they reviewed 165 ESA listed subspecies and report that "evaluation of data gathered since subspecies were described suggests that about one-third are valid, one-third are not, and one-third have not been tested." The authors state that their "summary suggests that a listed subspecies has a fifty-fifty chance of being significant."<sup>18</sup>

*Distinct population segment* (DPS) is another term incorporated into the ESA's definition of species. It is another term below the level of a biological species. Congress provided for the listing of DPS's for vertebrate (animals with a backbone) only, barring the application of DPS to invertebrates (e.g., insects, spiders, snails, mussels and plants).<sup>19</sup> Congress provided specific guidance that this term was to be used 'sparingly.'<sup>20</sup> This term was not and is not one used in taxonomy (naming different living organisms and grouping them). Including DPS's in the ESA's definition of species allows the listing of a grouping of vertebrate animals that is not a biological species or subspecies. For example, bald eagles south of the US-Canadian border were among the original 'species' covered by the ESA. This division was not because the US-Canadian border is a meaningful biological dividing line for bald eagles. Yet, at the time, bald eagles to the border's north were generally more plentiful and considered more secure, and bald eagles to its south were generally rarer and considered less secure, and US bald eagles south of the border were added to list as distinct population segments.

There is more to the concept of distinct population segments, all of which should be explored. The Congressional guidance that the term was to be used 'sparingly,' that the term *DPS* is not a taxonomic hierarchical unit, and that the DPS definition excludes invertebrates and plants, reveals intent that the provision was not to be applied as a binary (organism meets the definition or not) determination for a group of animals or plants. The term was almost certainly intended for animals that were perceived to capture greater public interest or, as they are known in the business, 'charismatic megafauna' or 'flagship species.'

When the law was enacted, the term provided a means whereby populations of animals like the bald eagle, grizzly bear, gray wolf, and American crocodile could be added to the list although as a species or subspecies they may not in fact have been endangered. These species were depleted in the lower 48 states when the ESA was enacted and, in the case of the crocodile, also had a naturally small portion of its range within the US, but they were not so depleted across their entire range (i.e. Alaska and Canada or the Western Hemisphere) as to be actually biologically endangered as a species or subspecies. These species were not facing biological extinction.



In extreme southern Florida, the American crocodile is at the northern limit of its range that includes coastal nations of the Caribbean as well as from Mexico south to Peru along coastal areas of the Pacific. The growing population in Florida is reflected in nest counts that have risen from eight in 1970 to 189 in 2021.<sup>21</sup> Courtesy USFWS.<sup>22</sup>

Subsequently, the USFWS and NMFS developed biologically rooted policy and definitions for the term DPS. The agencies use the definitions and policies when considering listing subsets of vertebrate animal species. NMFS applies the DPS term not only to a kind of fish within a particular river but also to a particular run (i.e. a subset of fish in a particular river that migrate for spawning at a particular time such as the fall or spring run).<sup>23</sup> For example, NMFS has listed nine different distinct population segments of the Chinook salmon species. This includes distinct population segments for a spring/summer run, for a fall run within the Snake River, for an Upper Columbia River spring run, and one for a Lower Columbia River population.<sup>24</sup> NMFS refers to these groupings as “evolutionarily significant units,” a term that does not appear in the ESA. NMFS listed even more DPSs—14, for steelhead (a fish) along the US West Coast.<sup>25</sup>

The application of the term DPS has likely been significantly different from the original intent. Today some 65 distinct population segments for a total of 18 different species or subspecies of animals in the US are now on the *List*.<sup>26</sup>

The practical effect of dealing with each lessor subdivision of a biological species of an animal or plant, is that from species to subspecies to DPS, the numerical population and often the range are, by definition, smaller and, consequently, any threat to this animal or plant is magnified. This is easily illustrated by considering the possible effects of cutting down 1,000 trees upon robins (the bird) in the lower 48 states, upon robins on the East Coast, robins in Washington, D.C., and upon robins on the Capitol's grounds. The effects range from insignificant, which would be true for all the options except for one, to significant, as there would likely be an impact upon robins on Capitol Hill grounds.

## IV. Legally “Endangered” Species

The ESA outlines a process for adding species (as legally defined) to the *List*. The process is generally known as the five factor analysis. The name is a reference to the ESA's five factors to be considered when determining if a species is endangered or threatened. The factors are:

- “present or threatened destruction, modification, or curtailment of its habitat or range,”
- “overutilization for commercial, recreational, scientific, or educational purposes,”
- “disease or predation,”
- “inadequacy of existing regulatory mechanisms,” and
- “other natural or manmade factors affecting its continued existence.”<sup>27</sup>

In a written analysis, USFWS or NMFS addresses its assessment of whether a species is endangered (“in danger of extinction throughout all or a significant portion of its range”) or threatened (“likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range”).<sup>28</sup> The latter theoretically receives a lower level of protection.<sup>29</sup> The information used by the agencies in making this assessment is required to be “the best available scientific and commercial information.”<sup>30</sup> The process is carried out in accordance with the *Administrative Procedures Act* with proposed and final rules noticed and published in the *Federal Register*, opportunities for public submission of comments, and the agencies' responses to comments.

While a species is on the *List*, using the same process it may be changed from endangered or threatened (‘downlisted’) or from threatened to endangered (‘uplisted’). The same process is also used to determine if a species should be removed completely from the *List*. Regulations provided three possible reasons for a determination that a species should be removed from the *List*. USFWS explained “our regulations... identify three reasons why we might determine that a listed species is neither an endangered species nor a threatened species: (1) The species is extinct; (2) the species has recovered, or (3) the original data used at the time the species was classified were in error.”<sup>31</sup> When one of these three determinations is made, the species is removed from the *List* or ‘delisted.’

These regulations were changed in 2019 and the Service responded to public comments about the change stating:

We received many comments expressing concern over removing the terms “recovery” and “error” from the regulatory text because of a perception that the basis of the Services’ actions would not be clear. As is the Services’ current practice, we will continue to explain in proposed and final delisting rules why the species is being removed from the lists—whether due to recovery, extinction, error, or other reasons. These revisions do not alter, in any way, the Services’ continued goal of recovery for all listed species.<sup>32</sup>

Actual endangerment and legal endangerment are not synonymous. One is reality and another is a legally guided assessment of reality that is supposed to use the best available scientific and commercial data available. The data or the assessment of it may be wrong. While there are provisions for removal of species that were added to the list based on erroneous data, and some species have been removed on this basis, a significant number that may not or do not merit listing remain listed.<sup>33</sup>

Some still-listed species that may not merit endangered status were added to the *List* based on erroneous data that underestimated the species’ population or range. For example, when the Hind’s emerald dragonfly was added to the *List*, the rule doing so reported that it was present at only seven small sites in Illinois and at six sites in Wisconsin. Subsequently, USFWS reported that this insect was found in Illinois, Iowa, Michigan, Missouri, and Wisconsin, and at almost ten times the number of sites.<sup>34</sup>

Other listed endangered species may be listed on erroneous taxonomic information. For example, *Echinocereus reichenbachii* var. *albertii*, a cactus variant of the species *E. reichenbachii*, was listed in 1979.<sup>35</sup> USFWS subsequently reported that the taxonomic boundaries of the cactus species *E. reichenbachii*’s varieties were viewed by one expert as “nebulous and controversial.”<sup>36</sup> According to an online database called the Integrated Taxonomic Information System (ITIS), this listed cactus variant is invalid.<sup>37</sup> The database is managed by US, Canadian, and Mexican agencies including the USFWS, USGS, National Park Service (NPS), US Department of Agriculture (USDA), National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA), National Aeronautics and Space Administration (NASA), and NatureServe, and reports that it provides “authoritative taxonomic information on plants, animals, fungi, and microbes of North America and the world.”<sup>38</sup>

Species may also be listed or considered for listing as endangered based on overestimated threats. For example, USFWS is now considering adding the well-known monarch butterfly to the *List* noting, “based on the past annual censuses, the eastern and western North American migratory populations have been generally declining over the last 20 years.”<sup>39</sup> Whether this decline

actually means the species is ‘endangered’ is highly debatable. The International Union for the Conservation of Nature (IUCN) reduced its assessment of the threat to the butterfly after being challenged. While there is agreement that the number of monarchs has declined, it may have declined from a high number *that resulted from clearing of land for farms hundreds of years ago*.

The Journal *Science* reported upon the contention that monarch “populations were anomalously high decades ago thanks to large-scale clearing of forests for agriculture in the 1800s. The resulting open landscapes allowed milkweed and monarchs *to flourish until the land shifted back to forest or intensive farming* [emphasis added].”<sup>40</sup> By the mid 1800’s the amount of forest cover in Massachusetts, for example, had been reduced to about 35%.<sup>41</sup> With more forest converted to open fields, milkweed that grows in sunny areas but in not in forests likely increased dramatically and, monarchs, that are dependent upon milkweed, likely did too. Over the last century, a remarkable regeneration of forest on these former farm fields occurred in the northeastern US. Today, forests cover about 60% of Southern New England including Massachusetts, and while this undoubtedly reduced the acres where milkweed plants could grow and host the monarch butterflies that feed upon them, it provided massive additional habitat for other species like the black bears that are booming.<sup>42</sup>

Without context, a quoted number of listed ‘endangered species’ can appear daunting. For example, there are 98 different insects on the *List*.<sup>43</sup> Over a dozen of these are beetles, five being just different kinds of tiger beetle.<sup>44</sup> While these may seem to be large figures, for context, there are reportedly “2300 currently described species [of tiger beetle] found across the globe,” never mind the much larger numbers of different species of beetle and insect in North America.<sup>45</sup>



The federally threatened northeastern beach tiger beetle is one of tens of thousands of different beetles in North America. Photo by Susi von Oettingen, courtesy USFWS.<sup>46</sup>

## V. ‘Never Enough Time’ – A Snail’s Tale

Before looking at the ESA’s record of recovery, addressing the oft repeated notion that recovering endangered species ‘takes time’ is merited. For example, a former USFWS Director wrote in the USFWS’s biannual Report to Congress on the Recovery Program that “it takes time to reverse declining populations and pull species away from extinction risk...”<sup>47</sup> Such statements are often made alongside examples of how species’ generation times vary and can, in cases, be lengthy, as can be the time required to establish habitat. For example, USFWS reports that gopher tortoises require between 9 and 20 years to reach reproductive maturity, and further that, “ongoing and planned [gopher tortoise] restoration efforts will take time (i.e., years) to achieve the desired vegetative community structure. Any behavioral or demographic response by tortoises to habitat manipulation will also take time.”<sup>48</sup> While such lengthy times are applicable to some listed species, they are not applicable to all. For example, in 2006 USFWS added 11 fly species found on endangered Hawaiian plants to the *List*.<sup>49</sup> Unlike the tortoise, these flies generally breed year-round with egg laying and larval development increasing “following the rainy season as the availability of decaying matter, which the flies feed on, increases in response to the heavy rains.”<sup>50</sup> The flies generally “lay between 50 and 200 eggs in a single clutch” and the eggs develop into adults in about a month, and adults generally become sexually mature one month later.<sup>51</sup>

Congress recognized the requirement of time in the ESA’s provisions regarding species’ recovery plans. These provisions require “estimates of the time required... to carry out those measures needed to achieve the plan’s goal and to achieve intermediate steps toward that goal.”<sup>52</sup> In fact, from 1990 through 2014, USFWS included in its biannual Report to Congress an “estimated years to recovery” for each species as taken from the species recovery plan. Although the reported values were, more often than not, either “unknown” or “not applicable” because there was no recovery plan, the 2013–14 Report to Congress listed just over 60 species with 10 or fewer years to recovery.<sup>53</sup> A decade later, only four of these have been delisted with one being officially delisted on the grounds of erroneous data.

One species reported to have just three years required for recovery in the 2014 Report to Congress was the Iowa Pleistocene snail. This snail was added to the *List* four and a half decades ago.<sup>54</sup> As of November of 2023, it remained listed, and USFWS had not proposed a regulation—which in and of itself can be a lengthy and expensive process—to remove this snail from the *List*.<sup>55</sup>

The snail is one of perhaps 1,200 North American *terrestrial* gastropods (snails and slugs) north of Mexico.<sup>56</sup> The species’ recovery plan notes that the snail “is of particular interest because it is a glacial relict” and that the snail’s

major long-term cause of decline is cyclic climatic change. The species has survived several such cycles in the past, however. *With a return to glacial conditions* it will be resuscitated over a major part of the upper Midwest, provided its relictual areas are preserved and maintained (emphasis added).<sup>57</sup>



When adding the species to the *List*, USFWS noted, that the Iowa Pleistocene snail is “now known *only from a cave* in Bixby State Park, Clayton County, Iowa” and, ominously, that “a new footpath cuts through the habitat and the park is heavily vandalized” (emphasis added).<sup>58</sup> It also cited only one population estimate for the snail, stating “probably *fewer than 100* live individuals exist” (emphasis added).<sup>59</sup> The species was believed to be so imperiled that “an ardent collector in the process of turning over the rocks, could destroy it, and thereby the species, in one afternoon.”<sup>60</sup> The threats serving as the basis of listing the snail were this presumed lone, miniscule population susceptible to just a single, hypothetical, “ardent collector,” and a one sentence mention of a generalized threat in the general area, “the spraying of 2,4,5-T, a defoliant... to convert forest and brushland into pasture for livestock.”<sup>61</sup>

Subsequently, many more snails were discovered. There are now reportedly some 38 Iowa Pleistocene snail locations, with at least 22 occupied.<sup>62</sup> This estimate is for the *known* sites for a 6–8 millimeter snail (less than half the diameter of a dime), with a brownish or greenish-white shell that lives under leaf litter on slopes *when* it is above ground. USFWS also reports that it has identified 71 sites (slopes) that have the type of habitat used by the snail.<sup>63</sup> Just how easy would it be to miss this minuscule, often hidden, unremarkable looking invertebrate? It is apparently easy enough to do that an expert quoted in the listing notice thought there was only one, exceptionally small population. Even species that are far more obvious, such as a population of 125,000 gorillas, have been missed by experts.<sup>64</sup>



Reportedly numbering perhaps fewer than 100 snails when added to the *List*, Iowa Pleistocene snails were subsequently estimated to number in the hundreds of thousands following discoveries. Photo courtesy Iowa Department of Natural Resources.<sup>65</sup>

The change in total population from the time this tiny snail was listed is even more pronounced, with USFWS reporting “past surveys suggest that snail abundance on the various occupied slopes ranges from 50 up to 205,000 *individuals per colony* or slope” (emphasis added).<sup>66</sup> Just one colony at this upper end of the range is over 2,000 times the figure reported when the snail was listed.

The threats noted to the snail have changed somewhat since listing as well. The Service concluded that the threat of “pesticide or other chemical contamination from agricultural crop fields into the upland sinkholes is not a *direct or indirect threat* to the snail,” reducing the hazy threat mentioned at the time of listing (emphasis added).<sup>67</sup> More recently, USFWS added climate change as a possible threat. This new possible threat is despite USFWS noting that the species has “survived many interglacial warming periods during the Pleistocene Epoch and other warming or drying periods during the Holocene Epoch so we should recognize the species['] resilience.”<sup>68</sup> With regard to another new possible threat from invasive species, USFWS states that invasive plant species “may impact” Iowa Pleistocene Snails and notes competition from these invasive plants *might* be resulting in the decline of “suitable” snail “forage species” at *some* snail sites.<sup>69</sup>

Unquestionably, however, the biggest threat to the snail identified by USFWS remains trampling of snail habitat. This results from *monitoring and studying the snail and its habitat*, and possibly from hikers and educational programs. According to USFWS, “recreational hiking, educational programs, *scientific investigations and research, and population monitoring* are all sources of trampling and habitat disturbance” (emphasis added).<sup>70</sup> USFWS reports at least 84 different monitoring efforts across the 38 sites between 1980 and 2015.<sup>71</sup> The recovery plan notes one snail colony suffered 60% attrition in two years’ time “due mostly to scientific activities such as snail sampling, plant collection, and temperature/humidity data collecting.”<sup>72</sup>

While of the now over three dozen snail locations, USFWS noted by 2009 that “24 colonies [are] in some form of protected ownership” (owned by or having easements on them owned by federal, state, county or non-profit organizations), the snail is reportedly still not sufficiently secure to delist.<sup>73</sup> USFWS reported that same year that easements of and owned snail habitat are reportedly insufficient to consider the species for delisting as 13 of these sites need “*additional buffer areas*” (emphasis added).<sup>74</sup> The buffers are needed to eliminate threats to sinkholes that provide the relictual snail’s microclimate habitat and for protection from “adjacent land uses such as row crop production” (emphasis added).<sup>75</sup>

After almost a half century of being listed, with more than ten times the number of locations and thousands of times the population discovered, with 24 sites being secured, and pesticides no longer a significant direct or indirect threat, now there are new ‘possible’ hazy threats of climate change and invasive species and, USFWS just needs more buffer zones. While the snail’s wide-spread general resuscitation is apparently dependent on the next ice age, its legal recovery appears to work at a similarly glacial pace. That more time is really needed or that the snail is or ever was on the brink of extinction is at least questionable.

In USFWS’s first Report to Congress more than three decades ago, the Service stated “a commitment to endangered species recovery *is needed for a long time* to allow for noticeable results” (emphasis added).<sup>76</sup> At that point, the ESA had been law for not quite two decades. USFWS ceased reporting “estimated years to recovery” after the 2014 Report to Congress. It has now been nearly a decade since then, and a half century since the ESA became law.

## VI. Measures and Claims of the ESA’s Success

To ask whether the ESA is working in its current form is not to assert that there are not real endangered species or that some listed endangered species have not benefitted from ESA actions. For example, the few remaining California condors were gathered from the wild by 1987 and a captive breeding program was undertaken. Subsequently, the bird’s numbers in the wild went from a low of 22 in 1983 to 350 by 2022, and there is a captive population of 214.<sup>77</sup> This successful effort was implemented despite early opposition from many environmental organizations including the Audubon Society. Some argued for “Death with Dignity”—allowing the condor to go extinct in its natural environment.<sup>78</sup>

Similarly, the black footed ferret was so rare that by the 1950’s it was presumed extinct.<sup>79</sup> A wild population was discovered in 1964 and used to establish a captive breeding population. Unfortunately, the captive breeding population was lost following an unsuccessful attempt to vaccinate the ferrets against canine distemper, and the wild population died out as well.<sup>80</sup> A second wild population was discovered in 1981 when a dog returned to a ranch home with a fresh ferret in its mouth.<sup>81</sup> From the newly discovered population, another captive breeding program was established. USFWS reported that as of 2019, 13 of the 29 sites where captively bred ferrets had been reintroduced remained active, and there were some 325 adult ferrets while ferrets at six captive breeding facilities numbered 301.<sup>82</sup> The conservation challenges with ferrets are huge, as in addition to a significantly limited gene pool, likely the gravest threat to the small predator is plague. The organism that causes plague is carried by fleas and has wreaked havoc on prairie dogs, the ferret’s prey, and the ferrets directly. The bacterium causing plague has spread in rodent populations from California to at least 15 additional states after being introduced from China around 1900.<sup>83</sup>



Left: A condor and chick in a nest cave near Hopper Mountain National Wildlife Refuge. Created by Joseph Brandt. Courtesy USFWS.<sup>84</sup>

Right: A black footed ferret. Created by Ryan Hagerty. Courtesy USFWS.<sup>85</sup>

Other species that have benefitted include manatees that have increased substantially in number following conservation activities such as establishment of boating rules and boater education that has reduced collisions.<sup>86</sup> Nelson’s checker-mallow, a plant, has benefitted from dozens of new populations established by seeding or transplant. Meanwhile, the Apache trout has benefitted from fish reared in hatcheries and translocations.<sup>87</sup> There are clearly ESA conservation efforts that have improved the condition of a number of listed species. These anecdotal accounts, however, do not provide a sufficient measure of the ESA’s programmatic effectiveness.

### **A. Has the ESA really ‘Saved 99% from Extinction’?**

According to the USFWS, the ESA, “*has been highly effective and credited with saving 99% of listed species from extinction*”<sup>88</sup> (emphasis added). This claim, however, incorporates numerous assumptions that make it an unreliable measure. For example, the 99% claim assumes that listed animals or plants were accurately determined as endangered at the time of listing and are taxonomically valid.<sup>89</sup> As will be subsequently shown, these are unreliable assumptions. Some appear to assume that listed species are persisting simply *because* they were included on the *List*. This is akin to presuming that because a patient filled out an admittance form to a hospital and no death certificate has been issued, his or her condition somehow measurably improved.

When Penland's beardtongue was added to the *List*, the plant was believed to number approximately 5,000 while the Heliotrope milkvetch, another plant, was believed at the time of listing to number 10,500.<sup>90</sup> Subsequently, survey estimates for Penland's beardtongue ranged from 12,000+ to 1.2 million.<sup>91</sup> For the Heliotrope Milkvetch, "USFWS estimated 200,000 individuals in 1995," "Franklin (2005) estimated... 2 million individuals," and "McCormick et al. (2018, 2019) estimates 400,000 to 2 million individuals."<sup>92</sup> These species remain listed as they have been for over three decades. It is certainly questionable that being listed 'saved' them.

Other species have been added to the list and been subsequently determined to be invalid taxons like Johnson's seagrass.<sup>93</sup> NMFS listed this plant found off Florida's shores in 1998. However, by no later than 2002, NMFS had information indicating this seagrass was possibly no different from another species found in the vast tropical waters of the Indian and the western and central Pacific Oceans.<sup>94</sup> Numerous studies and two decades later, NMFS finally delisted the species as an invalid taxon, concluding 'Johnson's seagrass' off Florida's coasts was "a single female clone" of the Indo-Pacific species.<sup>95</sup>

When listing the species, one of NMFS's reviewers stated, "While it is important to clarify the taxonomic status of the species, *it is not an issue that needs to be resolved before listing*" (emphasis added).<sup>96</sup> NMFS's 2002 designation of critical habitat for 'Johnson's seagrass'—that included *thousands of acres in Biscayne Bay from Miami to North Miami*—mentions a genetic study that found two populations were "distinguished by a higher index of genetic variation."<sup>97</sup> Just how high the genetic variation could have been given they were clones—the same document noted "large clones of mature female plants flower prolifically"—would seem questionable.<sup>98</sup>

Upon delisting the species NMFS provided responses to 'frequently asked questions.' It stated that the Indo-Pacific seagrass was not an invasive species because it "is a long-established species in southeastern Florida" and "provides ecological services consistent with other seagrass species in the environments in which it is found."<sup>99</sup> USFWS likewise took twenty years to delist the 'Arizona agave' even though the US Forest Service opposed the listing and petitioned USFWS to delist the plant the year after it was listed because it was a hybrid (See Data Table 2 in the appendices).

It is simply not reasonable to assume that species on the list are being 'saved' by the ESA and given how slowly the agencies have moved to correct clear mistakes, the assumption that there is veracity to all federally designated "endangered species" is not well founded.

## B. Abandoned Measurements in the Report to Congress on the ESA's Recovery Program

As reported by an article in *Frontiers of Conservation*:

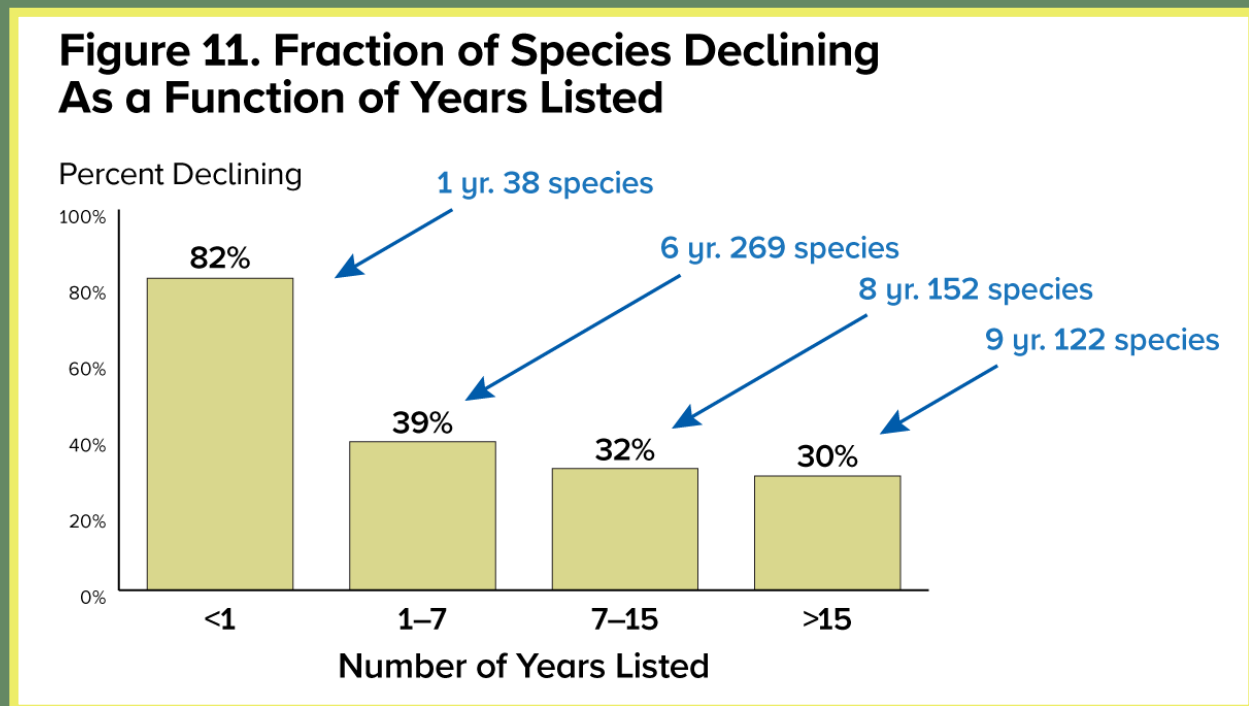
The *only government data available on the progress of listed species toward recovery* were biennial reports that the Services (i.e., USFWS and NOAA) submitted to Congress. These reports provided a 2-year status update on each species; however, *these reports were terminated in 2012* (emphasis added).<sup>100</sup>

The referenced “2-year status update” was included in the same report that formerly included an “estimated years for recovery.” These reports were and are produced pursuant to 1988 amendments to the ESA that require a report regarding the recovery program to be submitted to Congress every two years.<sup>101</sup> The report is supposed to include information “on the status of all species for which such [recovery] plans have been developed.”<sup>102</sup> Previously, for these reports, both the USFWS and NMFS assigned and reported a ‘status’ value for each species. USFWS reported whether each species was assessed as “improving,” “stable,” “declining,” “unknown,” or “presumed extinct.” The USFWS’s first report was produced in 1990 and included this data, which the Service continued to report until 2012. The report was not “terminated” as the referenced article reports, but after 2010, USFWS began substituting other data for the “status” of each species as will be addressed below.

USFWS similarly abandoned reporting another measurement of the endangered species’ program that had been included in the Report to Congress. That measurement, “recovery objective achieved,” assigned each species to a quadrant (e.g. 0–25%, 26–50%, 51–75%, and 76–100%) to indicate a species’ progress towards recovery. This measure was discarded by the Service after the 2006 Report to Congress.<sup>103</sup>

In the Service’s last report providing the species status data, USFWS stated that the measurement “...is not a long-term trend, and thus does not necessarily reflect progress toward recovery. We have found that this information is often misunderstood or misused.”<sup>104</sup> This ‘misunderstanding or misuse’ perhaps includes a Congressional Committee report revealing a rather unencouraging record.<sup>105</sup>

Rather than explaining how the metric was “misunderstood or misused,” USFWS chose to abandon it. However, before doing so, the Service reported on the metric in a manner that appears directly at odds with the Service’s above statement. In its first Report to Congress in 1990, USFWS included a graph entitled *Fraction of Species Declining as a Function of Years Listed*.<sup>106</sup> Explaining the graph, USFWS stated “species listed longer appear to have a better chance of becoming stable or improving.” The artful graph has four step-like columns that do *appear* to support USFWS’s statement. However, the columns represent, without explanation, species that have been listed for varying intervals of time: 1, 6, 8, and 15 or more years and, consequently, each column also represents significantly differing numbers of species. This construction *only seems to make sense* if the goal was to *make it appear* that the longer a species is listed the better its chances of being stable or improving. It does not, however, actually do so.



USFWS’s 1990 figure (blue data added) purported to show that “species listed longer *appear* to have a better chance of improving or becoming stable”(emphasis added). The last column includes species listed under the preceding endangered species law. The Service later quit including this data in its Report to Congress.

NMFS still reports a status value for species. In its 2018–2020 report, the agency indicated the status of the 99 endangered or threatened species for which NMFS’s recovery plans have or will be developed. NMFS reported 25.3% of these species were “stabilized or increasing,” 11.1% were “declining,” 17.2% were “mixed” “with their status varying by population location,” and 46.5% were of “unknown” status.<sup>107</sup> Reviewers of the report are left with little information about 64% of species (the unknown and mixed). If NMFS can report declining species, can it not report increasing species rather than blending them with stable species? If NMFS cannot provide more precise assessments, can it effectively manage the program? It is more than USFWS provides but leaves much to be desired.

Unfortunately, USFWS chose to simply cease reporting “species status,” something described by others as “the only government data available on the progress of listed species toward recovery.”<sup>108</sup> Along with “recovery objective achieved” that USFWS also stopped reporting, the data provided some programmatic measures of progress towards the goal of recovery for listed species. It is therefore worth asking: *why would officials presumably engaged in a science guided program cease reporting data that had been collected and reported for over two decades? If the status data revealed the program had positive results as the Service contended in 1990, why would the USFWS eliminate it? For a program of this size and importance, how is it reasonable to fly blind by ceasing to report the status of listed species as well as the estimated costs and estimated times needed for recovery?*

In various versions of its report, USFWS instead began providing other program measurements that are of dubious value at best. For example, the reports now include the number of actions from a species’ recovery plan that have been implemented. This is a near useless statistic regarding *bureaucratic outputs* rather than *outcomes for the species*.

Comparing two listed frogs, the California red-legged frog and the golden cocqui, reveals how little value this measurement provides. The 2020 Report to Congress indicates that 39 and 3 recovery actions have been implemented respectively for these frogs.<sup>109</sup> The report from 2010—a decade before—is almost identical, 38 and 3 actions respectively.<sup>110</sup> The nearly four-decade old plan for the golden cocqui is just 12 pages, while the plan for the California red-legged frog is 173 pages and has a ten-page spreadsheet of more than 100 enumerated actions.<sup>111</sup>





The reported “recovery actions implemented” for the California red-legged frog only increased from 38 to 39 between the 2010 and 2020 Report to Congress. Photo courtesy USFWS, created by Ashley Spratt.<sup>112</sup>

The 2010 Report to Congress—which still reported a species’ status, reveals the golden cocqui was “presumed extinct” by that time.<sup>113</sup> While one could not discern this from the most recent Report to Congress, it explains *why* there has been no change in the three recovery actions over a decade. Rather than reporting that the species is believed extinct, the 2020 Report to Congress simply states “no change” for the golden cocqui.<sup>114</sup> The 2020 Report to Congress indicates “not applicable” for the California red-legged frog with regard to recommendations for changing the species’ listing status.<sup>115</sup> It sheds no light as to why the “recovery actions implemented” for the red-legged frog have crawled from 38 in 2010 to 39 a decade later. This information is of no value to anyone.

Some recovery plans are voluminous, highly detailed and have lengthy lists of enumerated actions while others are not. For example, the recovery plan for the Valley Elderberry longhorn beetle has five recovery actions and a reported cost of \$4.4 million, while the plan for endangered bull trout distinct population segments has 771 actions and implementation schedules for six different areas, or “recovery units,” and anticipated costs of \$1.5 billion plus.<sup>116</sup>

Some recovery plans are contemplated as being implemented over many decades while others are for a shorter duration or essentially have interim goals. Additionally, recovery plans are not mandatory, and the implementing agencies may pick and choose which actions to implement, allowing them to adapt their actions. Some plans may be long out of date and eclipsed by more recent information. USFWS's own statements make clear that the number of recovery plan actions implemented that it reports is a meaningless metric:

Recovery plans *provide guidance* to the Service... on ways to minimize threats to listed subspecies, and on criteria that *may be used* to determine when recovery goals are achieved... recovery may be achieved *without fully meeting all recovery plan criteria...* *new recovery approaches and/or opportunities unknown at the time the recovery plan was finalized* may be more appropriate ways to achieve recovery. Likewise, *new information may change the extent that criteria need to be met* for recognizing recovery of the subspecies. Overall, *recovery is a dynamic process requiring adaptive management*, and assessing a subspecies' degree of recovery *is likewise an adaptive process that may, or may not, fully follow the guidance provided in a recovery plan* (emphasis added).<sup>117</sup>

When USFWS eliminated the “species status” measurement after 2010, it also began reporting the “status review recommendation.” This information was taken from another type of report called a five-year review or other reviews. As the reports to Congress cover two-year periods and five-year reviews cover five-year periods (if completed on time), this change reduced the potential data points for each species. Moreover, this metric simply indicates whether USFWS has concluded a species should be changed from endangered to threatened or vice versa, or be removed from the *List* because of erroneous data, extinction, or recovery. This measure does not indicate *why* these rare regulatory changes are recommended.

In its most recent (2020) Report to Congress USFWS states:

Of the 1,388 status reviews completed, *93 percent* (1,294) recommend no change in status for the species, 3 percent (40) recommend reclassifying from endangered to threatened, 3 percent (38) recommend delisting (22 due to extinction, 13 due to recovery, and 3 due to error), 1 percent (13) recommend reclassifying from threatened to endangered, and less than 1 percent (2) recommend a revision to the listed entity (emphasis added).<sup>118</sup>

USFWS's data reveals 96% of the species it is responsible for have either have no regulatory change recommended or have no status review (84%, 12% respectively).<sup>119</sup> Consequently, for 96% of the species covered by the report, there is virtually no information by which to judge the effects of the program on the species.

Of the 1,586 species covered by USFWS's 2020 Report, only 91 species are reported as having a recommendation for a change to the species listing 'status.' This included 53 recommended for delisting on the basis of recovery or downlisting to threatened. These actions would indicate positive developments *as long as* they are not attributable to data error. The 2020 Report reveals 38 other species for which the recommendation is uplisting or delisting based on extinction or data error. These outcomes indicate either a higher threat assessment, the converse of recovery—extinction, or wasted resources. The 53 possibly positive recommendations cover only 3% of the species covered by the report, scant data for measuring the program.

More importantly, USFWS data indicate that *at least* 23 of the 53 species (more than 40%) that were recommended for delisting as “recovered” or downlisting, had numbers, populations or a range that was substantially underestimated and/or threats that were overestimated at the time of listing. These include the Cumberland sandwort, Etonia Rosemary, *Mitracarpus polycladus*, and Northeastern bulrush, all plants, and a fish, the tidewater goby.

When the Cumberland sandwort was listed there were five known occurrences but subsequently USFWS reported 71.<sup>120</sup> Similarly, the Etonia rosemary went from two sites at the time of listing to 11, and there was a 22% increase in the known number of plants.<sup>121</sup>

Data subsequent to listing showed *Mitracarpus polycladus* went from an “undetermined number of plants located in a single population” to “3 populations... with more than 20,000 adult individuals in 11 localities in southern Puerto Rico and multiple localities on Saba Island and Anegada Island.”<sup>122</sup>

Likewise, data gathered subsequent to listing of the Northeastern bulrush showed the proposed listing report of “twelve extant populations [that] are extremely small, each having less than 70 flowering clumps” in just six states—less than one thousand total plants, was incorrect as well.<sup>123</sup> According to the Service, “the species is now known from 148 extant populations in 8 states... Increased survey effort since listing is likely the primary reason for the increase in the number of known populations.”<sup>124</sup> At least 13 of these populations “had 1,000 or more stems, 34 had at least 251–1000 stems, and 36 had 51–250 stems.”<sup>125</sup>



After the tidewater goby was listed, the fish was discovered to occupy more than twice as many localities. Photo courtesy USFWS, created by Sarah Swenty.<sup>126</sup>

As for the tidewater goby, when listed, USFWS reported that only 48 of the 87 localities where the goby *had been known to historically occur* were known to be occupied.<sup>127</sup> Subsequently, the Service reported that *more than double the number of localities where the fish had been historically known to occur*, 114, were currently occupied.<sup>128</sup>

*Eighteen other species* that were recommended for a delisting or downlisting status change in the Service’s 2020 report are addressed in subsequent sections and tables.<sup>129</sup> They have similarly discouraging stories.

## VII. “Recovered” Species

With a half century of implementation, any presumption that the ESA is working as it should, is clearly in need of scrutiny. When the USFWS abandoned the collection and reporting of biannual status data for listed species (as well as the measure of the percent of recovery achieved), it eliminated a measure of the effect of the ESA program on listed species. The obvious, best and available measure of meeting the ESA’s conservation goal are those species that have ‘checked out’ of the hospital ER—species that have been officially delisted as recovered.

As addressed, USFWS had explained that its prior “regulations... identify three reasons why we might determine that a listed species is neither an endangered species nor a threatened species: (1) The species is extinct; (2) the species has recovered, or (3) the original data used at the time the species was classified were in error.”<sup>130</sup> When one of these three determinations is made the species is to be delisted.

The first of the three reasons for delisting a species, extinction, is self-evident.

The third reason for delisting is ‘original data error.’ It is the recognition that, except for the erroneous information used in making the determination that a species was endangered, the species would not have been added to the *List*. When it is discovered that erroneous data led to an inaccurate determination that a species was endangered, the species should be delisted on the basis of original data error.

The second reason for delisting a species is that the species has recovered. Under the ESA, when a species’ actual status improves so that it is “no longer in need of the protections afforded by the Act,” it has met the ESA’s definition of being conserved and is to be delisted as “recovered.”

That delisting on the basis of recovery is the ultimate measure of the ESA is clear given the laws’ definition of endangered species conservation is recovering an animal or plant to the point it no longer needs to be on the *List*. It is a measure that the Department of the Interior and USFWS have pointed to as well.

According to *The Washington Post*, in 1998, then Secretary of the Interior Bruce Babbitt announced that “many species would be flying, splashing, and leaping off the list.” The announcement was reportedly “intended in part to blunt criticism from congressional opponents who complain that endangered-species laws don’t work.”<sup>131</sup> The *Post* reported that over two dozen “...formerly threatened animals and plants are likely to be declared fully or partly recovered within two years in what officials describe as the biggest such “de-listing” since the Endangered Species Act was adopted 25 years ago.”<sup>132</sup>

The announcement was, in fact, a PR blunder. It appears a Department PR official confused a list of plants and animals that should be delisted as representing a list of species that had been recovered and could therefore be delisted.<sup>133</sup> The two are not the same. The announced species that would purportedly demonstrate that the law works by “flying, splashing and leaping” off the list included the Mariana mallard and Oahu tree snail(s) that are believed extinct; the Dismal Swamp southeastern shrew, Lloyd’s hedgehog cactus and Truckee barberry that were delisted in subsequent years on the grounds that the original data were in error; the Virginia round leaf birch—that appears to be taxonomically invalid, and numerous other species for which listing data was grossly in error. The latter included Hoover’s woolly star, the Island night lizard, the heliotrope milk vetch, Missouri bladderpod, running buffalo clover, tidewater goby, Tinian monarch, and Virginia northern flying squirrel. With the exceptions of the tidewater goby and Heliotrope milkvetch that have already been addressed, all of these other species are subsequently addressed in the text or tables and are clearly not exemplars of successful conservation activity. More than twenty years after this mistaken PR announcement, *more than a dozen of the species* that were ready to “fly, splash or leap” off the list in 1998 are still stuck there.<sup>134</sup>



The Virginia round-leaf birch's status as a unique species is dubious. Photo courtesy USFWS.<sup>135</sup>

About a decade and a half later, *Nature* similarly announced that “U.S. endangered-species recovery surge to record high.”<sup>136</sup> *Nature* reported that “more species protected by the US Endangered Species Act (ESA) have recovered during President Barack Obama’s administration than under all other presidents combined...” *Nature* quotes an official from the Center for Biological Diversity, who states the increase in delistings “also reflects the fact that the Obama administration has been putting more resources into processing delistings for recovered species, in an effort to counter attacks from Republicans in Congress who say the law has a poor success rate.”<sup>137</sup>

USFWS continues to point to recoveries as a measure of the ESA. The Service has regularly highlighted species it has delisted as officially ‘recovered’ in the USFWS’s Report to Congress. One former USFWS Director stated in 2014 “the fact that, to date, 34 species have successfully recovered and no longer require federal protection in just over four decades is *remarkable* progress” (emphasis added).<sup>138</sup>

Similarly, in the 2020 Report to Congress, the USFWS Director states:

During these four fiscal years, the Endangered Species Act (ESA) achieved some *remarkable* successes by bringing state, federal, and private partners together. This included the recovery and delisting of 14 species once threatened with extinction... (emphasis added).<sup>139</sup>

These fourteen species, with the exception of two foreign parakeets, will be subsequently addressed, and for most, the reality is much less encouraging than the accolades.<sup>140</sup>

### A. Analysis of Species “Recovered” after 50 Years of the ESA

For a determination that a species no longer merits inclusion on the *List*, some new information is necessary to change the original assessment. This could, for example, be information that reveals the population and/or range of the species has increased or that the population and/or range considered at the time of listing was in error. The threats assessed as leading to the endangerment of the species could have actually changed during listing or the original assessment of these threats could have been in error. New taxonomic information could indicate that the species is not as it was understood to be at the time it was listed. The new information could be as simple as that with the passage of time and no observations or other evidence of a living specimen, the species is presumed to be extinct. In short, something has to have changed between the original assessment of endangerment and the subsequent determination that the original assessment is no longer valid.

This review considers all the species that have been delisted as officially “recovered” and provides an assessment of which of the reasons for removal from the list is most fitting for each. All delisted species that USFWS or NMFS determined to be “recovered” are included in Table 1. These species were taken from USFWS’s ECOS list of “Delisted Species” on November 1, 2023. To this count, the Cumberland sandwort, a plant, that was delisted in 2021 but not included in the retrieved USFWS data is included. In addition, species proposed for delisting on the basis of recovery were added to this table. These species were taken from USFWS’s ECOS list of “Species Proposed for Status Change or Delisting” on November 2, 2023.<sup>141</sup> The table includes the common and scientific name of the species, the dates of the species’ listing and delisting (or proposed delisting), years on the *List*, what group the species belongs to (i.e., bird, plant, etc.), and the official reason for the delisting. Additionally, Table 1 includes a column entitled “accurate attribution” for the delisting (either agreeing with “recovery” as reported by USFWS/NMFS or reporting an assessment made herein that the actual reason for the delisting was likely original data error).

In assessing the accurate attribution for a delisting, the approach was to consider whether given the new information used in determining a species as ‘recovered,’ would the original determination of endangerment likely have been valid. For example, a species may have been determined to be recovered because the perceived threats to the species were considered no longer significant as the known population of the species is much greater than when the species was listed. If the population change actually occurred between listing and delisting, then the species delisting could be accurately attributed to ‘recovery.’ However, if the change in population resulted primarily from the discovery that the original estimated population was in error, then the species delisting would be more accurately ascribed to original data error. At the bottom of Table 1, twelve species proposed for delisting on the basis of recovery are included along with the same information. A final column in Table 1 (and in other tables) may include notes bearing upon the assessed “accurate attribution” and, in cases, various additional information of interest.

The documents primarily relied upon to assess why a species was delisted are available by hyperlinks on each listed species’ ECOS profile. Species that are focused upon in this report are bolded in the endnotes followed by a link to the species’ ECOS profile.<sup>142</sup> The documents included proposed and final *listing* and *delisting* notices, five-year-reviews (*FYR*), species status assessments (*SSA*), and recovery plans (*RP*). Documents available on the ECOS profile are simply cited as indicated above in italics, for example, “USFWS, Iowa Pleistocene snail listing” followed by a hyperlink. These or other similar documents can also be retrieved by accessing ECOS, searching a species by common or scientific name, and then selecting the relevant link.

In addition, species officially delisted on the basis of original data error are listed in Table 2, species delisted as presumed extinct are in Table 3, and selected species that have been downlisted for which original data error is likely the reason for the downlisting are included in Table 4.

The official data error species on Table 2 were drawn from the list of all delisted species referenced above. The Tumamoc globeberry and *Adiantum vivesii*, plants that were delisted on the basis of original data error but not included on the list retrieved from ECOS, were added. Additionally, the Chorro shoulderband snail was also added to the table. This snail has been handled in a rather unique manner by USFWS. The snail was believed extinct when listed, and then found to be sufficiently abundant so that it did not merit listing.<sup>143</sup> Although never removed from the *List* by rulemaking, USFWS has stated that it is not regulating the snail on the basis of a “position paper.”<sup>144</sup>



In the cases of some of the presumed extinct species in Table 3, information indicates the animal may be an invalid taxon and, therefore, might more appropriately fit on Table 2. In these cases, the “Notes” column indicates “data error.” The species included in this Table were also drawn from the aforementioned list of all delistings and the recent USFWS announcement on the delisting of extinct species.<sup>145</sup> The Service subsequently chose to reconsider delisting two species included in its recent proposal, the ivory-billed woodpecker and *Phyllostegia glabra* var. *lanaiensis*, a plant. These species are included and noted in the Table.

The downlisted species in Table 4 were drawn from the ECOS list of “Reclassified Species.”<sup>146</sup> From 63 total reclassified species, foreign species and domestic species changed from threatened to endangered were excluded, leaving 40 species. When this figure is added to the 62 officially “recovered” species, the group equals 102. This is generally consistent with USFWS’s recent press release stating “...more than 100 species of plants and animals have been delisted based on recovery or reclassified from endangered to threatened *based on improved conservation status*” (emphasis added).<sup>147</sup> Some twenty species for which downlisting is more likely to be primarily attributable to data error than “improved conservation status” are included in Table 4.



The Chorro shoulderband snail was thought extinct when listed but turned out to be so plentiful that USFWS is reportedly not regulating the snail based on a “position paper.” The snail has never been formally removed from the List. Courtesy USFWS, photo Dan Dugan.<sup>148</sup>

This analysis reveals that in a majority of the cases where a species has been officially declared as “recovered,” other data indicates that a more accurate attribution would likely have been data error. While USFWS reports 62 species as recovered, **more than half of these, 36, were likely added to the List in error.** The remaining 26 recovered species include two assessed as “possibly recovered” in the accurate attribution column. For a number of the 26 recovered species, the most important factors in these species’ recoveries were *substantially or completely independent of the ESA* as is indicated in the notes on Table 1.

The species that should have been delisted on the basis of original data error are addressed below. In numerous cases the inaccurate attribution to recovery is glaring.

### B. “Recovered” Species That Owe Their “Recovery” to Data Error

**Hoover’s Woolly-star:** This California plant was delisted by the USFWS in 2005 as a “recovered” species.<sup>149</sup> When USFWS added the plant to the *List*, the Service believed that the plant was limited to the San Joaquin Valley and surrounding foothills, it noted the threats of oil and gas development with a focus on the Naval Petroleum Reserve lands, agricultural activities, and off road vehicle use.<sup>150</sup> USFWS believed there were only 118 extant populations, that only two occurred on public land, that 92% of the populations were threatened by human activities.<sup>151</sup> *None of this, including these substantial population estimates, was close to correct.*

The plant was not imperiled by oil and gas development “because [Hoover’s woolly-star] *reoccupies* disturbed surfaces such as *well pads and pipeline rights-of-way after a period of non-use*, the species likely will continue to exist both on federally and privately owned, fully developed oil fields...” (emphasis added).<sup>152</sup>

The plant was not threatened by agricultural development as “the majority of the existing locations are located on or near hilly areas due to ongoing geological processes that create habitat essential for the species; therefore, *agricultural and urban threats* to the continued survival of [Hoover’s woolly-star] *appear to be minimal*” (emphasis added).<sup>153</sup> Additionally, as regards to the threat from cattle grazing, the Service later reported that “...observations of the... plants have shown that they are not desirable forage for livestock,” and “therefore, grazing does not constitute a serious threat to [Hoover’s woolly-star].”<sup>154</sup> USFWS found that even trampling by cattle and sheep “does not appear to constitute a serious threat” as “only 5 percent of the sites... were affected by cattle and sheep grazing activities...”<sup>155</sup> In fact, USFWS reported that “*survival was higher in grazed areas* possibly due to the reduced vegetation cover...”(emphasis added).<sup>156</sup>

The plant was not even threatened by off road vehicle use as while the rule listing the plant “... considered 15 percent of sites evaluated to have potential threats from off highway vehicles...” in reality, “most of the sites documented in the report had no threats or documented impacts because

the sites were inaccessible to vehicles.”<sup>157</sup> In fact, USFWS reported that “...light road use appears to *help maintain the presence of the species*, although the plants do not grow in the actual tire tracks” (emphasis added).<sup>158</sup>

Subsequent data revealed that about 55% of the sites where Hoover’s woolly-star occurred were owned by the Bureau of Land Management, the US Forest Service or were properties where the federal government owned the mineral rights.<sup>159</sup>

Surveys conducted after listing “resulted in a dramatic increase in the number of Hoover’s woolly star known populations, the size of its topographical and elevational range distribution, and a clearer understanding of its habitat associations.”<sup>160</sup> During surveys for a different plant, Hoover’s woolly star was found at an elevation 500 feet higher and in a different habitat type than it had been known to occupy. It was found in the Mojave Desert 87 miles from the closest known population, and plants were found distributed across a 100 square mile area of Edward’s Air Force Base.



One of four metapopulations of Hoover’s woolly-star was found to number 135 million, and USFWS subsequently declared the plant had “recovered.” Photo by Stephen Laymon, Bureau of Land Management, from Wikipedia.<sup>161</sup>

At Edwards Air Force Base “in 2003, 7 to 12 million plants” were found.<sup>162</sup> On BLM land a “total of 1,128 new sites” were found.<sup>163</sup> The burgeoning number of populations or occurrences, were subsequently grouped into four metapopulations. According to USFWS, at some point between 1992 and 1994, just *one* of these metapopulations had a staggering 135 million Hoover’s woolly-stars.<sup>164</sup> Not until 2003, *about a decade later*, would the plant be delisted.

When USFWS proposed to remove Hoover’s woolly-star from the endangered species list, it stated that Hoover’s woolly-star “...is more widespread and abundant *than was documented at the time of listing*, is more resilient and less vulnerable to certain activities *than previously thought*, and is protected on Federal, State, and private lands” (emphasis added).<sup>165</sup> USFWS also stated that Hoover’s woolly-star “is more resilient and less vulnerable to certain activities, particularly impacts from grazing and oil and gas development, *than was previously thought...*” (emphasis added).<sup>166</sup>

The proposed delisting notice also reports that “we conclude that, based on more complete survey data and information on the biology of the species *than was available at the time of listing*, [Hoover’s woolly-star] is not likely to become endangered within the foreseeable future throughout all or a significant portion of its range” (emphasis added).<sup>167</sup>

Clearly, the reason for the proposed delisting was that information that became available *after listing* showed that the original assessment that Hoover’s woolly-star was a threatened species was the opposite of reality, and the scope and scale of the error was enormous. USFWS’s proposed delisting cryptically recognized that the reason for delisting was error stating:

Section 4(g)(1) of the Act requires us to monitor a species for at least 5 years after delisting due to *recovery*. [Hoover’s woolly-star] is being delisted based on new information, *rather than recovery*, the Act does not require us to monitor this plant following its delisting (emphasis added).<sup>168</sup>

However, USFWS’s final delisting rule reported that it received the following comment on its proposed rule:

Recovery of [Hoover’s woolly-star] should have been the rationale for delisting, rather than the wider distribution of the species and tolerance of disturbance. *The threatened status of E. hooveri prompted the surveys and research projects* that now provide partial justification for delisting. More importantly, the listing led to actions by Federal agencies to protect the species and its habitat (emphasis added).<sup>169</sup>

USFWS boldly replied, “Our Response: *We agree* and have clarified that *the delisting is due in large part to recovery*” (emphasis added).<sup>170</sup> The rule farmed out the post-delisting monitoring to the BLM noting “at the end of the 5-year period, we may end post-delisting monitoring if information indicates that the overall status of [Hoover’s woolly-star] is secure...”<sup>171</sup>

If the reason for delisting Hoover’s woolly-star should not have been ‘original data error,’ *then nothing could meet that bar*, not even the Monito Gecko.

**Monito Gecko:** This tiny lizard graduated from the *List* in 2019.<sup>172</sup> The lizard is about an inch and a half from the tip of its snout to about where its tail begins. The Monito gecko is only found on a 37-acre rock—Monito, near the island of Mona, part of and about 40 miles west of Puerto Rico.<sup>173</sup> The island is uninhabited and difficult to access having sheer rock cliffs meeting the sea. Monito is home to a large sea bird nesting colony and was also home to a large population of introduced black rats. The gecko was added to the List in 1982. While there were many rats on the island, a survey that same year revealed *only 18* geckos.<sup>174</sup> “This threat [being preyed upon by rats] was *suspected* to be the main cause of an *apparent* population decline for the Monito gecko...”<sup>175</sup>

In 1992, the Puerto Rico Department of Natural Resources and the Environment (PRDNER), took action to eliminate the rats that might be endangering the gecko and were certainly preying on the eggs of nesting birds. While the rat population was dropping, USFWS intervened in 1993, concerned that the geckos could be killed by the poisonous bait used to control the rats. According to Garcia, Garcia and Alvarez, “the USFWS claimed that the PRDNER had not satisfied all the requirements of the Federal Insecticide, Fungicide, and Rodenticide Act... The major concern was the possibility of poisoning Monito Island geckos with anticoagulant rodenticide.”<sup>176</sup>

The same authors “conducted a study to test the effect of anticoagulant rodenticides on captive geckos. We used the Mona Island Gecko... a surrogate species because it is very abundant, lives in a comparable habitat, and is similar in size and in feeding habits to the Monito Island gecko.”<sup>177</sup> In their 22-day experiment:

...four treated and four control cages were used. Three geckos and two [blocks of poison bate] were placed within each cage. The results were not statistically analyzed since *all geckos survived the experiment*. We neither observed changes in the behavior of the geckos which might be related to poisoning (e.g. erratic movements or immobility), nor saw geckos licking or eating the pellets of poison (emphasis added).<sup>178</sup>

Uncontrolled during the imposed bait moratorium, the rat population rebounded. Rat control had to be initiated again in 1998.<sup>179</sup> Eventually, observations during visits to the island reported no rats.<sup>180</sup>

There was also really nothing more than conjecture to support the presumption that rats preyed upon the Monito gecko. According to USFWS, some of the researchers who conducted Monito gecko surveys reported “...that during their surveys, predator pressure on the gecko could not be proven and that more studies were needed to determine if rats or other predators do affect the Monito gecko.”<sup>181</sup> Similarly, the researchers who tested the effect of the rat bait on geckos report that “rats *have never* been documented preying upon geckos on Monito or Mona Island (or mainland Puerto Rico)”(emphasis added)<sup>182</sup> In fact, when USFWS first listed the lizard, it was provided comments skeptical of rat predation: “Dr. A. Schwartz doubted that rats could have any effect on the gecko or its eggs...”<sup>183</sup> USFWS recognized several years before delisting the species that “there is also no information available on the potential effect of rats on the Mona gecko... or the Desecheo gecko..., both relatively common species on the larger Mona Island and Desecheo Island. However, the *potential effect of rats... on the Mona gecko seem to be low or not significant, same as for rats on the Desecheo gecko*” (emphasis added)<sup>184</sup> For a process that is supposed to employ the best available scientific and commercial data, there *was nothing* other than conjecture to support the assumption that the Monito gecko’s “apparent population decline” was attributable to rat predation.



Monito Island, home of the Monito Gecko. A nocturnal survey for the Monito gecko was not conducted until more than three decades after the lizard was added to the *List* even though Geckos are commonly nocturnal. The post-listing nocturnal survey revealed thousands of geckos on the tiny island. Photo courtesy US Customs and Border Patrol.<sup>185</sup>

In 2014, researchers visited Monito to conduct a quick assessment of the gecko and observed that the Monito gecko was active at night.<sup>186</sup> In 2016, another survey was conducted during the day and at night. Four two-person teams observed 40 20-meter square plots, equal to more than a tenth of the island.<sup>187</sup> They observed 84 geckos while only 2 were found opportunistically during the day.<sup>188</sup> The disparity between night and day observations is most likely attributable to the fact that *the Monito gecko is predominately nocturnal*.<sup>189</sup> From this new data, USFWS reported that “the estimated number of geckos per plot from the best fit model was 73.3 geckos (Range: 1–101)...,” approaching five geckos per square meter.<sup>190</sup> From this, the Monito gecko’s total population was calculated to be “**7,661 geckos** (50 percent confidence interval: 5,344–10,590” (emphasis added).<sup>191</sup>

USFWS subsequently opined:

*It can be argued that if black rat predation on the Monito gecko was the driver for its apparent significant decline and endangered status, then the Monito gecko population numbers before rat invasion (unknown) must have been such that allowed for long-term persistence in the face of rat predation (emphasis added).*<sup>192</sup>

While that could be argued, it could be much more reasonably argued that the number of Monito geckos was actually likely much greater than believed at listing since the observations then available were conducted during the day, and the Monito gecko is nocturnal. In addition, the assertion that the population had ‘apparently declined’ is nothing more than conjecture, and it is nothing more than conjecture that the supposed cause of the ‘apparent decline’ is rat predation.

Nonetheless, USFWS announced in 2019, that it had successfully recovered the Monito gecko.<sup>193</sup>

**Foskett Spectacled Dace:** The same year the gecko was delisted, the Foskett speckled dace, a four inch minnow, was too.<sup>194</sup> Almost three and a half decades before, on March 28th, 1985, USFWS added the “Foskett speckled dace (*Rhinichthys osculus ssp.*)” to the List.<sup>195</sup> USFWS reported that the “threatened” small fish did not yet have a subspecific name (hence the “ssp” indicating it was an unnamed subspecies), but it would soon. A description (when animal or plant is given a scientific name) was “being prepared under the direction of Dr. Carl Bond, Oregon State University.”<sup>196</sup>

The threat to this presumably unique but yet unnamed subspecies and another Oregon fish listed in the same Federal Register notice included a small population and a small habitat being “extremely vulnerable to destruction or modification.”<sup>197</sup> Specifically, USFWS reported that “factors that may jeopardize the species include: ground water pumping for irrigation, excessive trampling of the habitats by livestock, channeling of the springs for agricultural purposes, other mechanical manipulation of the spring habitats...”<sup>198</sup>

Regarding the threat from cattle grazing, USFWS reported it received comments from the Nature Conservancy's Data Base coordinator in Portland "that trampling by livestock, particularly at Foscett Spring, is a detrimental factor that has resulted in a change in water flow."<sup>199</sup> However, another comment at the time of listing came from Dr. Carl Schreck of the USFWS's Cooperative Fisheries Research Unit at Oregon State University. Dr. Schreck indicated "*that fencing could create problems by allowing establishment of plants that would encroach on fish habitat*" (emphasis added).<sup>200</sup> USFWS reported that Schreck:

did not state whether or not he supported listing. Although there is obviously a difference of opinion as to the necessity to fence springs, it is clear that excessive livestock use has the potential to detrimentally affect the habitat. The measures required to maintain and/or enhance the habitat will be discussed and evaluated during development of recovery plans for these species.<sup>201</sup>

BLM acquired the property with Foscett and Dace Springs and the surrounding 161 acres in 1987 "specifically to provide conservation benefit to the Foscett speckled dace."<sup>202</sup> BLM subsequently fenced off 160 acres "to exclude cattle from both springs."<sup>203</sup>

In 1997, "the Foscett Spring estimate was 27,787 fish, and the majority of the fish (97 percent) occurred in an open water pool *located in the marsh outside of the existing Foscett Spring cattle enclosure*" (emphasis added).<sup>204</sup> The 1998 recovery plan noted that "the effects of increased plant growth on the habitat requirements of the Foscett speckled dace are unknown."<sup>205</sup>

In 2015, USFWS noted that "since the recovery plan was completed in 1998, [large aquatic plants] increased throughout the spring habitat *which was fenced to exclude cattle grazing*" and that vegetative encroachment "significantly reduced open water area" between 1997 and 2012.<sup>206</sup> In this same time frame, the "abundance [of Foscett speckled dace] declined substantially..."<sup>207</sup> By the 2005–2007 window, the fish's population measured about 3,000 compared to almost 28,000 in 1997, and USFWS noted that "the decline in abundance of the Foscett speckled dace since 1997 *is probably due to the reduction of open water habitat*" (emphasis added).<sup>208</sup> USFWS opined that "exclusion of cattle grazing improves water quality and habitat suitability, but *may have played a role in reducing the extent of encroaching aquatic vegetation*."<sup>209</sup> The later, would seem to be closely tied to "habitat suitability."

The BLM began using controlled burns of vegetation and hand excavating to create open water habitat for the fish in 2013.<sup>210</sup>



As in the 1985 listing notice, USFWS noted in the 1997 Recovery Plan, that the Foscett spectacled dace did not have a subspecies name. “The Foscett speckled dace (*Rhinichthys osculus ssp.*) is... currently being described (hence, it has not yet received a subspecific name).”<sup>211</sup> While the Service had mentioned a pending description of the fish by Dr. Bond in the listing, USFWS reported more than a decade later, in 1998, that work by Bond did not provide a formal description.<sup>212</sup>

Another decade later, 2009 genetic analysis, showed the Foscett spectacled dace and another dace were “very closely related” to one another and appeared more typical of populations than being separate species or subspecies.<sup>213</sup> Analysis of mitochondrial DNA did not reportedly “justify subspecies status.”<sup>214</sup> 2014 genetic analysis “found no evidence that the speckled dace from Foscett Spring warrant subspecies or species status.”<sup>215</sup>



When the ‘Foscett speckled dace’ was added to the *List*, USFWS reported that a description for the unnamed subspecies was in process. About three decades later, analysis found no evidence that the fish warranted subspecies status. Photo courtesy USFWS.<sup>216</sup>

In 2019, USFWS reported:

We reviewed the information provided by the peer reviewers, and conclude that the genetic analysis supports the taxonomic status of the Foscett speckled dace currently and at the time of listing, specifically that the Service knowingly listed the Foscett speckled dace as an “undescribed subspecies.” We are not seeking a change in that status, but are delisting the entity as it is currently classified... We are not pursuing a study to describe the Foscett speckled dace, but are making a decision to remove it from the Federal List of Endangered and Threatened Wildlife” (emphasis added).<sup>217</sup>

A search of ITIS for “Foscett speckled dace” reports “No Data Found.”<sup>218</sup> USFWS delisted this fish as yet another successful ‘recovery.’

**Hawaiian hawk:** Another previously ‘endangered’ species found on the islands of Hawaii, the Hawaiian hawk, was also claimed as a recovery. This bird was on the list for an endangered species law that preceded the ESA. At the time of ESA listing, the bird was believed to have a population in the low hundreds.<sup>219</sup> At the time of listing, the hawk was believed to be threatened by habitat alteration, invasive species, environmental contaminants, and its small population.<sup>220</sup> It was not.

Subsequent information indicated that “the Hawaiian hawk had adapted to occupy, and nest in, nonnative forests and had exploited nonnative prey species.”<sup>221</sup> According to USFWS “there was *no significant difference in fecundity or population growth rate between native and mixed, native and exotic, or mixed and exotic habitats*” (emphasis added).<sup>222</sup> Invasive species were also found to compose a large percent of the bird’s diet, “32 percent of the Hawaiian hawk’s diet is birds and 37 percent is small mammals of two species [*a rat and house mouse*]...; the remaining proportion of food items included *mongoose*..., insects, and unidentified prey items (some of which were *mammals*)” (emphasis added).<sup>223</sup>

As early as 1985 the hawk was estimated at 1,400 to 2,500 birds.<sup>224</sup> A 1989 study indicated 2,700 hawks and the USFWS reports this data indicated that “... Hawaiian hawks were more common than previously thought.”<sup>225</sup> A 1998 study estimated a population of 1,457.<sup>226</sup> However, new methodology applied to the 1998 study data in 2007 indicated that the population in 1998 was *actually* 3,239 hawks.<sup>227</sup>

When the bird was delisted almost five decades later, USFWS reported that new data “indicate that the Hawaiian hawk population **was**, and continues to be, stable; Hawaiian hawks use both native and nonnative habitats for breeding and hunting; the species’ range is not contracting; and there is no evidence of threat from environmental contaminants” (emphasis added).<sup>228</sup> In the same Federal Register notice published the day after New Year’s, USFWS stated, “all available data indicate that the Hawaiian hawk population had remained relatively constant over a nearly 30 year period (approximately 1980 through 2008).”<sup>229</sup> Despite this, USFWS delisted the species as “recovered.”<sup>230</sup>

**(West) Virginia Northern Flying Squirrel:** Other animal species on the mainland have been inaccurately delisted as “recovered” as well. One, the Virginia northern flying squirrel, one of perhaps 24 subspecies of the flying squirrel, *Glaucomys sabrinus*, was found to be much more plentiful than believed at listing but just not where one would assume given its common name.<sup>231</sup>

At listing, only 10 individuals had been trapped in two Virginia counties.<sup>232</sup> After listing, the Virginia northern flying squirrel’s range was found to actually occur predominately in neighboring West Virginia. That’s where most of 1,141 of the squirrels subsequently trapped in eight counties were found.<sup>233</sup> Given how difficult trapping the subspecies is, the captures indicated that the squirrel had a healthy population.<sup>234</sup> USFWS biologists dealing with the species took the uncommon step of referring to the species by their own new “common” name, the *West Virginia northern flying squirrel*.<sup>235</sup> The tiny acrobatic mammal, reportedly occurring throughout its historic habitat, was delisted in 2008 as yet another successful recovery.

**Snail darter:** This small fish was similarly undercounted, but unlike the Virginia northern flying squirrel, this species is well known from the pantheon of endangered species conflicts. The conflict between the snail darter and the construction of the Tellico Dam became emblematic of the ESA’s power when the Supreme Court ruled that Congress intended for federally endangered species to be saved “whatever the cost.”<sup>236</sup>



Listed on the assumption that there was just a single population threatened by reservoir construction, the snail darter was later found in 7 reservoirs, nine rivers and three creeks. Photo courtesy USFWS.<sup>237</sup>

When the species was listed, USFWS reported that “the Tellico Project, now under construction, would *completely inundate the entire range and only known established population of the snail darter...*” (emphasis added).<sup>238</sup> The Service reported that the Tennessee Valley Authority that was building the dam “offers only opinion rather than specific scientific evidence that the snail darter has been found to exist elsewhere.”<sup>239</sup> USFWS believed that the fish would be driven to extinction by the dam’s construction, as the fish was believed “to require shallow, *unimpounded portions of river* to survive” (emphasis added).<sup>240</sup> None of this was accurate.

Subsequently, snail darters were determined to have a much larger range that included *impounded* portions (reservoirs) on the Tennessee river including the Fort Loudoun, Watts Bar, Chickamauga, Nickajack, Guntersville, Wheeler, and Pickwick reservoirs; numerous other rivers and creeks including the Holston, French Broad, Hiwassee, Ocoee, Sequatchie, Paint Rock, Flint, Elk, and Little rivers, as well as South Chickamauga, Shoal, and Bear creeks.<sup>241</sup> The snail darter was not threatened by impoundments (dams) and was much more widely spread than was believed at listing. The snail darter too was delisted as a “recovered” species.

**Eggert’s sunflower:** At the time of listing, Eggert’s sunflower was believed to have low numbers and, in part, to be threatened as many of the 24 remaining Kentucky and Tennessee populations were subject to routine roadside maintenance and weedy competitors.<sup>242</sup>

USFWS subsequently reported that there were at least 287 populations in 24 counties.<sup>243</sup> Additionally, USFWS found that the plants found along roadsides were not threatened by mowing but benefited from it.<sup>244</sup> While Eggert’s sunflower was officially “endangered,” USFWS reports having evaluated the potential impacts of 262 federal actions on the species.<sup>245</sup> These evaluations can result in the imposition of modifications, restrictions, and other conservation requirements for the federal action. Federal actions can include anything from issuing a wetlands permit or harvesting trees to building a bridge. This plant too, was declared ‘recovered’ in 2005.<sup>246</sup>

**Running buffalo clover:** When this plant was listed in 1987, USFWS reported that only a single extant population of running buffalo clover was known from one county, in one state, and consisted of just four individuals.<sup>247</sup> The Service reported “this species is clearly endangered by its rarity alone; threats include trampling or other inadvertent destruction by humans or other animals, crushing by off-road vehicles, and competition with weedy species.”<sup>248</sup>

Uncertain of the cause of decline, the proposed listing notice states “other factors contributing to the species’ demise could include clearing of its habitat for pasture and agriculture...”<sup>249</sup> USFWS reported that the plant was “one of the rarest members of the North American flora,” and noted that a population “occurs at the margin of a mowed field” and in 1984 contained only four plants.<sup>250</sup> During a recent field inspection... these plants could not be relocated. Therefore, the status of this population is questionable; the plants may or may not reappear next spring.”<sup>251</sup> It appeared grim.



When listed, the running buffalo clover was assumed to be one of the rarest in North America with a single population. Afterwards, the plant was found at 175 locations and in six states. Photo courtesy USFWS.<sup>252</sup>

A recovery plan produced two years after listing reported “13 small populations,” and noted that populations occurred “along a four wheel drive trail,” “bordering cultivated ground,” in “wooded stream valleys that are grazed by cattle,” “along an annually mowed trail and in a small opening adjacent to a cemetery,” “in an Ohio Historical Society cemetery,” and that “sites have been disturbed, either by mowing, grazing, or flooding.”<sup>253</sup> A revised 2007 recovery plan set criteria for the number and size of populations for delisting as shown below.

### Running Buffalo Clover Known Populations and Recovery Criteria

Population Size (Plants)	1987 Known Listing <sup>254</sup>	2007 Recovery Criteria <sup>255</sup>	2007 Known <sup>256</sup>	2019 Known Proposed Delisting <sup>257</sup>	2021 Known Delisting <sup>258</sup>
> 1,000	0	2	10	16	18
100 to 999	0	6	25	35	47
30 to 99	0	6	27	44	40
1 to 29	1	20	38	59	70
<b>TOTAL</b>	<b>1</b>	<b>34</b>	<b>100</b>	<b>154</b>	<b>175</b>

Under the ESA, USFWS conducted at least 20 biological opinions referring to this plant since 2010, reviewing the effects of federal actions on the plant.<sup>259</sup> One from 2019 resulted in a 30-page USFWS Biological Opinion. It reported running buffalo clover populations were now known in West Virginia, Kentucky, Ohio, Indiana, Missouri, and 1 more in Pennsylvania and that “*new populations are being discovered almost annually*” (emphasis added).<sup>260</sup> The plant is now “known or believed” to be in 82 counties.<sup>261</sup> More than a decade before delisting, USFWS had already reported 101 populations and that the largest population in West Virginia numbered 64,998 plants.<sup>262</sup> When delisting and declaring the plant yet another recovery in 2021, the Service reported 175 populations.<sup>263</sup>

**Cumberland sandwort:** This plant found in Tennessee and Kentucky had only five known occurrences when it was listed in 1988.<sup>264</sup> Of the five, four were described as “small,” one with “approximately 50 clumps” and another a “very small population with just “six clumps.”<sup>265</sup> Regarding the largest population, USFWS noted that “existing threats to the species at this site include hiking, camping, picnicking, rappelling, and other recreational use of the area.”<sup>266</sup>

By 2012, there were 64 known occurrences and, by 2018 there were 71.<sup>267</sup> USFWS estimated that just the “24 of the largest occurrences indicate that they collectively hold at least 67,000” plants.<sup>268</sup> When delisting this plant in 2021, USFWS announced “this determination is based on a thorough review of the best available scientific and commercial data, which indicate that Cumberland sandwort has recovered...”(emphasis added).<sup>269</sup>



Fourteen times the number of known Cumberland sandwort populations were discovered after the plant was listed. Photo courtesy USFWS.<sup>270</sup>

**Hidden Lake blue curls:** This California plant was delisted as recovered in 2018.<sup>271</sup> Several actions were taken to protect the plant’s only known habitat within California’s Mount San Jacinto State Wilderness. After listing the plant, trails to the lake were obscured, impediments for access by horse were erected, and the lake was removed from maps provided to park visitors.<sup>272</sup> The actions were designed to discourage use of the plant’s habitat and thereby reduce potential trampling. Research and other activities including storing seed were carried out.<sup>273</sup>

Population studies indicate that the species’ population numbers vary dramatically both within a season and from season to season. Surveys apparently did not reveal this until many years after listing. When listing the plant, USFWS noted “between 1979 and 1991, the population sizes of this species fluctuated from less than 50 to 10,000 individuals.”<sup>274</sup> According to the 2017 delisting, “*data collected since 1980... show that the standing population size fluctuates from fewer than 100 to greater than 10,000 plants, but the presence of a persistent soil seed bank has allowed the subspecies to persist. (emphasis added)*”<sup>275</sup> “Greater than 10,000” is a substantial understatement as the population was estimated at 27,000 in 2008, 59,250 in 2015, and 243,000 in 2012.<sup>276</sup>

Data collected after listing revealed that the plant’s numbers can peak at different months in different years. The draft Post Delisting Monitoring Plan reveals that a July 2006 survey found fewer than 50 plants, while in October that year there were 2,145. Conversely, the October 2008 survey revealed fewer than 1,000 plants, while June’s indicated 27,000 plants.<sup>277</sup> Earlier surveys had not accounted for this seasonal variance. When delisting the species, USFWS reported “over the past few years, [California Department of Parks and Recreation] and [Rancho Santa Ana Botanic Garden] have worked together *to develop and implement a more robust statistical sampling method*” (emphasis added).<sup>278</sup> USFWS also reported “*initial results suggest that plant numbers were previously underestimated in annual surveys...*” (emphasis added).<sup>279</sup>

The uniqueness of the plant is not entirely clear. When it was described in 1945 as a subspecies, reportedly no species to which the plant would have belonged had yet been described.<sup>280</sup> By later taxonomic rules this would invalidate a taxon.<sup>281</sup> A full species to which the Hidden Lake subspecies belongs was subsequently described in 2021 and, those who did so, reported that “genetic studies are pending.”<sup>282</sup>

**Bradshaw’s lomatium:** This formerly ‘endangered’ plant found in Oregon and Washington was added to the *List* in 1988.<sup>283</sup> USFWS reports that “when Bradshaw’s lomatium was listed as endangered in 1988, 11 populations were known” and that “the total population at the time of listing was estimated to be from 25,000 to 35,000 individuals.”<sup>284</sup> By the time a new recovery plan had been completed in 2010, “the Service was aware of 62 sites containing greater than 1,000,000 total plants.”<sup>285</sup>

When delisting the plant in 2021, USFWS reported that “there are many paths to accomplishing recovery of a species...”<sup>286</sup> While USFWS recovery activities for this plant included, for example, producing “17,300 Bradshaw’s lomatium plugs that were outplanted at two sites,” this plant’s recovery was clearly accomplished primarily through increased survey efforts that “led to the discovery of previously unknown wild populations...”<sup>287</sup> One such discovery was a none-too-wild population “located on a privately owned golf course.”<sup>288</sup> It contained approximately 10.8 million Bradshaw’s lomatium plants.”<sup>289</sup> Regarding this site, USFWS reported that “even without formal protections, the regular mowing that occurs at this site on a consistent basis year after year has provided for the most vast and robust population of the species known.”<sup>290</sup>

At delisting, USFWS noted, “we now estimate there are likely more plants across the range of Bradshaw’s lomatium than we have accounted for because not all areas of suitable habitat within the range of the species have been surveyed, and recent visits to previously unsurveyed areas have resulted in the identification of formerly unknown populations.”<sup>291</sup> While the 2010 Recovery Plan called for 20 populations of Bradshaw’s lomatium, USFWS reported before delisting the plant as yet another recovery that there were 71 sites and more than 11,000,000 plants.<sup>292</sup>



Over 10 million Bradshaw’s lomatium were found on a golf course after the plant was added to the List. Photo courtesy USFWS, created by Jeff Dillon.<sup>293</sup>



**Water Howellia:** According to USFWS, “at the time of Federal listing (1994), 107 water howellia occurrences... were known to occupy an estimated 200 acres... across its range...”<sup>294</sup> A 2013 Five Year Review of this plant reports, “since listing, new occurrences have been documented in all five States, generally in areas known historically to support the species... Thus, locations of extant occurrences are generally representative of the areas where the species was thought to historically occur.”<sup>295</sup> USFWS also reported that by 2012, “a minimum of 302 occurrences were documented...”<sup>296</sup>

USFWS delisted this plant as “recovered” in 2021.<sup>297</sup>

**Johnston’s frankenia:** This Texas plant was thought to number perhaps 1,000 in a few Texas counties and Mexico when it was listed, and USFWS expressed concern about “grazing pressure.”<sup>298</sup> The Service delisted the plant in 2016 reporting that it had recovered.<sup>299</sup>

Subsequent surveys had revealed over 4 million Johnston’s frankenia by one estimate, over 9 million plants by another and possibly even more.<sup>300</sup> Although the plant had been estimated at 4 million by 1999, it was not delisted until more than a decade and a half later. *Like all species delisted on the basis of recovery* as opposed to original data error, a post-delisting monitoring plan was required to ensure the species did not slip back into an endangered status. USFWS’ plan anticipated costs of \$100,000 over nine years for the remote sensing of 20 sites and on-site assessments at nine, and is designed to ensure threats, including “substantial human persecution,” do not trigger a need to relist the species.<sup>301</sup>

**Maguire daisy:** USFWS listed the Maguire daisy as endangered in 1985, reporting “it is known to occur only at the upper end of a sandstone canyon in Emery County, Utah. *Only seven plants were seen there in 1982...*” (emphasis added).<sup>302</sup>

After listing, the Maguire daisy was determined to be the same as another variety of plant previously believed to be slightly different. USFWS explained that when the status of the now combined plants was considered “a larger number of individuals is involved than had been previously considered to comprise [the Maguire daisy].”<sup>303</sup>



The number of known Maguire daisies increased from an assumed seven plants to 163,000 after listing when it was discovered the plant was the same as another plant from which it had been believed distinct. Photo courtesy USFWS.<sup>304</sup>

The 1995 recovery plan that called for “...maintaining 20 viable populations was based primarily on the assumption that numerous small sites would remain scattered and disconnected.”<sup>305</sup> A decade and a half later, in the over 14,000 word and 14-page notice delisting the Maguire daisy—now composed of two plants previously believed to be distinct from one another—USFWS reported individual populations of 10, 20, 30, and 100 thousand plants.<sup>306</sup>

USFWS announced the delisting with a press release touting “an Endangered Species Success Story,” stating that the “population of the daisy was known to number seven plants when it was listed as endangered in 1985 but now numbers 163,000 plants within 10 populations.... it is the 21st species to be delisted due to recovery.”<sup>307</sup> The release omitted that the new big number had nothing to do with an actual population increase.

**Deseret milkvetch:** When listing this Utah plant in 1999, USFWS reported that the “only known population of *Astragalus desereticus* consists of between 5,000 and 10,000 individuals growing in an area of less than” 300 acres.<sup>308</sup> However, a 2011 Five-Year Review reported “we know that the species occurs in *much larger numbers than we knew at the time of listing*. We also know that the existing geographic area occupied by *A. desereticus* is larger than we knew at the time of listing” (emphasis added).<sup>309</sup>

Subsequent to listing, surveys indicated from almost 9 to 17 times as many plants as believed at listing. According to USFWS, “in 2017, surveys of all accessible habitats were conducted in accordance with the protocol used in 2008, resulting in a population estimate of 88,427 (adults and juveniles) in the population total...”<sup>310</sup> In 2018 USFWS announced “we, the U.S. Fish and Wildlife Service... are removing Deseret milkvetch (*Astragalus desereticus*) from the Federal List of Endangered and Threatened Plants due to recovery.”<sup>311</sup>

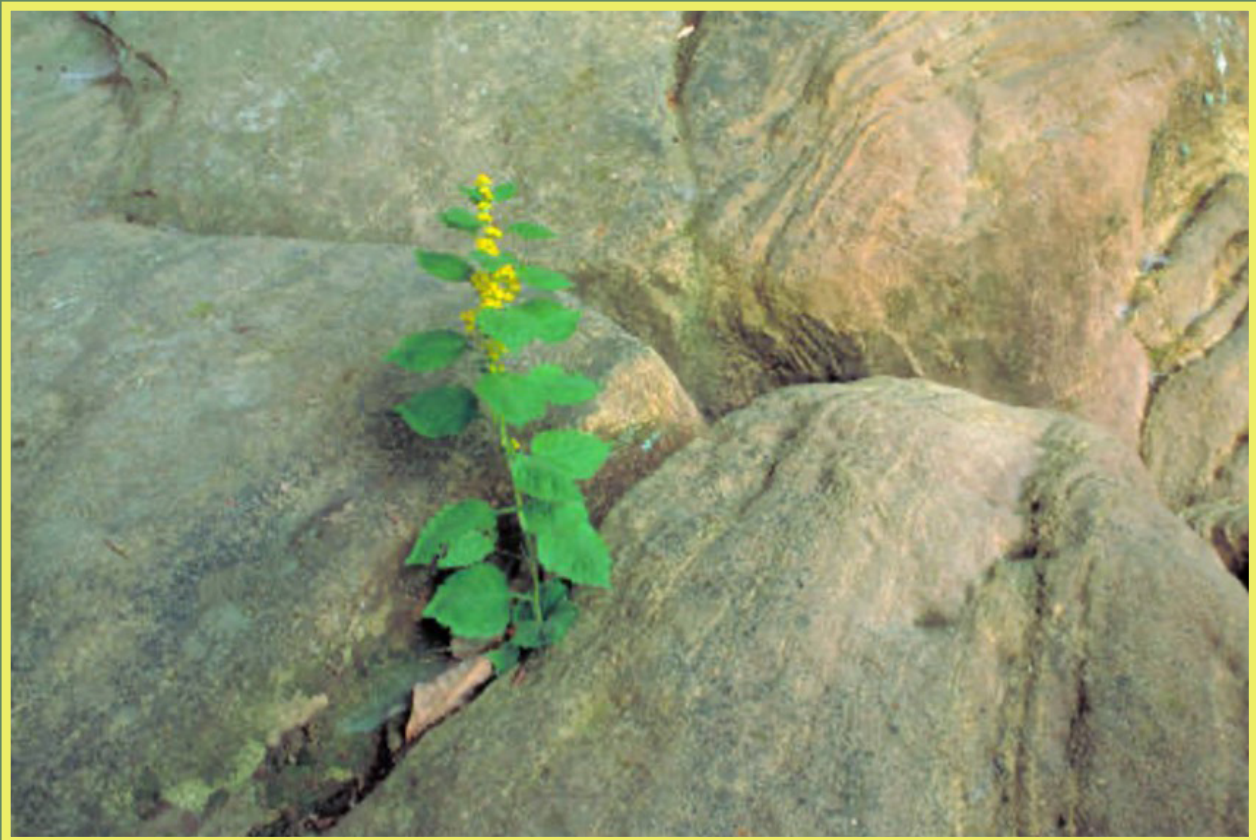
***Lepanthes eltoroensis*:** According to USFWS: “...at the time of listing, 140 individuals were known.”<sup>312</sup> In a Species Status Assessment conducted before delisting this orchid as a recovery, USFWS reported:

...surveys for *L. eltoroensis* have been infrequent, sparse, and done with varying spatial spread and methodology, making the results difficult to compare over time... there has never been a complete census of the entire meta-population because most of the areas off the two main trails... are dangerous and mostly inaccessible. *All the estimates from previous surveys are likely to substantially underestimate the true abundance of the species...* The best estimate we have for... the total number of *L. eltoroensis*... *is in the range of 3,000* individuals. However, this estimate is based on surveys along the existing Trade Winds Trail” and “further populations may occur within suitable habitat outside this trail.”<sup>313</sup>

USFWS delisted this orchid as “recovered” in 2020.<sup>314</sup>

**Tennessee purple coneflower:** When the coneflower was listed in 1979, USFWS reported “three extant populations of the coneflower occur today.”<sup>315</sup> The notice expressed concern for wildflower collectors, medicinal uses of the plant, and reported “a population was known to occur near LaVergne on Stones River Road up until 1967, when the site was converted to a trailer park. Recent searches failed to locate any coneflowers among the trailers.”<sup>316</sup>

After listing, the flower was propagated, and numerous colonies were planted. The proposed delisting notice, however, reports “...natural colonies, or those not known to have been established through introductions, included 83,895 flowering stems in 2005... which translated to an estimated 47,941 individual flowering plants [as there are multiple stems per plant] and 719,101 *total individuals*, including juveniles...” (emphasis added).<sup>317</sup> The delisting notice reports 15 natural colonies.<sup>318</sup> The 1989 Recovery Plan established the recovery criteria as “...at least five secure wild populations, each with three self-sustaining colonies of at least a minimal size.”<sup>319</sup> The flower was declared “recovered” in 2011.<sup>320</sup>



Though post-listing surveys, the number of white-haired golden rod plant stems nearly quintupled to over 174,000. Photo courtesy USFWS.<sup>321</sup>

**White-haired goldenrod:** The white-haired goldenrod, a plant, was declared endangered in 1988.<sup>322</sup> The plant occurs in three Kentucky counties in the Daniel Boone National Forest.<sup>323</sup> USFWS reported 10,500 individual plants and a few more remote uncounted populations around the time of listing.<sup>324</sup> The listing reported “All known population of the species are threatened by trampling from recreational use of their specific habitat within the National Forest.”<sup>325</sup>

By the time of the 1993 recovery plan, the number of known populations had risen to 90, and individual stems, of which each plant may have many, were estimated to be 45,000.<sup>326</sup> Subsequently, surveys by the Kentucky State Nature Preserves Commission documented 116 populations.<sup>327</sup> USFWS reported that 11 of these populations had a minimum of 2,500 stems each (a total minimum of 27,500 stems) and twenty-seven more populations that had a minimum of 1,000 stems each (a total minimum of 27,000 stems).<sup>328</sup> In its rule delisting the plant and declaring it recovered, USFWS provided a total stem count of 174,357.<sup>329</sup>

**Palau dove, owl, and flycatcher:** These three birds were among the first species removed from the list and declared “recovered,” constituting 75% of all recoveries in 1985. All occur on the Pacific islands of Palau that have passed from Spain, to Germany, to Japan, and then to the US following a battle fought there in World War II. Palau, formerly a United States Trust Territory, is now a republic in free association with the US.

According to the Government Accounting Office, “although officially designated as recovered, *the three Palau species owe their ‘recovery’ more to the discovery of additional birds than to successful recovery efforts*” (emphasis added).<sup>330</sup> When included on the list for the ESA’s predecessor law in 1970, these birds were believed to have suffered losses from habitat destruction during the war.<sup>331</sup> Later surveys, however, indicated that the flycatcher was “common and widespread.”<sup>332</sup> Similarly, the Palau dove, which had been believed to be rare, was revealed by surveys to have a population “thought to be near the level before the arrival of man on these islands.”<sup>333</sup> The owl possibly suffered some decline after infestation of its habitat by coconut beetles, which when consumed by the owl, could pierce the owls’ intestines with a large spine on the beetle’s back.<sup>334</sup> The coconut crop was protected by controlling the beetle with pesticides.<sup>335</sup>

**Tinian monarch:** Another bird found on Tinian, one of the Northern Mariana Islands in the Pacific Ocean, was on the original *List* when the ESA was enacted. It was included even “though there had been no surveys of its status in the preceding two decades.”<sup>336</sup> USFWS reported that the Tinian monarch’s “numbers in 1945 were thought to be critically low due to the removal of native forests for sugarcane production, and due to the destruction of forest by the activities of World War II.”<sup>337</sup> The original decision to list the bird as “endangered was based on a report... of 40 to 50 monarchs on Tinian after WW II... but it is not clear *if this report represented the number of birds seen, or an estimate of the total population on the entire island.*”<sup>338</sup> Some experts suggested that this “estimate” actually only represented the number of birds seen by one observer.<sup>339</sup>

According to one USFWS cited expert, “it seems very likely that *the species had recovered to near its pre-1945 abundance by the time the Service listed it in 1970.*”<sup>340</sup> USFWS appears to have agreed stating, “reassessment of the original classification data indicate that *the monarch was probably not endangered when actually listed in 1970.*”<sup>341</sup> The bird was already plentiful when listed. It had apparently already recovered from Tinian being subject to aerial bombing, the first field application of napalm, extensive naval bombardment and artillery shelling from nearby islands, an amphibious assault by US Marines, and brutal ground warfare with the occupying Japanese.<sup>342</sup> The bird was proclaimed “recovered” in 2004.

**Brown pelican:** Even in cases of some of the widely known and publicized ESA “successes,” recovery was really a result of original data error. For example, regarding the “recovered” brown pelican along the Atlantic Coast and in Florida, USFWS itself stated that:

Population data gathered since the listing have questioned the likelihood that the pelican population in Florida was ever endangered, as defined by the Act. This designation was also questionable for the pelican in South Carolina. The *data was not in existence at the time of listing* and the most prudent course of action, based upon the best available data at that time, was to list the entire species as endangered.<sup>343</sup>

Brown pelicans along the Atlantic Coast and in Florida and Alabama were delisted as another “recovery” in 1985.<sup>344</sup>

**American alligator:** The alligator was also first listed under the predecessor law for the ESA. It too was included among those species first regulated under the ESA when it was enacted in 1973.<sup>345</sup> USFWS rather quickly—in endangered species time—delisted the alligator as “recovered” in 1987.<sup>346</sup> A National Wildlife Federation article, however, reported that same year that the “familiar and gratifying” alligator recovery story is “mostly wrong.”<sup>347</sup>

After the ESA had been law less than two years, USFWS reported “that significant losses of [alligator] populations have occurred *only in geographically peripheral and possibly ecologically-marginal areas. Population levels in parts of South Carolina, Georgia, Florida, Louisiana, and Texas are high*, and, in many areas over these regions are considered to be ecologically secure” (emphasis added).<sup>348</sup> By that same year, the Florida Game and Fresh Water Fish Commission was annually responding to around 5,000 ‘nuisance’ alligator complaints per year and relocating about 2,000 alligators.<sup>349</sup> In 1979, the USFWS also reported that the expert who had provided a population estimate for alligators in Louisiana before listing, advised that “his original 1965 estimate of 35,000–46,600 animals within [Louisiana] was extremely conservative, and that ‘a more realistic estimate of the 1966 statewide population would be about 100,000 animals.’”<sup>350</sup>



After listing and in large part because of the subsequent discovery of over 60 more roosts, the lesser long-nosed bat's estimated population climbed from about 500 to 200,000. Photo courtesy of USFWS.<sup>351</sup>

**Lesser long-nosed bat:** According to the delisting notice for this bat:

much debate surrounds the legitimacy of the 1988 listing of the [Lesser long-nosed bat], mostly centered around the population numbers and trends recorded from roost-site monitoring. At the time of listing, population numbers and trends used by USFWS in determining the endangered status of the [Lesser long-nosed bat], *showed low numbers (~500 in Arizona) and a declining trend (emphasis added).*<sup>352</sup>

When delisting, USFWS also reported that “at the time of listing, we believed livestock grazing and fire were impacting the viability of this subspecies. We now know that livestock grazing and fire have less of an impact on the viability of this subspecies than previously thought.<sup>353</sup> As is commonly the case, USFWS reported that “monitoring efforts have led to an increase in the number of known roosts throughout its range, from approximately 14 known at the time of listing to *approximately 75*” (emphasis added).<sup>354</sup> In its 2017 proposed delisting notice USFWS reported:

With a documented increase from an estimated 500 lesser long-nosed bats in the U.S. at the time of listing to *over 100,000 currently documented*, the total number of bats currently being documented is many times greater than those numbers upon which the listing of this species relied, and while *this may, in large part, reflect a better approach to survey and monitoring in subsequent years*, it gives us better information upon which to evaluate the status of the lesser long-nosed bat population (emphasis added).<sup>355</sup>

When the final delisting rule was published one year later, the same sentence was repeated verbatim except that the number had been multiplied by two. Lesser long-nosed bats were estimated to number 200,000—*400 times the number reported at listing*.<sup>356</sup> The species was delisted as a “recovery” in 2018.

**Modoc sucker:** The Modoc sucker, a seven-inch fish, was declared endangered in 1985.<sup>357</sup> USFWS reported threats to include human activities that caused erosion, particularly cattle grazing, and then reduction of natural barriers leading to hybridization with another fish, and predation by introduced fish.<sup>358</sup> The listing notice reported that the fish had been greatly reduced in number, that entire populations had been lost to hybridization, and that the fish’s distribution had shriveled to less than 13 miles of rivers and streams.<sup>359</sup>

Subsequently, USFWS reported that the populations originally believed to have been lost to hybridization were not. According to USFWS, “the genetic data suggest that introgression is natural and is not caused or measurably affected by human activities.”<sup>360</sup> USFWS also reported that suckers “have persisted in the presence of nonnative predators, and populations have remained relatively stable... prior to and since the time of listing” and, similarly, that “surveys completed since the time of listing reveal no evidence of historical natural barriers that would have acted as physical barriers to fish movement.”<sup>361</sup> While cattle ranching did cause erosion, it was apparently not as significant a threat as originally believed, as post listing surveys indicated that the sucker “currently *occupies its entire known historical range*,” 42.5 miles—three times greater than originally estimated.<sup>362</sup>

The Modoc sucker was declared recovered 2015.<sup>363</sup>

**Oregon chub:** The Oregon chub is a non-descript 0.3- to 1.3-inch-long minnow endemic to the Willamette River Basin in Oregon. The fish was listed as endangered in 1993.<sup>364</sup> When USFWS listed the species it reported that only nine populations were known to exist, and that the fish was believed to only inhabit two percent of its former range.<sup>365</sup>



A Five-Year Review from 2008 reports, “since the time of listing [the Oregon Department of Fish and Wildlife] has completed comprehensive investigations for Oregon chub throughout the Willamette Basin. According to the... investigations report, *34 populations are now known to exist...*”<sup>366</sup> The report or this USFWS description of it appears to have conflated some *newly found* populations with *new* populations stating, “conservation actions *have resulted in a 425 percent increase in the number of Oregon chub populations*, from eight to 34—an addition of 26 populations” (emphasis added).<sup>367</sup> The report indicates eleven successful introductions which would mean 14 of the populations were found.<sup>368</sup>

USFWS downlisted the fish to threatened status in 2010.<sup>369</sup> Less than five years later, USFWS reported “recently, since we reclassified the Oregon chub to threatened status in 2010, *a substantial number of new Oregon chub populations have been discovered... 28 populations...*”<sup>370</sup> USFWS declared the fish recovered in 2014 stating “the status of the species *has improved dramatically*,” first citing “*the discovery of many new populations*” and then “*successful reintroductions*” (emphasis added).<sup>371</sup>

Between 2005 and 2014, less than a decade, USFWS species expenditure reports indicate federal and state agencies spent over \$13 million on the fish including over \$10,000,000 by the Department of Energy, \$400,000 by US Department of Agriculture, and \$300,000 by the Army Corps of Engineers.<sup>372</sup> The fish was listed for over two decades.



After listing, well over 30 populations of the Oregon chub were discovered. Photo courtesy of USFWS, created by Rick Swart, ODFW.<sup>373</sup>

**Louisiana black bear:** When first considering the listing of this ‘subspecies’ of black bear, USFWS noted “a number of threats were indicated to exist, *including the threat of interbreeding with black bear stocks*” from Minnesota that had been introduced to Louisiana between 1964 and 1967 (emphasis added).<sup>374</sup> The Service reported that it had made a determination on a petition to list this bear, finding in July of 1988 “that the action requested in respect to the Louisiana black bear was warranted but precluded by work on other species having higher priority for listing.”<sup>375</sup>

USFWS eventually declared the Louisiana black bear endangered in 1992. It did so in part because of threats from loss and fragmentation of its habitat, including from forestry.<sup>376</sup> At listing, USFWS noted “because of their importance, actual den sites/trees or candidate den trees [hollow trees] in occupied Louisiana black bear habitat are to be maintained.”<sup>377</sup>

USFWS delisted the bear in 2016 and now noted that “*the availability of den trees does not appear to be a limiting factor* in reproductive success as bears demonstrate flexibility in den use.”<sup>378</sup> The Service also noted that nests were “*located in thick vegetation, usually in areas logged within the past 1 to 5 years...and are typically found within felled tops and other logging slash.*”<sup>379</sup> When designating Louisiana black bear critical habitat the Service estimated the economic impact of conservation efforts to range from \$165.7 to \$202.9 million.<sup>380</sup> The Service later reported over 148,000 acres of private lands had been entered into conservation easements.<sup>381</sup>

The ‘Louisiana black bear’ is putatively a subspecies of the black bear, *Ursus americanus*, which, as noted, is the most common of all bears. In fact, there are more black bears (near 1 million) than all bears of all other species combined, and the species is found in 46 of 50 states.<sup>382</sup>

According to the IUCN the ‘Louisiana black bear’ is one of 16 named subspecies.<sup>383</sup> IUCN reports “some of these gained special protections, particularly in the eastern US, where recognized subspecies are morphologically distinguishable from cranial morphology... However, *these subspecies designations do not correspond with recently documented genetic population clusters*” (emphasis added).<sup>384</sup> The IUCN also notes:

moreover, a new population of bears within Louisiana was established by translocating bears from other Louisiana populations... in order to create a stepping-stone between two separated populations; this enabled bears to travel between them... *One irony is that the stepping-stone successfully linked a population that was believed to be native Louisiana black bears with a population that had previously been established by translocating U. a. americanus bears from Minnesota (1964–1967)... if the luteolus subspecies has any merit, the successful establishment of a conservation corridor reduced the purity of that genetic stock.*<sup>385</sup>

Additionally, non-Louisiana black bears from Arkansas wandered into the habitat of and interbred with Louisiana black bears.<sup>386</sup> When delisting the bear, USFWS referenced one expert reporting that he “suggested genetic interchange by bears from outside the range of the Louisiana black bear (that is, Arkansas) probably should be considered as a positive genetic and demographic contribution...”<sup>387</sup>

The IUCN-cited authors report their analysis “suggests that these three subspecies represent a single genetic cluster... we suggest that *U. a. americanus* may be the most accurate subspecies designation for bears across the eastern range.”<sup>388</sup> This suggestion incorporated the Louisiana black bear.

When delisting the Louisiana black bear, the USFWS responded to a commenter concerned about the analysis of the impacts of future human population growth on the bear. The bear was perhaps officially recovered but the parishes (Louisiana’s equivalent of counties) where it occurred, appeared to have fewer promising prospects. The Service responded:

...we question the relevance of such data for assessing future threats to that species. Nonetheless, to ensure that we have fully considered potential threats associated with future human population growth, we evaluated the data referenced by the commenter... we anticipate minimal threats to the Louisiana black bear from future population growth based on projections provided by [the Louisiana State Census Data Center] ...using the longest-range population forecast data currently available, *which predict [human] population declines from current levels in 15 of the 17 parishes within the Louisiana black bear [Habitat Restoration Planning Area]* (emphasis added).<sup>389</sup>

When USFWS delisted the bear, it provided no overall population estimate, but from the near indecipherable data in the notice, the population appears to have been relatively small. The decision to delist this “subspecies” might be best explained by compelling evidence indicating that the bear did not really merit subspecies status, including the extensive genetic study published the same year as the proposal to delist the ‘subspecies’ as yet another recovery.<sup>390</sup>

**Black-capped vireo:** At the time of listing in 1987, USFWS reported “the vireo no longer occurs in Kansas, is gravely endangered in Oklahoma, and is no longer found in several parts of its formerly extensive range in Texas.”<sup>391</sup> According to the Service “at the time of listing in 1987, approximately 350 individual birds were known from 4 Oklahoma counties, 21 Texas counties, and 1 Mexican state.”<sup>392</sup>



According to USFWS, the black-capped vireo's population was "substantially larger than was known at the time of listing" but it was "not clear how much of the difference can be attributed to increased survey effort." Courtesy USFWS, photo by Kenny Seals.<sup>393</sup>

A 2007 review reported, "to date, about 75 percent of the known population in the breeding range is found on four well-surveyed areas ... an area representing *only 1 percent of the total area of rangeland* in the Texas/Oklahoma range of the species. The remaining 25 percent of the known population is the product of documented occurrences from at least 52 other properties, *many of which are on private lands with only recent survey access*" (emphasis added).<sup>394</sup>

The four "well-surveyed" areas included two military bases, a wildlife refuge and wildlife management area. The USFWS referenced "rangeland" as measure of the vast area that fell within the species' range and might contain habitat suitable for the bird.

In the delisting notice, USFWS recounted assessments of the bird's numbers. The Service reported that, as regards the four well-surveyed areas, "data reported from 2000 to 2005 indicate these populations represented 64 percent of the known population."<sup>395</sup> However, the Service then reported that data from 2009 to 2014 indicated these four major populations only accounted for 40 percent of the known range-wide breeding population.<sup>396</sup> USFWS opined that the difference "suggests the black-capped vireo's distribution is more diverse and occurs more on private lands than known..."<sup>397</sup>

The bird's population in 2013–14 was estimated for the two well-surveyed military bases, the two well-surveyed conservation areas, and one additional large, documented population. These areas were estimated to have 14,418 adult males.<sup>398</sup> Assuming a somewhat similar number of female birds, this would be an increase approaching two orders of magnitude over the original total population estimate. But, according to USFWS, four of the five large populations in this estimate contained only 40% of the bird's population. On top of that, the area surveyed for this large increase represents only “1% of the total area of rangeland in the Texas/Oklahoma range of the species” plus the area of the one additional large, documented population.

Despite this ‘endangered bird’ being on the *List* for over two and a half decades and just federal and state agencies’ costs being at least \$18 million between 1995 and 2005 alone, by the time it was delisted in 2016 USFWS reported there was “no available rangewide population estimates of breeding black-capped vireo.”<sup>399</sup> USFWS reported that “additional unknown populations *likely exist on private lands throughout the breeding range*”(emphasis added).<sup>400</sup>

When removing the species from the *List*, USFWS reported that “the known breeding distribution now occurs in 5 Oklahoma counties, 40 Texas counties, and 3 states in Mexico.”<sup>401</sup> The Service also reported, “from available survey data it is clear that the overall breeding population of black-capped vireos *is substantially larger than was known at the time of listing. However, it is not clear how much of the difference can be attributed to increased survey effort*” (emphasis added).<sup>402</sup> USFWS delisted the bird as another “recovered” species in 2006.

**Interior least tern:** When USFWS listed the interior least tern in 1985, it reported 1,250 terns, scattered in the interior of the US.<sup>403</sup> Although USFWS initially proposed listing the bird as the subspecies, *Sterna antillarum athalassos*, the Service's final rule listed the bird as a distinct population segment, distinguishing it from terns elsewhere along the Gulf, East Coast, and California.<sup>404</sup> The bird was believed to be primarily threatened by human alteration of its habitat along rivers by activities such as damming and channelization.<sup>405</sup> The bird was delisted in 2021 as recovered and the estimated population was reported to be 18,000.<sup>406</sup>

In its 2013 review, USFWS noted that “the quality of the available data does not permit us to quantify actual population increase (or trends) over the range of” the interior least tern.<sup>407</sup> The Service also reported that “estimates of productivity [how many off-spring fledge from the nest]... do not appear sufficient to support observed increases in local or range-wide populations...”<sup>408</sup> USFWS stated, “much of the increase in both [interior least tern] counts and colonies *may be related to increase in survey efforts and geographical extent of the surveys*” (emphasis added).<sup>409</sup> Additionally, the Service reported that some researchers, observing that interior least tern population increases were not supported by available fledgling success estimates, “*hypothesized that [interior least tern] increases since listing were due to immigration surges from least terns inhabiting the Gulf Coast*” (emphasis added).<sup>410</sup>

USFWS also reported that 2010 “genetic studies indicate at least some degree of interbreeding and genetic exchange between populations of” interior least tern and the eastern least tern and California least tern subspecies.<sup>411</sup> In fact, the same authors USFWS cited regarding those genetic studies reported two years later that, “phylogeographic analysis revealed no association with geography or traditional subspecies designations.”<sup>412</sup>

Further, USFWS reported that “while factors related to river channel engineering may result in local negative impacts to [the interior least tern], and/or limit the size of local subpopulations, *there is no evidence that they represent a threat to the continued existence of the species* (emphasis added).<sup>413</sup> In fact, USFWS reported that human induced:

changes in some river drainages supporting [the interior least tern], *may also have benefited the bird in ways that have partially compensated for habitat losses*. For example, in the Lower Mississippi River, impoundment of the major tributaries and channelization of the river have resulted in earlier and shorter duration spring and summer high water events... possibly reducing egg and chick flood related mortality events, extending the nesting season, and increasing re-nesting opportunities. *Dam construction in arid regions unsuitable for the species allowed expansion of the [interior least tern], range* (emphasis added).<sup>414</sup>

When delisting the “interior population” of the least tern, USFWS announced:

We, the U.S. Fish and Wildlife Service... propose to remove the inland population of the least tern (Interior least tern) (*Sterna* (now *Sternula*) *antillarum*), from the Federal List of Endangered and Threatened Wildlife... This proposed action is based on a thorough review of the best available scientific and commercial data, which indicate that the Interior least tern has recovered...<sup>415</sup>

**Concho water snake:** USFWS included the Concho water snake on the *List* in 1986 when there were concerns regarding the pending construction of a reservoir.<sup>416</sup> USFWS believed the construction of the reservoir would destroy the snake’s habitat and separate populations of the snake.<sup>417</sup>

The Service reported threats at listing to include “the construction of three dams that were anticipated to fragment the distribution of the Concho water snake, a prolonged drought accompanied by extreme low water flows in parts of the snake’s range, and concerns about heavy nutrient inflows.” After, USFWS found “that the snakes *have occupied habitat along the new lakeshores, survived in or quickly reoccupied areas of extreme low flows, and have not been adversely affected by nutrient-related effects*” (emphasis added).<sup>418</sup>

When delisting the snake, USFWS reported that the Concho water snakes “do not depend on the previously accepted narrow habitat requirements,” and are “known to use areas above and below low head dams, pools created by the dams, man-made lakes, naturally occurring pools in the river.”<sup>419</sup> The Service also reported that the snake “can survive lower flows than previously thought necessary,” “uses the shoreline of reservoirs,” “may not need to be transferred between populations in order to prevent genetic isolation,” and “persists, reproduces, and remains viable throughout its range.”<sup>420</sup>

After a quarter of a century after listing, USFWS declared the snake “recovered” in 2011.<sup>421</sup>

**Lake Erie watersnake:** This snake is a subspecies of the abundant and widely distributed northern water snake. The most significant distinguishing feature of Lake Erie watersnakes are that “the dark markings that one sees on the northern water snake are greatly reduced or completely lacking,” and that these snakes are found on several islands in Lake Erie.<sup>422</sup> The snake’s population was estimated to be only 1,530 to 2,030 adults when it was listed in 1999.<sup>423</sup>



USFWS required the construction of snake hibernacula in new home’s private yards for the undercounted Lake Erie watersnake. Photo courtesy USFWS.<sup>424</sup>

Female water snakes require approximately three years to reach sexual maturity and older, larger females have a larger number of young. Adult watersnakes have an annual survival rate of 50% and not all adult female snakes reproduce in any given year.<sup>425</sup> In their first year of life, newly hatched watersnakes—neonates—have a significantly higher mortality rate as they are more likely to succumb to predation, and a survey on snake roadkill mortality found that of 45 killed Lake Erie watersnakes, 43 were neonates or juveniles.<sup>426</sup>

Despite this, “there were an estimated 6,180 adult watersnakes on the U.S. islands combined” by 2002.<sup>427</sup> If accurate, this would be a *tripling to quadrupling in three years*, clearly revealing the estimated snake population at the time of listing was wrong. USFWS delisted the snake in 2015 as a “recovery.”<sup>428</sup>

USFWS documents reveal surreal regulatory hurdles faced by a developer seeking to build seven homes on just 15 acres during this time. The Service sought easements on over five acres of lakefront property; the donation of \$50,000 in in-kind contributions including the construction of two dens for hibernating snakes on each of seven residential properties; and the establishment of a homeowner’s association to impose even more restrictions.<sup>429</sup> The homeowner’s association’s restrictions included ensuring no snake be within 20 feet when applying weed killer to poison ivy, not allowing cats outside, abiding by seasonal height and temperature restrictions for mowing, providing up to \$18,750 for snake research, and allowing researchers to access the homeowner’s yards.<sup>430</sup>

**Island night lizard:** When the USFWS listed the island night lizard on three California islands, it did so over the objection of California Fish and Game and the Navy.<sup>431</sup> Even the National Park Service opposed the designation of critical habitat for the lizard, while an expert with the Natural History Museum of Los Angeles County reported the lizard was “widespread and abundant” on San Clemente island.<sup>432</sup> San Clemente Island and neighboring San Nicholas Island are Navy property. A third island that is home to the lizard, Santa Barbara, belongs to the National Park Service.

San Clemente “has been operated by Navy as a tactical training range and testing area for over 70 years,” and the San Clemente Island Range Complex’s “land, air, and sea ranges provide the US Navy, US Marine Corps, and other military services space and facilities which they use to conduct readiness training and test and evaluation activities.”<sup>433</sup> It is also “the Navy’s only remaining live fire range,” and is the home of the Navy SEAL training complex.<sup>434</sup> The Navy also owns San Nicholas with its 10,000 foot runway, launch pads for various stationary and portable-launched test missiles, and targets.

San Clemente is not only prominent in the Navy’s affairs, but also prominent as regards the list of recovered species. The island night lizard, San Clemente Bell’s (sage) sparrow (addressed subsequently) and four plants—San Clemente Island paintbrush, San Clemente Island larkspur, San Clemente Island lotus, and San Clemente Island bush-mallow—account for about 10% of all official recoveries.



Like the island night lizard, this group of species was reported to have suffered from substantial alteration of the California Channel Islands. The Channel Islands include San Clemente and San Nicholas (Navy), Santa Barbara, Rosa and Cruz, San Miguel, and Anacapa (National Park Service) and Santa Catalina. In 1977, USFWS determined five of the species to be endangered and the island night lizard and San Clemente sage sparrow to be threatened.<sup>435</sup> These species only occur on some of the Channel Islands. USFWS reported:

...that island-adapted taxa are often detrimentally affected by accidental or intentional introduction of non-native species. On all California Channel Islands, such past introductions have had disastrous effects...<sup>436</sup>

At listing, USFWS rejected the arguments that the lizard was sufficiently secure given it was widespread and abundant on San Clemente Island. It did so noting that “the Navy’s goat removal program is inactive.”<sup>437</sup> The Service also justified listing the lizard on the grounds that the lizard’s other habitat on Santa Barbara and San Nicholas was “reduced and any future reduction would seriously imperil the lizard’s populations which occur there.”<sup>438</sup> USFWS listed the lizard and the sparrow as threatened rather than endangered.



The California Department of Fish and Wildlife and the Navy opposed listing this lizard, and the Navy reported a crude estimate of six to ten million lizards at the time of listing. An island night lizard, courtesy of USFWS, photo US Navy.<sup>439</sup>

The Navy eventually petitioned to delist the lizard. When it did so in 2004, the Navy provided its own “crude population estimate.”<sup>440</sup> It reported that there were *six to ten million lizards on San Clemente Island at the time of listing—1977*.<sup>441</sup> Moreover, 2012 USFWS data reveals the near insignificant role Santa Barbara and San Nicholas play in the lizard’s future. According to the Service, while San Clemente provides 19,640 acres of the lizard’s ‘high-quality habitat,’ the other two islands provide just under 38 acres combined.<sup>442</sup> By USFWS’ own data, *99.81% of high-quality island night lizard habitat is on San Clemente Island*.

In 2014 USFWS finally delisted the lizard as yet another successful recovery. Being “recovered” the lizard had to be monitored as the Service is obligated “to prevent significant risk to the well-being of any recovered species.”<sup>443</sup> USFWS prepared a Post Delisting Monitoring Plan dated that same year. It reported on the lizard’s numbers and habitat conditions establishing baseline data. According to the plan there were an estimated 32,600 lizards on San Nicholas and Santa Barbara.<sup>444</sup> The estimate for San Clemente Island was 21.3 million, and it is from 2001.<sup>445</sup>

USFWS states in its plan, “we... must remain actively engaged in all phases of post-delisting monitoring.”<sup>446</sup> While it further reports, “we have developed and will implement this Post-Delisting Monitoring Plan in cooperation with the Navy and the NPS,” the Service also states, “at this time, we do not anticipate having sufficient personnel and resources available for conducting the necessary field work, data analysis, and reporting required for the post-delisting monitoring effort.”<sup>447</sup>

As for the work the Navy and NPS needed to have done, the Service states it designed the plan “...to maximize data continuity and comparability with existing studies and current methodologies to best determine island night lizard density, recruitment, and habitat trends.”<sup>448</sup>

More specifically, the plan states: “surveys will be conducted at previously established sampling sites using several methodologies including pitfall traps, rock-turn surveys, and coverboards; they will be arranged in grid arrays or transects, each of which are dependent upon the soil regime and biologist preference for each island surveyed...”<sup>449</sup>

In the section titled “Triggers for Considering Relisting and Potential Management Actions” the plan advises:

If the data suggest a decline in island night lizard density (trap capture rates), in recruitment, or a reduction of high quality habitat... such that the species is likely to become threatened or endangered, *we may determine it necessary to extend the post-delisting monitoring term beyond 9 years, or may initiate a status review to consider if relisting the island night lizard as threatened or endangered is warranted*.<sup>450</sup>

Perhaps, thirty-seven years on the *List* and nine more of post-delisting monitoring will be sufficient for the USFWS. The lizard certainly did not need it.

**San Clemente sage sparrow:** When listing this bird as threatened along with the Island night lizard in 1977, USFWS considered among the threats, habitat destruction from grazing, particularly by the feral goats, and possible predation by cats.<sup>451</sup> Again, the Navy and California Fish and Game opposed the listing and again USFWS raised that it considered the Navy’s goat removal effort to be insufficient as “there still exists a threat which will remain until all goats are removed.”<sup>452</sup> According to USFWS “habitat conversion caused by nonnative ungulates from the mid-1800s to 1991 altered plant communities on [San Clemente Island], *likely impacting the distribution and abundance of California boxthorn... cactus... and sagebrush... components of*” the sparrow’s nesting and foraging habitat (emphasis added).<sup>453</sup>

According to USFWS, early researchers noted that the birds “*preferred habitat that had ‘abundant quantities’ of boxthorn...*” (emphasis added).<sup>454</sup> The listing notice reported an estimated “current population of 200–400 pairs.”<sup>455</sup>

To estimate population sizes after listing, surveys were conducted in the area of the boxthorn habitat that was about 5,184 acres—14% or less of the island.<sup>456</sup> Somehow, the estimates fluctuated wildly. For example, from 2001 to 2003 the island population of this non-migratory bird fluctuated from 578 birds to 1,519 birds and then back to 544 birds.<sup>457</sup>

Surveys from 1976 through 2011 focused on the boxthorn habitat area “until incidental observations of... sparrows outside the surveyed areas prompted assessment of the potential for... sparrow presence in other plant communities...” The 2013 survey that included other types of habitat on the island, revealed 4,533 birds while the most recent prior survey of the boxthorn habitat area had only indicated 1,544 birds.<sup>458</sup> Every subsequent survey through 2018 was not limited to the boxthorn habitat and ranged from 4,354 and 7,656 birds.<sup>459</sup> As soon as the other 86% of the island had been surveyed, the bird’s population more than doubled.

USFWS noted in a later document that “while boxthorn habitat is still considered high quality habitat, moderate to high population densities are also found in sagebrush and shrub habitat near canyons and along the steep eastern slope.”<sup>460</sup> In the same document, USFWS states, it is likely that the sparrow “*had persisted in the boxthorn habitat as grazers and browsers favored other, more palatable shrub communities*” (emphasis added).<sup>461</sup> Perhaps goats did not like browsing on thorns. Looking beyond the boxthorn, the Service reported that the “current potential habitat includes an estimated... 32,450 acres... or almost 90% of the island...”<sup>462</sup>

Researchers reported in 2018, “we found that nest success in *boxthorn habitat, previously considered an essential habitat for Bell’s Sparrow nesting, was similar to success in alternative habitat types*. Our findings contradict previous conclusions that Bell’s Sparrows were boxthorn-dependent” (emphasis added).<sup>463</sup>

The cited researchers did not refer to the bird as the “San Clemente sage sparrow,” as by the time this work had been published, the bird had been renamed the “San Clemente Bell’s Sparrow.” This occurred right around the same year the bird had been discovered to live all over the island, not just in the boxthorn shrubs.<sup>464</sup> The San Clemente Bell’s sparrow name was soon in doubt as well.

USFWS conducted a review of the Navy’s plan for the San Clemente Island Combat Aircraft Loading Area in June of 2020. The Service issued a biological opinion to address the associated effects upon whatever the bird was. The *biological* opinion refers to the bird as the “San Clemente Bell’s (=sage) sparrow [*Artemisiospiza* (= *Amphispiza*) *belli clementeae*; Bell’s sparrow].”<sup>465</sup>

The document advises the Navy that:

To be exempt from the prohibitions of section 9 of the Act, the Navy must comply with the following term and conditions, which implement the reasonable and prudent measure described above and outlines monitoring and reporting requirements. These terms and conditions are non-discretionary.<sup>466</sup>

USFWS advised the Navy that the biological opinion allowed, for example, “harm to one pair of Bell’s sparrows due to operation-related degradation of habitat as a result disturbance associated with helicopter training activities.”<sup>467</sup> The Service would measure whether the Navy exceeded this legal limit by using a “surrogate measure for take” of the species.<sup>468</sup> Unlike as with homicide investigations, having an actual body to prove violation under the ESA is not a concern. USFWS would consider the permit to be violated using surrogate measures of harm instead of evidence like blood or feathers. The Service’s biological opinion laid out that the number of permitted deaths would “be exceeded if less than four Bell’s sparrow [nesting] territories are consistently recorded in the action area within 5 years following initiation of operation of the [Combat Aircraft Loading Area].”<sup>469</sup>

The biological opinion was for a bird that, by then, was indicated not to be a subspecies unique to the island but likely the same as birds on the mainland, Bell’s sparrow. The Service’s reference to the bird in its biological opinion as “San Clemente Bell’s (=sage) sparrow [*Artemisiospiza* (= *Amphispiza*) *belli clementeae*; Bell’s sparrow]” reveals the Service was well aware of this. They were, after all, the officials charged with conserving whatever it was.

The USFWS’s 2022 Species Status Assessment notes questions regarding the bird’s taxonomy and officiously states that “until these questions are resolved, *we continue to consider the Bell’s sparrows (Amphispiza belli clementeae) on [San Clemente Island] a subspecies, as listed*” (emphasis added).<sup>470</sup>

2018 research had already indicated this listed bird was likely an invalid subspecies.<sup>471</sup> ITIS, the taxonomic database maintained in part by USFWS, reports as well that *Amphispiza belli clementeae* (San Clemente sage sparrow) and *Artemisiospiza belli clementeae* (San Clemente Bell’s sparrow) are both invalid taxons as they are “invalid – junior synonym[s].”<sup>472</sup> In plain language, they are not considered valid subspecies, at least according to the USFWS supported “authoritative taxonomic information” database.

The bird on San Clemente Island is the same as other Bell’s sparrows that are otherwise plentiful in California and Baja, and are rated by the IUCN as of “least concern” and the Cornell Ornithology Lab as of “low” concern.”<sup>473</sup> Not only are the birds on the island not a unique subspecies, but they also were substantially undercounted for three and a half decades. They were undercounted because they are not habitat-dependent on boxthorn shrubs. Because the birds are not habitat-dependent on boxthorn shrubs, they occupy 90%, not 14%, of the island.

This was all known when the Service disgorged the 35,600 word, 97 page, tax-payer funded, Species Status Assessment in 2022.<sup>474</sup> The document was produced after the Service had proposed delisting the bird, and less than a half year before it would actually do so. In part, the Service’s voluminous document addresses the possible implications of the *serious* work carried out at sniper ranges, impact areas, the existing and proposed training areas and ranges, assault vehicle maneuver areas and the landing zones, infantry operations area, shore bombardment area, and restricted access areas on an invalid subspecies of a generally secure bird.<sup>475</sup> (According to the Cornell Lab, “the combined breeding population of Sagebrush Sparrow and the closely related Bell’s Sparrow” numbers 4 million.)<sup>476</sup>



USFWS required the Navy to conduct post-delisting monitoring for the invalid “San Clemente Bell’s sparrow” and island night lizard because they had “recovered.” Ship to shore bombardment range on San Clemente Island, KPBS.<sup>477</sup>

As in the other cases, USFWS proclaimed, “We, the U.S. Fish and Wildlife Service... propose to remove the San Clemente Bell’s sparrow (*Artemisiospiza belli clementeae*) (formerly known as the San Clemente sage sparrow... based on our evaluation of the best available scientific and commercial information” as “recovered.”<sup>478</sup>

This was, as of one month before the ESA made the half century mark, the lone final (not proposed) “recovered” species of 2023. To ensure that this now “recovered” bird does not slide back into peril, the USFWS stated, “We will continue to coordinate with the Navy to implement effective post-delisting monitoring...”<sup>479</sup>

## VIII. Conclusion

Recovery is the goal and the ultimate measure of success under the ESA. It is, after a half century, the obvious and best measure of the program. Unfortunately, and rather inexplicably, the USFWS eliminated other yardsticks for the program by ceasing to report the status of species as well as “recovery objective achieved” in biannual Reports to Congress and, instead, substituted bureaucratic fluff.

At the half century mark, the 62 aforementioned ‘recovered’ species compose the entire universe of species that have met the ESA’s definition of a conserved species. Unfortunately, of these 62 officially ‘recovered’ species, 36—nearing 60%—are not conservation success stories. These ‘recoveries’ are supposed to be among the best of the ESA’s achievements after a half century. Yet, they are hollow, inaccurate proclamations attributable to error. Additionally, of the species currently proposed for delisting purportedly on the basis of recovery, at least 5 of 12 appear more likely to be attributable to original data error as well (Table 1). Furthermore, about half of the downlisted species (at least 20 of about 40) pointed to as recovering appear to primarily owe their downlisting to erroneous original data too (Table 4). This poor showing for the ESA is compounded by the fact that for some species that have recovered, the recovery is not primarily or even significantly attributable to the ESA as can be seen in Table 1.

After a half century, Potemkin recoveries and official data errors are more than double actual recoveries (~58 to 26). These disguised and *properly* delisted data errors, downlisted data errors, and the untold number of species that remain listed based on erroneous data, demonstrate a lack of scientific rigor in listing and delisting species. They also evidence a serious lack of scientific integrity in implementing the law. The erroneous data used to justify adding these species to the *List* was supposed to be “the best scientific and commercial data available.” It was clearly either wrong or insufficient or the assessment of it, knowingly or not, was wrong.

These errors are not without consequence. Each mistake consumes money and time. *Almost a decade ago*, in 2014, USFWS reported that the “median cost for preparing and publishing a 90-day finding is \$39,276; for a 12-month finding, \$100,690; for a proposed rule with critical habitat, \$345,000; and for a final listing rule with critical habitat, \$305,000.”<sup>480</sup> The process of coming off the *List* costs money as well. There are more such costs once a species is listed, including the preparation of recovery plans, conducting five-year reviews and preparing species status assessments. These are just the planning, review, and paperwork costs associated with being officially endangered.

More importantly, even if a species is subsequently delisted, the regulatory powers of the ESA were already triggered, and many of these mistakes remained on the *List* for decades while others are still there. Burdensome and costly requirements and restrictions for homeowners imposed in the name of the Lake Erie water snake, activities imposed on other federal agencies for the Oregon chub, or the requirements for the Navy to keep tabs on a lizard that does *and did* number in the millions for yet another decade are indefensible.

Keeping non-endangered species on the *List* whether they are subsequently delisted as ‘data errors’ or, falsely, as ‘recoveries’ is just wrong. Were NMFS’s biological opinions for ‘Johnson’s seagrass,’ the clone of an Indo-Pacific plant, ESA conservation work carried out by public servants or just bureaucratic hoops fashioned by regulators leveraging the ESA? One from *November 2020* addressed the Venetian Causeway in Miami-Dade. NMFS recommended the Florida Department of Transportation “in coordination with *seagrass researchers* and industry, support ongoing research on light requirements and transplanting techniques... and on *collection of plants for genetics research, tissue culture, and tissue banking*” (emphasis added).<sup>481</sup>

Is it reasonable for USFWS to pressure a developer of 300 low-income housing units to accept conservation measures that included setting aside 50 acres “for conservation” *and* funding a study in which transmitters are surgically implanted into captured Puerto Rican boas that are released and tracked for a year?<sup>482</sup> That’s just what a USFWS document indicates the agency did. How much worse is it given USFWS concluded decades later that the boa is “**probably less abundant now than in pre-Columbian times**”? (See Table 1). These regulatory intrusions and burdens were imposed under false pretenses.

The conflicts, expenses, and burdens mentioned here and in the appendices are but a few, small examples of what goes on. The costs and burdens imposed are not this report’s focus. However, these examples do make clear that not only does misreporting species as “recovered” hide the ESA’s true conservation record, but it also masks the wasted resources, regulatory burdens, economic impacts, and infringement on private property imposed by ‘error.’



There are plausible explanations beyond just wishful thinking for the misleading species accounting. These include concern for the agencies' reputations, the disappointment or embarrassment of the agencies or those involved in efforts regarding the species, detriment to the 'general cause' of the ESA, and the reaction of those who endured a regulatory burden triggered in error. No matter how important USFWS thinks survey work done after the original listing (often carried out by or imposed upon others) is, if the work reveals a species should not have been listed, it is not work that actually recovers a species. Nor is research that reveals the threats to the species were overestimated, or the discovery that an animal or plant is not a unique species or subspecies. Despite these activities being carried out after listing, when they reveal the original determination that a species was 'endangered' was wrong, the activities are not evidence of a recovery. Likewise, while controlling rats on Monito Island and thousands of goats on San Clemente Island were responsible management actions, neither the Monito gecko nor island night lizard were ever threatened with extinction and were not 'saved' by these actions.

While recovery takes time, a recovery record that is inflated by more than 100% after a half century should raise serious questions about the conservation effectiveness of the law. The silence of the environmental lobby about this dishonest record is deafening. Refusing to acknowledge the real record perpetuates the inaccurate narrative that ESA activities are well-grounded in science and that the Act works well..

Notably, the false proclamations of success cannot be blamed on inadequate funding or lack of authority—the usual defense of a faltering government program. In fact, in addition to violating scientific integrity and misinforming Congress and the public, these illegitimate recoveries resulted in *even more waste* than would have occurred if the species had been properly delisted on the grounds of original data error. Species delisted on the basis of recovery require post delisting monitoring, detailed plans to do so, accompanying Federal Register notices, and, possibly, more unnecessary regulatory or management actions undertaken by other federal agencies post delisting.<sup>483</sup>

The dishonest claims of recovery should not only set off alarm bells about the ESA's effectiveness at the half century mark, but also about the scientific integrity, or really lack thereof, in the implementation of one of the Nation's most powerful environmental laws.

## IX. Appendices

**Table 1: “Recovered Species”**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting (or proposed) Date	Years to Delist	Where	Official Delisting Reason	Accurate Attribution	Notes (bold text is added for emphasis.)
San Clemente sage sparrow	<i>Amphispiza belli clementiae</i>	Bird	9/12/1977	1/25/2023	45.4	CA	Recovered	Data Error	See text.
Snail darter	<i>Percina tanasi</i>	Fish	11/10/1975	11/4/2022	47.0	AL, GA, MS, TN	Recovered	Data Error	See text.
San Benito evening-primrose	<i>Camissonia benthamii</i>	Plant	2/12/1985	3/7/2022	37.1	CA	Recovered	Data Error	See text.
Running buffalo clover	<i>Trifolium stoloniferum</i>	Plant	6/5/1987	9/7/2021	34.3	IN, KY, MO, OH, PA, WV	Recovered	Data Error	See text.
Cumberl sandwort	<i>Arenaria cumberlandensis</i>	Plant	6/23/1988	8/16/2021	33.2	KY, TN	Recovered	Data Error	See text.
No common name	<i>Lepanthes eltoroensis</i>	Plant	11/29/1991	7/16/2021	29.6	Puerto Rico	Recovered	Data Error	See text.
Water Howellia	<i>Howellia aquatilis</i>	Plant	7/14/1994	7/16/2021	27.0	CA, MT, ID, OR, WA	Recovered	Data Error	See text.
Bradshaw's lomatum	<i>Lomatium bradshawii</i>	Plant	9/30/1988	4/7/2021	32.5	OR, WA	Recovered	Data Error	See text.
Interior least tern	<i>Sterna antillarum</i>	Bird	5/28/1985	2/12/2021	35.7	AR, CO, IA, IL, IN, KS, KY, LA, MS, MO, MT, ND, NE, NM, OK, SD, TN, TX	Recovered	Data Error	See text.
Hawaiian (=’lo) Hawk	<i>Buteo solitarius</i>	Bird	3/11/1967	2/3/2020	52.9	HI	Recovered	Data Error	See text.
Colorado Butterfly plant	<i>Gaura neomexicana var. coloradensis</i>	Plant	10/18/2000	12/5/2019	19.1	CO, NE, WY	Recovered	Data Error	See text.
Monito gecko	<i>Sphaerodactylus microphthecus</i>	Reptile	10/15/1982	11/4/2019	37.1	PR	Recovered	Data Error	See text.
Foskett speckled dace	<i>Rhinichthys osculus ssp.</i>	Fish	3/28/1985	10/15/2019	34.6	OR	Recovered	Data Error	See text.
Deseret milkvetch	<i>Astragalus desereticus</i>	Plant	10/20/1999	11/19/2018	19.1	UT	Recovered	Data Error	See text.

**Table 1: “Recovered Species” CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting (or proposed) Date	Years to Delist	Where	Official Delisting Reason	Accurate Attribution	Notes (bold text is added for emphasis.)
Hidden Lake bluecurts	<i>Trichostema austrorontanum</i> <i>ssp. compactum</i>	Plant	10/14/1998	7/2/2018	19.7	CA	Recovered	<b>Data Error</b>	See text.
Lesser long-nosed bat	<i>Leptonycteris curasoae</i> <i>yerbabuena</i>	Mammal	9/30/1988	5/18/2018	29.6	AZ, NM	Recovered	<b>Data Error</b>	See text.
Black-capped Vireo	<i>Vireo atricapilla</i>	Bird	10/6/1987	5/16/2018	30.6	OK, TX	Recovered	<b>Data Error</b>	See text.
White-haired goldenrod	<i>Solidago albopilosa</i>	Plant	4/7/1988	10/11/2016	28.5	KY	Recovered	<b>Data Error</b>	See text.
Louisiana black bear	<i>Ursus americanus luteolus</i>	Mammal	1/7/1992	3/11/2016	24.2	LA, MS, TX	Recovered	<b>Data Error</b>	See text.
Johnston's frankenia	<i>Frankenia johnstonii</i>	Plant	8/7/1984	2/11/2016	31.5	TX	Recovered	<b>Data Error</b>	See text.
Modoc sucker	<i>Carostomus microps</i>	Fish	6/11/1985	1/7/2016	30.6	CA, OR	Recovered	<b>Data Error</b>	See text.
Oregon chub	<i>Oregonichthys crameri</i>	Fish	10/18/1993	3/23/2015	21.4	OR	Recovered	<b>Data Error</b>	See text.
Island night lizard	<i>Xantusia riversiana</i>	Reptile	9/12/1977	4/1/2014	36.6	CA	Recovered	<b>Data Error</b>	See text.
Virginia northern flying Squirrel	<i>Glaucomys sabrinus fuscus</i>	Mammal	7/31/1985	3/4/2013	27.6	WV, VA	Recovered	<b>Data Error</b>	See text.
Concho water snake	<i>Nerodia paucimaculata</i>	Reptile	9/3/1986	11/28/2011	25.3	TX	Recovered	<b>Data Error</b>	See text.
Lake Erie water snake	<i>Nerodia sipedon insularum</i>	Reptile	8/30/1999	9/15/2011	12.1	OH	Recovered	<b>Data Error</b>	See text.
Tennessee purple coneflower	<i>Echinacea tennesseensis</i>	Plant	7/5/1979	9/2/2011	32.2	TN	Recovered	<b>Data Error</b>	See text.
Maguire daisy	<i>Erigeron maguirei</i>	Plant	9/5/1985	2/18/2011	25.5	UT	Recovered	<b>Data Error</b>	See text.
Eggert's sunflower	<i>Helianthus eggertii</i>	Plant	5/22/1997	8/18/2005	8.2	AL, KY, TN	Recovered	<b>Data Error</b>	See text.
Tinian Monarch (old world flycatcher)	<i>Monarcha takatsukae</i>	Bird	6/2/1970	9/21/2004	34.3	Tinian	Recovered	<b>Data Error</b>	See text.

**Table 1: “Recovered Species” CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting (or proposed) Date	Years to Delist	Where	Official Delisting Reason	Accurate Attribution	Notes (bold text is added for emphasis.)
Hoover's woolly-star	<i>Eriastrum hooveri</i>	Plant	7/19/1990	10/7/2003	13.2	CA	Recovered	<b>Data Error</b>	See text.
American alligator	<i>Alligator mississippiensis</i>	Reptile	3/11/1967	6/4/1987	20.2	AL, AR, FL, GA, LA, MS, NC, SC, OK, TX	Recovered	<b>Data Error</b>	See text.
Palau fantail flycatcher	<i>Rhipidura lepida</i>	Bird	6/2/1970	9/4/2/1985	15.3	Palau	Recovered	<b>Data Error</b>	See text.
Palau ground dove	<i>Gallinula canifrons</i>	Bird	6/2/1970	9/4/2/1985	15.3	Palau	Recovered	<b>Data Error</b>	See text.
Palau owl	<i>Pyrroglaux podargina</i>	Bird	6/2/1970	9/4/2/1985	15.3	Palau	Recovered	<b>Data Error</b>	See text.
Brown pelican	<i>Pelecanus occidentalis</i>	Bird	6/2/1970	2/4/1985	14.7	FL, SC, US Atlantic Coast	Recovered	<b>Data Error</b>	See text.
Eureka Valley evening-primrose	<i>Oenothera avita</i> ssp. <i>eurekaensis</i>	Plant	5/27/1978	3/29/2018	39.9	CA	Recovered	Possibly Recovered	USFWS reports “we have no information regarding population size of Eureka Valley evening-primrose at the time of listing; abundance surveys... prior to listing were limited to the north end of Eureka Dunes. Therefore, we cannot determine how populations may have changed over time and across the range of the species since listing.” USFWS reports that “at the time of listing, the primary threat to Eureka Valley evening-primrose and Eureka dune grass was OHV activity at Eureka Dunes.” The plant is also found on Saline Spur and Marble Canyon Dunes where there are respectively 988 and 1,176 acres of habitat. In 2010, USFWS received a petition to delist the plant. In 2011, the agency published its “90 day finding” indicating it would review the plant for a “12 month finding.” In 2014, USFWS published its “12 month finding” combined with a proposal to delist the plant. The proposed delisting notice references the plant’s population in “2013 to be 21,286 individuals... a substantial increase in the above-ground expression of plants following a mass germination event.” (Proposed Delisting, p. 11057). After publishing the proposed delisting notice 2014, USFWS published a final delisting notice in 2018 that reported that “...the Park Service has continued to observe great annual variability in the abundance of the taxon, with 2014 being a “superbloom” year with the number of individuals estimated at well over 1 million...” (Delisting, p. 8579)
Columbian white-tailed deer	<i>Odocoileus virginianus leucurus</i>	Mammal	3/11/1967	7/24/2003	36.4	OR, WA	Recovered	Possibly Recovered	This “recovered” entry on the List was for a distinct population segment of a dubious subspecies of white-tailed deer that is plentiful at the species level. (Conin MA (1991) Mitochondrial and nuclear genetic relationships of deer ( <i>Odocoileus</i> spp.) in western North America. Can J Zool 69:1270–1279)

**Table 1: “Recovered Species” CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting (or proposed) Date	Years to Delist	Where	Official Delisting Reason	Accurate Attribution	Notes (bold text is added for emphasis.)
Golden paintbrush	<i>Castilleja levisecta</i>		6/11/1997	8/18/2023	26.2	OR/WA	Recovered	Recovered	When it was listed, USFWS provided reported 10 populations/colonies that totaled a minimum of about 13,000 plants (two had just four plants and the populations/colonies appear to number 11) (Listing, p. 31741–2). USFWS reports that “Extant populations in Washington, at the time of listing, were the necessary source of seeds and plugs for outplantings that exist today in Oregon” (SSA, p. 5). At delisting, USFWS reported that “since its Federal listing in 1997, only one new population of golden paintbrush that was likely extant at the time of listing has been discovered across the species’ range... All other new populations across the range are the result of reintroductions through outplanting or direct seeding. Seeds used to grow plugs for outplanting, and plant stock for seed production, were derived from populations that were extant at the time of listing... Since its Federal listing, the distribution and abundance of golden paintbrush have increased significantly as a result of outplanting... During the last rangewide assessment, a minimum of 48 populations were documented.” (Delisting, p. 46090). According to USFWS, “A visual assessment of data shows that from 2004 to 2017 <i>C. levisecta</i> abundance is mostly due to success of outplanting efforts. Outplantings, especially over the last five years in Oregon have quickly increased the total rangewide population of <i>C. levisecta</i> ” (SSA, p. 30).
Okaloosa darter	<i>Etheostoma okaloosae</i>		6/4/1973	7/29/2023	50.2	FL	Recovered	Recovered	According to USFWS “approximately 90 percent of the 457-square-kilometer...watershed drainage area that historically supported the Okaloosa darter is Federal property under the management of Eglin Air Force Base... including about 98.7 percent of the stream length in the current range of the Okaloosa darter” (Delisting, p. 41836). In its delisting notice USFWS states, “many conservation and restoration actions have been successful” on Eglin Air Force Base “in restoring the Okaloosa darter to regions from which it had previously been extirpated and increasing darter densities since the time of its listing in 1973. Much progress has been made in implementing conservation actions since the Okaloosa darter was downlisted to threatened in 2011. For example, Eglin AFB has restored more than 534 acres of erosional sites and completed multiple stream restoration projects to reconnect fragmented populations” (Delisting, p. 41844).
San Clemente Island Paintbrush	<i>Castilleja grisea</i>		9/12/1977	1/25/2023	45.4	CA	Recovered	Recovered	“Historically, nonnative herbivores (goats, sheep, pigs, cattle, mule deer) severely degraded habitat on San Clemente Island, leading to the decline of endemic species. Since removal of these nonnative herbivores, the plant communities on San Clemente Island have been recovering. Removal of nonnative herbivores, along with restoration and management actions by the Navy, have led to the recovery of these five species to the point that they no longer require protections under the Act” (Delisting, p. 4761). Thousands of goats and other introduced species were removed from the habitat” (Delisting, p. 23883).
San Clemente Island Larkspur	<i>Delphinium variegatum</i> ssp. <i>kinikense</i>		9/12/1977	1/25/2023	45.4	CA	Recovered	Recovered	See above
San Clemente Island latus (=broom)	<i>Acmispon dendroideus</i> var. <i>traskiae</i>		9/12/1977	1/25/2023	45.4	CA	Recovered	Recovered	See above
San Clemente Island bush-mallow	<i>Malacothammus clementinus</i>		9/12/1977	1/25/2023	45.4	CA	Recovered	Recovered	See above
Borax Lake chub	<i>Gila boraxobius</i>	Fish	5/28/1980	7/13/2020	40.2	OR	Recovered	Recovered	“The proposed listing action was taken because proposed geothermal development in and around Borax Lake, and human modification of the lake, threatened the integrity of the species’ habitat and, hence, its survival.” The recovery plan called for “Removal of threats to subsurface waters from geothermal energy exploration or development.” Delisting notes that “the most recent exploration for geothermal resource development occurred in 2008” by “Pueblo Valley Geothermal LLC but that “Pueblo Valley Geothermal LLC subsequently has become inactive and filed to dissolve their LLC status in the State of Oregon on December 26, 2013” (Delisting, 35579).

**Table 1: “Recovered Species” CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting (or proposed) Date	Years to Delist	Where	Official Delisting Reason	Accurate Attribution	Notes (bold text is added for emphasis.)
Kirtland's Warbler	<i>Setophaga kirtlandii</i>	Bird	3/11/1967	11/8/2019	52.7	MI, OH, SC, WI	Recovered	Recovered	This rare bird increased in number and in the amount of occupied habitat largely as a result of increased clear-cutting followed by sapling planting or natural regeneration of preferred tree species. Kirtland's warbler management areas "are administrative boundaries that describe parcels of land dedicated to and managed for Kirtland's warbler breeding habitat... further subdivided into <b>cutting blocks containing 200 or more acres of contiguous stands</b> , determined by factoring an average population density of one breeding pair per [30 acres] <b>into a 45- to 50-year commercial harvest rotation</b> .... Data collected from the annual singing male census from 1980 to 1995 indicated that a breeding pair used closer to [38 acres].... Based on these data... the Kirtland's Warbler Recovery Team... recommended increasing the total amount of managed habitat to... 190,000" acres (Delisting, 54438).
Humpback whale	<i>Megaptera novaeangliae</i>	Mammal	6/2/1970	10/11/2016	46.4	HI DPS	Recovered	Recovered	The Humpback whale was listed as an endangered species in 1970. In 2016, NMFS issued a rule that subdivided the species into 14 different groupings (distinct population segments) and then included on the list four as endangered, one as threatened and removed 9 as recovered, some of which occurred in U.S. waters and others that did not. (Identification of DPS, pp. 93639–93644). According to NMFS, "the International Whaling Commission's final whaling moratorium on commercial harvest, in effect since 1985, played a major role in the recovery of humpback whales" (NMFS, <a href="https://www.fisheries.noaa.gov/species/humpback-whale">https://www.fisheries.noaa.gov/species/humpback-whale</a> ).
Humpback whale	<i>Megaptera novaeangliae</i>	Mammal	6/2/1970	10/11/2016	46.4	West Indies DPS	Recovered	Recovered	See humpback whale, Hawaii DPS.
Humpback whale	<i>Megaptera novaeangliae</i>	Mammal	6/2/1970	10/11/2016	46.4	Oceania DPS	Recovered	Recovered	See humpback whale, Hawaii DPS.
San Miguel Island Fox	<i>Urocyon littoralis littoralis</i>	Mammal	3/5/2004	9/12/2016	12.5	CA	Recovered	Recovered	One of several subspecies of fox limited to the Channel Islands in California. Extensive management activities on these islands included replacing golden eagles that preyed on the fox with bald eagles to prevent recolonization, captive breeding and releasing foxes, and vaccinating the foxes for canine distemper on Santa Catalina (Delisting, 53315–53333). The fox are theorized to have been introduced to the island by early Native Americans or to have reached the islands by inadvertently rafting there on log jams thousands of years ago (2015 SSA, 7–8).
Santa Cruz Island Fox	<i>Urocyon littoralis santacruzae</i>	Mammal	3/5/2004	9/12/2016	12.5	CA	Recovered	Recovered	See: San Miguel Island fox.
Santa Rosa Island Fox	<i>Urocyon littoralis santarosae</i>	Mammal	3/5/2004	9/12/2016	12.5	CA	Recovered	Recovered	See: San Miguel Island fox.
Delmarva Peninsula fox squirrel	<i>Sciurus niger cinereus</i>	Mammal	3/11/1967	12/16/2015	48.8	DE, MD, VA	Recovered	Recovered	This squirrel benefitted from many successful transplants of squirrels taken from a population that had been introduced on the property of a hunting club (2007 SSA, p. 9).
Steller sea lion	<i>Eumetopias jubatus</i>	Mammal	4/5/1990	12/4/2013	23.7	AK, CA, OR, WA	Recovered	Recovered	According to NMFS the Eastern Distinct Population Segment of Steller sea lions have increased significantly with pups increasing by over 3% annually from around 1971 to around 2011 in in the Eastern DPS (NMFS, Status Review of Eastern DPS, p. 53). According to NMFS "intentional killing, such as predator control and commercial harvests in large areas of the range of the eastern population, resulted in major reductions in abundance through much of the 1900s. Culling and commercial harvests in Alaska (prior to the Marine Mammal Protection Act), competition with fisheries for prey, incidental take in fisheries, entanglement, legal and illegal shooting, and possibly other factors also adversely affected Steller sea lions" (NMFS, <a href="https://www.fisheries.noaa.gov/species/steller-sea-lion/eastern-and-western-populations">https://www.fisheries.noaa.gov/species/steller-sea-lion/eastern-and-western-populations</a> , accessed 10/16/23).

**Table 1: “Recovered Species” CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting (or proposed) Date	Years to Delist	Where	Official Delisting Reason	Accurate Attribution	Notes (bold text is added for emphasis.)
Magazine Mountain shagreen	<i>Infectarius magazinensis</i>	Snail	4/17/1989	6/14/2013	24.2	AR	Recovered	Recovered	The “final rule identified the following threats to Magazine Mountain shagreen: Loss of habitat due to a military proposal to conduct troop and heavy equipment movements and artillery operations on Magazine Mountain; loss of habitat due to development of a new State park on Magazine Mountain that would include construction of new buildings, roads, and trails; increased recreational use due to development of the State park; U.S. Department of Agriculture Forest Service (USFS) use of the land; and increased vulnerability to collecting.” (Proposed delisting, 36461). The basis for this delisting was the decision by the Army not to train on the snail’s habitat. “The U.S. Army is no longer considering the use of Magazine Mountain for military training exercises, an activity that was considered an imminent threat to Magazine Mountain shagreen when it was listed. The U.S. Army has no plans to conduct military training exercises on Magazine Mountain in the foreseeable future and withdrew its previous consideration after Magazine Mountain shagreen was listed as threatened in 1989” (Delisting, 28520).
Brown pelican	<i>Pelecanus occidentalis</i>	Bird	6/2/1970	12/17/2009	39.6	AZ, CA, LA, TX, WA	Recovered	Recovered	This species benefitted from over 1,000 nesting brown pelicans transplanted from colonies in Florida to coastal Louisiana to establish new populations by the Louisiana Department of Fish and Game, and the banning of DDT that preceded the enactment of the ESA (FYR, p. 8–11).
Bald eagle	<i>Haliaeetus leucocephalus</i>	Bird	3/11/1967	8/8/2007	40.4	Continental US	Recovered	Recovered	The eagle benefitted from the banning of DDT that preceded enactment of the ESA. The Recovery Plan for bald eagles in the Chesapeake Bay region states, “the major limiting factor for the Chesapeake Bay Region was identified as lower productivity resulting from the pesticide DDT and other contaminants exacerbated by shooting, disturbance and habitat destruction... Bald eagle populations began to recover throughout their range after the 1972 Environmental Protection Agency Ban on DDT. The [Chesapeake Bay Regional] population has increased from 80 nesting pairs in 1970 to over 230 in 1990. This comeback is attributed primarily to the reduction in use of environmental contaminants.” (Chesapeake Bay Region Recovery Plan, p. 1). Prior to enactment of the ESA, the enactment of the Bald and Golden Eagle Act imposed civil and criminal penalties for shooting bald eagles. The greatest cause of direct eagle mortality even at the time of listing was still attributed to gunshot wounds. According to USFWS’ listing notice, “shooting continues to be the leading cause of direct mortality in adult and immature bald eagles, accounting for about 40 to 50 percent of birds picked up by field personnel” (Listing, p. 6232). As USFWS noted at that time, “the bald eagle already is protected throughout the United States by the Bald and Golden Eagles Protection Act... the Migratory Bird Treaty Act... and regulations issued thereunder” (Listing, p. 6232).
Robbins’ cinquefoil	<i>Patentilla robbinsiana</i>	Plant	9/17/1980	8/27/2002	22.0	NH, VT	Recovered	Recovered	According to the USFWS, factors contributing to the recovery of Robbins’ cinquefoil, included transplanting to establish and augment populations and rerouting of a hiking trail (Delisting, 54968–54975).
Aleutian Canada goose	<i>Branta canadensis leucopareia</i>	Bird	3/11/1967	3/20/2001	34.0	AK, CA, NV, OR, WA.	Recovered	Recovered	This bird recovered from severely depleted numbers following elimination of introduced arctic and red fox on Alaskan islands where it nested as well as translocation efforts to establish new breeding colonies (Delisting, pp. 15643–54). ITIS indicates that <i>Branta canadensis leucopareia</i> is invalid and that this subspecies is now considered a subspecies of the cackling goose, the Aleutian cackling goose, <i>Branta hutchinsii leucopareia</i> (ITIS).

**Table 1: “Recovered Species” CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting (or proposed) Date	Years to Delist	Where	Official Delisting Reason	Accurate Attribution	Notes (bold text is added for emphasis.)
American peregrine falcon	<i>Falco peregrinus anatum</i>	Bird	6/2/1970	8/25/1999	29.2	Continental US	Recovered	Recovered	The most important factor to this delisting were the efforts of private falconers to release captive bred falcons. “The Service published an Advanced Notice of a Proposal to Remove the American Peregrine Falcon from the List... <b>based on data indicating this subspecies was recovered following restrictions on the use of organochlorine pesticides...</b> and because of successful management activities, including the <b>reintroduction of captive bred and relocated wild hatching peregrine falcons</b> ” (Proposed delisting, p. 45448). “In the Eastern United States where peregrine falcons were extirpated, the initial recovery objective was to reestablish peregrine falcons through the release of offspring from a variety of wild stocks being held in captivity by (private) falconers” (Proposed Delisting, p. 45448). “These and future releases, coordinated by the Service, State fish and wildlife agencies, <b>and representatives of The Peregrine Fund</b> , demonstrated that hacking, the practice of retaining and feeding young captive-bred birds in partial captivity until they learn to fly and hunt on their own, was an effective method of introducing captive-bred peregrines to the wild” (Delisting Proposal, p. 45449). The leading role of the Peregrine Fund in the reintroductions is well recognized and documented.
Arctic peregrine Falcon	<i>Falco peregrinus tundrius</i>	Bird	6/2/1970	10/5/1994	24.4	AK	Recovered	Recovered	The primary factor in this delisting was the banning of DDT which preceded enactment of the ESA. According to USFWS’s listing, “Arctic peregrine falcon numbers declined in the period following World War II as a result of contamination with organochlorine pesticides” (Listing, p. 50796).
Gray whale	<i>Eschrichtius robustus</i>	Mammal	6/2/1970	6/16/1994	24.1	eastern north Pacific population	Recovered	Recovered	NMFS reported that “the eastern North Pacific population has recovered to near its estimated original population size and is neither in danger of extinction throughout all or a significant portion of its range” (Corrections to the List, p. 31094). According to the Alaska Department of Fish and Game, “in the north Pacific, gray whales had been hunted to the edge of extinction in the 1850’s after the discovery of the calving lagoons, and again in the early 1900’s with the introduction of floating factories. <b>The gray whale was given partial protection in 1937, and full protection in 1947</b> by the International Whaling Commission. <b>Since that time the eastern north Pacific gray whale population has made a remarkable recovery and now numbers approximately 26,000, probably close to their original population size.</b> ” (AKDFG, Gray Whale, <a href="https://www.adfg.alaska.gov/index.cfm?adfg=graywhale.main">https://www.adfg.alaska.gov/index.cfm?adfg=graywhale.main</a> , accessed 11/2/23).
Colorado hookless Cactus	<i>Sclerocactus glaucus</i>	Plant	12/28/1973	4/11/2023	N/A	CO	Recovery (Proposed)	Data Error	USFWS listed the Colorado Hookless Cactus in 1979 reporting that “this plant occurs in Utah and Colorado. <i>Sclerocactus glaucus</i> is being commercially exploited by nurserymen and private collectors” (Listing, p. 58868). USFWS also reported that “approximately 15,000 individuals are found on eight sites.” (Listing, p. 58868). The cactus has a tortured taxonomic history. It is now considered to be four different cacti: <i>Sclerocactus glaucus</i> (Colorado hookless cactus), <i>S. dawsonii</i> , <i>Sclerocactus brevispinus</i> (Pariette cactus) and <i>Sclerocactus wetlandicus</i> (Uinta Basin hookless cactus). After division into four separate cacti, the one with the smallest population is double what was reported at listing. In its 2010 Recovery Outline, USFWS estimated just the Colorado hookless cactus to have 19,000 individuals and some 134 occurrences (Recovery Outline, p. 4, 5). By its 2021 Species Status Assessment, USFWS had grouped all Colorado hookless cactus occurrences into “eight analytical units” that appear to have increased dramatically as the agency reported that the cactus “currently has a minimum of 103,086 plants...” and over 593 square miles of habitat (SSA, p. iv, 7). USFWS also reported that while <i>S. glaucus</i> and <i>S. dawsonii</i> are not visually indistinguishable, the two species can be identified from one another by genetic analysis (SSA, p. iv, 7). As for the other three cacti, USFWS reports that <i>S. dawsonii</i> has a minimum population of 31,867 plants and a habitat of over 122 square miles (SSA, p. iv, 7). According to USFWS, the Uinta Basin Hookless cactus has a population between 81,160 and 108,592 individuals and 806 square miles of habitat. (Draft RP, p. 7). USFWS reports that the Pariette cactus has a population between 33,268 and 44,504 individuals and 173 square miles of habitat (Draft RP, p. 7).



**Table 1: “Recovered Species” CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting (or proposed) Date	Years to Delist	Where	Official Delisting Reason	Accurate Attribution	Notes (bold text is added for emphasis.)
Puerto Rican boa	<i>Chilabothrus inornatus</i>	Reptile	10/13/1970	7/13/2022	N/A	Puerto Rico	Recovery (Proposed)	<b>Data Error</b>	USFWS reports: “boa populations presumably declined in both size and distribution during a period of intense deforestation on Puerto Rico in the late 1800s. This decline and apparent rarity prompted the Federal government to include the [Puerto Rican] boa in the Endangered Species list in 1970.” (2011 FYR, p. 16). “Much of the lack of information and the [Puerto Rican] boa’s apparent rarity has been attributed to observer’s difficulties in visually detecting the species due to its cryptic coloration and habits. Some authors have established that based on the amount of individuals they found in their study area, and given the species detection difficulty, the [Puerto Rican] boa is more abundant than generally perceived. In fact, this species has been reported in about 90% of the municipalities of Puerto Rico...and the Puerto Rico GAP Analysis Project illustrates almost the entire island as having a probable occurrence of boas... there is a general consensus that the boa is not as rare as previously thought” (5FYR, p. 16–17). USFWS reports that the snake “is <b>probably less abundant now than it was in Pre-Columbian times...</b> ” (SSA, p. 19). USFWS reports “current initial population size of the [Puerto Rican] boa could range from 37,903 to 189,515 boas” (SSA, p. 37). “Although this estimate is considered a rough population estimate, the best available information indicates that the Puerto Rican boa is likely more abundant today than at the time of listing” (Proposed Delisting, p. 41654). The IUCN classifies the boa as “Least Concern” “due to its large distribution, lack of widespread threats, and ability to inhabit altered environments” (SSA, p. 11). The USFWS required some 24 conservation measures for a developer of 300 low income housing units (USFWS BO, 9/28/00, p. 1; <a href="https://ecos.fws.gov/tails/pub/document/13254353">https://ecos.fws.gov/tails/pub/document/13254353</a> ). These included setting aside 50 acres as a nature preserve and funding a study in which radio transmitters were surgically implanted in captured boas that were then to be released and monitored for a year (BO, p. 5–6).
Dwarf-flowered heartleaf	<i>Hexastylis naniflora</i>	Plant	4/14/1989	4/26/2021	N/A	NC, SC	Recovery (Proposed)	<b>Data Error</b>	When listing this plant, USFWS reported that it was known from 24 populations in eight counties (Proposed Listing, p. 13223). A valley of USFWS reported minimums of these populations yields 5,637 plants (individual rosettes) (Listing, p. 13223–4). USFWS’s 2019 Species Status Assessment reports 119 populations from 13 counties in North and South Carolina. According to USFWS, “if the most recent population estimates for each (element occurrence) record are compiled across years of observation, the 113 populations could conservatively be estimated to contain a collective total of more than 300,000 rosettes...” (SSA, p. 18). Twenty eight of the populations have been estimated to contain over 1,000 plants with some p opulations estimated at 19,000, 39,000, 54,000 and 100,000 rosettes (Delisting, p. 21997 and SSA, p. 24, Table 4.3). According to a 2017 USFWS biological opinion, the North Carolina Department of Transportation (NCDOT) was required to implement conservation measures for a project to improve safety by replacing a deteriorating bridge. (USFWS, BO, 10/13/17, p. 4; <a href="https://ecos.fws.gov/tails/pub/document/43605071">https://ecos.fws.gov/tails/pub/document/43605071</a> , accessed 11/15/23). The project was anticipated to affect 5% of the area where the plants occurred, and anticipated to result in the loss of 131 individual plants. NCDOT was to transplant the plants, and monitor the transplant and plants remaining at the site. NCDOT was to report results to USFWS including counts and mapping of the plants every two years for six years (BO, p. 6). NCDOT also purchased over 47 acres to be preserved in perpetuity (BO, p. 15).

**Table 1: “Recovered Species” CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting (or proposed) Date	Years to Delist	Where	Official Delisting Reason	Accurate Attribution	Notes (bold text is added for emphasis.)
Nashville crayfish	<i>Orconectes shoupi</i>	Crustacean	9/26/1986	9/23/2020	N/A	TN	Recovery (Proposed)	<b>Data Error</b>	At the time of listing USFWS reported that the Nashville crayfish was “currently known only from Mill Creek and five of its tributaries” but the historic collection records indicated the Nashville crayfish has been found in three other (Big Creek, South Harpeth River, and Richland) creeks. Subsequently, USFWS reported that Big Creek and South Harpeth River records were the result of introductions from fishermen’s bait buckets and, that the Richland Creek record was a misidentification of another species. According to USFWS “...the available information and experts we solicited agreed Nashville crayfish only occurs in the Mill Creek watershed in Davidson and Williamson counties, and it likely never occurred naturally outside of this watershed.” USFWS also subsequently reported that “estimates for Mill Creek were 1,854–3,217 individuals per 100 linear meters” and that “the species was found to be evenly distributed in the remaining 23.5 miles of Mill Creek.” USFWS reported that the species is currently known to occur in Mill Creek and 14 of its tributaries (Collins Creek, Owl Creek, Edmonson Branch, Sims Branch, Sevenmile Creek, Sorghum Branch, Whittemore Branch, Turkey Creek, Indian Creek, Holt Creek, four unnamed tributaries to Mill Creek) as well as in one unnamed tributary to Owl Creek (SSA, p. 5). Using USFWS’s density population density estimate, yields a population for just the main stem of Mill Creek of over 665,000 to 1.15 million crayfish. USFWS reports that “the Nashville crayfish has been found in a wide range of environments including gravel and cobble runs, pools where the flow was intermittent, and under slab rocks and other cover” and “other unique areas, such as storm water detention ponds, indicating the species may be more of a generalist than previously thought” (SSA, p. Exec. Sum.). According to USFWS “there have been consistent stormwater and sediment inputs to the Mill Creek watershed, as well as frequent spills/releases of raw sewage and hazardous substances, yet the Nashville crayfish persists in high numbers” (Delisting, p. 65104). A USFWS biological opinion for installation of an 8-in sanitary sewer utility line and span bridge across a creek required sweeps for Nashville crayfish and placing all captured crayfish in suitable, unoccupied habitat upstream of the work area, use of block nets to keep crayfish from reentering the work area while the coffer dams would be under construction, and monitoring “all aspects of the boring activity” by a “qualified/permitted biologist” (USFWS, BO, p. 7, 9; <a href="https://ecos.fws.gov/tails/pub/document/1474559">https://ecos.fws.gov/tails/pub/document/1474559</a> , accessed 11/15/23). The BO also requires that “upon locating a dead, injured, or sick individual” crayfish “initial notification must be made to the Fish and Wildlife Service Law Enforcement Office” and that “care should be taken in handling sick or injured individuals and in the preservation of specimens in the best possible state for later analysis of cause of death or injury” (BO, p. 39).
Gypsum wild-buckwheat	<i>Eriogonum gypsophilum</i>	Plant	1/19/1981	1/6/2017	N/A	NM	Recovery (Proposed)	<b>Data Error</b>	At listing USFWS reported that the <b>single known population of an total estimated population of 2,800 individuals was limited to 430 acres in one county</b> (Listing, p. 5730–5731). USFWS later reported <b>four known populations, covering 962 acres and having an estimated total population of 144, 878 individuals</b> (SSA, p. 4). The Gypsum wild-buckwheat is accompanied on the List by other endangered buckwheat including the lone, Umatum desert, Southern Mountain wild, scrub, cushionbury, clay-loving wild, and Tiehm’s buckwheat and on ECOS by numerous other unlisted buckwheat species (ECOS).
Santa Cruz Island dudleya	<i>Dudleya nesioica</i>	Plant	7/31/1997	12/1/2022	N/A	CA	Recovery (Proposed)	<b>Possible Recovery</b>	“At the time of listing, soil loss, herbivory by feral pigs ( <i>Sus scrofa</i> ), disturbance by pig rooting, and collecting for botanical or horticultural use were identified as threats to the species” (Proposed Downlisting, p. 73733). “While Moran (1979) considered collecting to be a threat, McCabe (2004) did not” (Proposed Downlisting, p. 73733). “The study occurred before a major increase in the nonnative annual grass <i>Aegilops cylindrica</i> and does not explain a seemingly steady abundance of Santa Cruz Island dudleya over the years despite that increase” (Proposed Downlisting, p. 73734). “In the original listing, the source of soil loss is specified as the result of feral ungulate activities.... All feral ungulates were removed from Santa Cruz Island by 2006 ... eliminating that source of soil loss. Vegetation cover has increased significantly on Santa Cruz Island since 2006... leading to reduced erosion and mitigating this threat” (Proposed Downlisting, p. 73733). However, “the best information available suggests that, <b>over the last 25 years [the entire period of listing], the population has fluctuated between at least 40,000 and 200,000 individuals and the current abundance is in the middle of that range (approximately 120,000 individuals).” Incomplete population estimates from 1994 indicated 165,000 plants—three years before listing, while more extensive population estimates from 2019 indicated 122,112 plants</b> (SSA, Table 2, p. 19).

**Table 1: “Recovered Species” CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting (or proposed) Date	Years to Delist	Where	Official Delisting Reason	Accurate Attribution	Notes (bold text is added for emphasis.)
Inyo California towhee	<i>Pipilo crissalis eremophilus</i>	Bird	8/3/1987	11/4/2013	N/A	CA	Recovery (Proposed)	Possible Recovery	USFWS reports “was thought to have been more widespread prior to climate changes at the beginning of the Pliocene Epoch (roughly 5.4–2.4 million years ago).” (delisting 63940). 68 percent of this of the bird’s habitat occurs on the Navy’s Air Weapons Station at China Lake, 28 percent on abutting BLM lands and five percent on California Fish and Game lands that, together, comprise 99% of bird’s habitat. The bird’s population was estimated at 72–138 in 1978–9. (Delisting 65940). The primary threat to the subspecies was reported as habitat loss and degradation, predominately from grazing by feral horses and burrows. At 1987 listing, the Navy commented that the bird should not be listed, that the threats to the towhee had “been essentially eliminated by suspension of cattle grazing in 1981 and removal of approximately 8,000 wild burros and horses...,” that Navy lands had been “withdrawn from all commercial and private mining since 1943, and that the majority of its activities occurred at lower elevations where there are no towhees, and “that towhee numbers had increased” (Listing, p. 28761). USFWS reported that “BLM indicated that because the majority of wild burros in the vicinity have been removed, thus reducing the threats to the towhee, the need to list the towhee should be reassessed” (Listing, p. 28781). USFWS responded that the Navy, BLM and California Fish and Game (who collectively held 99% of the bird’s range) had done “a commendable job of improving... riparian habitat of the towhee” but that USFWS was “evaluating the total range of this bird,” and that the Navy did not submit “biological evidence... to substantiate the claim that towhee population numbers have significantly increased” (emphasis added). (Listing, p. 28781). USFWS reported the Towhee population as less than 200 and listed the bird. A 1994 estimate reported a minimum of 180 towhees. The first systematic survey conducted in 1998 found 640 birds, more than doubling in just a decade the number USFWS used at listing in 1987. USFWS acknowledged the 1998 study was the first systematic survey and that “a portion of this increase over 1994 minimum estimates was likely the result of differences in methodology.” (Delisting 65940). Reportedly, the 1998 survey also “expanded the towhee’s range” and “documented a broader use of vegetative types for nesting than was previously believed” (Navy, INRMP 2002, p. 78 ( <a href="https://www.globalsecurity.org/military/library/report/entire/nov2002-vol-iii">https://www.globalsecurity.org/military/library/report/entire/nov2002-vol-iii</a> )). The same year as the 1998 survey, USFWS produced a recovery plan that set a target of 400 towhees, a number that the 1998 survey already well exceeded (Delisting, 65941). Given that the 1998 estimate was 160% of the recovery plan target, and that the 1998 results were in part “likely the result of differences in methodology” from the 1994 estimate, the towhee population had unquestionably reached the recovery plan target many years before. This is unsurprising in light of the extensive efforts by the Navy, BLM and California Fish and Game that covered 99% of the bird’s habitat, took place before listing, and for which USFWS had commended these entities at the time of listing. Following receipt of a petition to delist the towhee in 2011, the USFWS published its proposal to do so on November 4, 2013. In its proposed delisting, USFWS stated that the Navy and BLM efforts “to protect, improve, and expand the towhee’s riparian habitat corresponded with as much as a fourfold increase in towhee abundance since the [1987] time of listing.” This certainly exaggerates population growth post listing. The Towhee has remained listed nine years and 11 months later after USFWS proposed 2013 delisting.
Apache trout	<i>Oncorhynchus apache</i>	Fish	3/11/1967	8/11/2023	N/A	AZ	Recovery (Proposed)	Recovered	According to USFWS, after successful culturing in captivity and discovery of additional populations the Apache trout was downlisted from endangered to threatened in 1975 (SSA, p. 20). “At the time of the 1983 Recovery Plan there were only 14 known populations of Apache Trout occupying less than 48 km of habitat” (SSA, p. 22). During recovery efforts fish passage barriers, removal of nonnative salmonids, reintroductions of hatchery raised fish and transplanting of fish were employed to conserve the species. USFWS reports “38 Apache trout populations occupying 402 km of habitat.” Of these, 30 are “genetically pure relict or replicate populations covering 281.5 km. (SSA, p. 5).

**Table 1: “Recovered Species” CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting (or proposed) Date	Years to Delist	Where	Official Delisting Reason	Accurate Attribution	Notes (bold text is added for emphasis.)
Wood stork	<i>Mycateria americana</i>	Bird	2/28/1984	2/15/2023	N/A	AL, FL, GA, MS, NC, SC	Recovery (Proposed)	Recovered	When listing the wood stork, USFWS reported that "...U.S. breeding populations of the wood stork have declined over 75 percent from their 1930 levels. If this trend continues, the birds are expected to become extirpated as U.S. breeders by the turn of the century" (Listing, p. 8402). According to USFWS, "the United States breeding population of wood storks declined from an estimated 20,000 nesting pairs in the 1930s, to about 10,000 pairs by 1960... and then to a low of around 5,000 nesting pairs in the late 1970s." (USFWS, FYR, 2007, p. 5. <a href="https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1083.pdf">https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1083.pdf</a> ). According to USFWS "since listing, the number of colonies has increased significantly in the Southeast U.S. from 29 colonies to 81 colonies" (FYR, 2007, p. 8). "Wood storks use man-made wetlands for foraging and breeding purposes. Man-made wetlands include, but are not limited to, storm water treatment areas and ponds, golf course ponds, borrow pits, reservoirs, roadside ditches, agricultural ditches, drainages, flow-ways, mining and mine reclamation areas, and dredge spoil sites." (FYR, 2007, p. 16). While the wood stork has increased its population numbers, colonies and range, the exact causes of its prior decline are less clear a may involve the water levels, preferred prey size and feeding behaviors effects on nesting/fledging success. USFWS reports that "... loss, fragmentation, and modification of wetland habitats continue as threats to wood storks. However, the significance of the threat cannot be quantified" (FYR, p. 16).
Nelson's checker-mallow	<i>Sidalcea nelsoniana</i>	Plant	2/12/1993	4/28/2022	N/A	OR, WA	Recovery (Proposed)	Recovered	USFWS reports that has developed the knowledge and processes to "treat an area with prescribed fire, spot spray with herbicides (only if needed), and then establish the species by seeding it into the treated site" and that the agency has established over 40 new populations with 15 having greater than 1,000 plants. (ECOS Profile).
Florida golden aster	<i>Chrysopsis floridana</i>	Plant	5/16/1986	6/21/2021	N/A	FL	Recovery (Proposed)	Recovered	When listed the plant was known from nine populations in five coastal locations in southeastern Hillsborough County (Delisting, p. 33178). The most current surveys indicate 21 natural and nine introduced populations in five counties. (Delisting, p. 33178). There an estimated 50,000 individuals (Delisting, p. 33178).
Island bedstraw	<i>Galium buxifolium</i>	Plant	7/31/1997	12/1/2022	N/A	CA	Recovery (Proposed)	Recovery	"Historically, island bedstraw has been characterized as restricted to coastal bluffs, steep rocky slopes, and sea cliffs in the coastal-bluff scrub vegetation... However, the plant has also been found in other places, like in pine forest and at interior locations. For Santa Cruz Island, the number of known island bedstraw sites has increased with each successive survey effort, from 13 to 27 to 36 over the course of 20 years and 3 survey efforts. The number of sites on San Miguel Island has remained at six. Each site represents a separate population of island bedstraw for the purposes of this analysis. Where data are available, the estimated number of plants within sites has increased over time, sometimes dramatically. Plant totals have gone from about 100 to about 10,000 for Santa Cruz Island, and the most recent total does not include most of the terraces or cliffs on the coastal sites. The total number of known plants on San Miguel Island has increased from about 500 to about 5,000, again not including most cliff face plants. Most of the 42 total sites are either extant or presumed to be extant. Island bedstraw seems to be expanding on terraces and other non-cliff habitats; this expansion is demonstrated at several sites. (Proposed Delisting, p. 73725). " <b>On Santa Cruz Island, the total number of known island bedstraw sites has increased from 13 at the time of listing, to 27 at the time of the 2004–2006 surveys, to 36 after the 2015 helicopter surveys</b> " (Proposed Delisting, p. 73730–73731).

**Table 2: Original Data Error Species**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting Date	Years Listed	Notes ( bold text added for emphasis.)
Johnson's seagrass	<i>Halophila johnsonii</i>	Plant	9/14/1998	11/15/2022	24.2	Results of a molecular phylogenetic analysis published in 2002, " <b>indicated that [Johnson's seagrass] could not be distinguished from <i>H. ovalis</i></b> " (NMFS, Proposed Delisting, 12/23/21, p. 72909; <a href="https://www.govinfo.gov/content/pkg/FR-2021-12-23/pdf/2021-27631.pdf">https://www.govinfo.gov/content/pkg/FR-2021-12-23/pdf/2021-27631.pdf</a> , accessed 11/15/23). " <b>NMFS began funding projects to resolve the taxonomic uncertainty of Johnson's seagrass in 2012</b> " (Proposed Delisting, p. 72909). Test results published in 2015 indicated that "samples from the Atlantic originated from <i>H. ovalis</i> of the Indo-Pacific" and " <b>provided further evidence that [Johnson's seagrass] was not a unique taxon</b> " (Proposed Delisting, p. 72909). More extensive studies were conducted involving "phylogenetic analyses of <b>105 samples of <i>Halophila</i> [subspecies] from 19 countries</b> " (Proposed Delisting, p. 72909). Results published in 2021 of "the population-level analyses indicate that <b>[Johnson's seagrass] is genetically indistinguishable from <i>H. ovalis</i></b> ." A subsequent NMFS review concluded "the complete absence of male [Johnson's seagrass] plants... <b>suggests that [Johnson's seagrass] consists of a single female clone</b> ." (Proposed Delisting, p. 72910) NMFS' designation of critical habitat for the species noted "yet, large clones of mature female plants flower prolifically at several locations" and " <b>Johnson's seagrass possesses only female flowers; thus vegetative propagation, most likely through asexual branching, appears to be its only means of reproduction and dispersal</b> ." (CH Designation, p. 17789-90). When designating critical habitat for the species NMFS reported, "The Boca Raton and Boynton Beach sites have populations which <b>are distinguished by a higher index of genetic variation</b> than any of the central and northern populations examined to date. <b>These two sites possibly represent a genetically semi-isolated group</b> which could be the reservoir of a large part of the overall genetic variation found in this species. Information is lacking on the geographic extent of this genetic variability. <b>Locations with populations that have unique genetic variability have been designated as critical habitat</b> " (CH, p. 17790; <a href="https://www.govinfo.gov/content/pkg/FR-2000-04-05/pdf/00-8394.pdf#page=2">https://www.govinfo.gov/content/pkg/FR-2000-04-05/pdf/00-8394.pdf#page=2</a> , accessed 11/16/23). The CH map appears to indicate thousands of acres of Biscayne Bay from Miami to North Miami were designated as critical habitat (CH, p. 17804). <b>Some two decades after initial evidence that Johnson's seagrass was an invalid taxon, NMFS proposed delisting the plant.</b>
Braken Bat Cave meshweaver	<i>Cicurina venii</i>	Arachnid	12/26/2000	9/23/2022	21.8	A blind, subterranean spider, the Bracken Cave meshweaver was found to be the same species as another endangered spider, the Madla Cave meshweaver. USFWS explains that "spider taxonomy generally relies largely on genitalic differences in adult specimens to delimit species" and that female spiders of this genus "exhibit variability in genitalic characters within and between caves; this makes it difficult to determine whether an individual represents a distinct species or intraspecific variation based on morphology alone" (Delisting, p. 51926). While listed, three Biological Opinions regarding residential development, a transmission line, a water supply pipeline, a highway and road included this spider. (ECOSPHERE - Section 7 Consultation Issued Biological Opinion). The Madla Cave meshweaver has been combined with the Bracken Cave meshweaver that has been included in eight biological opinions. (ECOSPHERE - Section 7 Consultation Issued Biological Opinions).
No common name	<i>Adiantum vivesii</i>	Plant	6/9/1993	8/24/2022	29.2	USFWS reports that "... <i>A. vivesii</i> is not a distinct species, but rather a sterile hybrid..." p. 40996 ( <a href="https://www.govinfo.gov/content/pkg/FR-2021-07-30/pdf/2021-16248.pdf#page=1">https://www.govinfo.gov/content/pkg/FR-2021-07-30/pdf/2021-16248.pdf#page=1</a> )
Kanab ambersnail	<i>Oxyloma haydeni kanabensis</i>	Snail	8/8/1991	7/26/2021	30.0	"Our review indicates that the Kanab ambersnail <b>is not a valid subspecies</b> and therefore cannot be listed as an endangered entity under the Endangered Species Act" (delisting, p. 33137). "The subsequent publication of a larger, more comprehensive study on the genetics of the Kanab ambersnail and the <i>Oxyloma</i> genus (Culver et al. 2013, entire) resulted in our proposed rule to delist Kanab ambersnail based on new taxonomic information indicating that it was not a valid taxon" (Delisting, p. 33138).
Hualapai Mexican vole	<i>Microtus mexicanus hualapaiensis</i>	Mammal	10/1/1987	6/23/2017	29.7	" <b>Field surveys demonstrated that the Hualapai Mexican vole is not as rare as it was once thought to be</b> . Prior to listing, only 15 specimens from seven locations (all within the Hualapai Mountains) were known. The genetic studies mentioned above, in conjunction with trapping success, <b>demonstrate that <i>M. m. hualapaiensis</i> populations are widespread and not restricted to a single mountain range</b> " (Delisting, p. 28584-5) "The majority (i.e., five out of seven) of scientists who reviewed the "Hualapai vole ( <i>Microtus mogalonensis hualapaiensis</i> ) Genetic Analysis"... determined that Hualapai Mexican voles ( <i>Microtus mexicanus hualapaiensis</i> ) <b>are not genetically distinct from other vole subspecies in Arizona</b> " (Delisting, p. 28585).
No common name	<i>Gahnia lanaiensis</i>	Plant	9/20/1991	5/28/2013	21.7	According to USFWS, " <i>Gahnia lanaiensis</i> was listed as endangered in 1991" as it was only "known from 15 or 16 large 'clumped' plants growing on the ... on the island of Lanai... in a recently published paper, Koyama... found that ... <i>Gahnia lanaiensis</i> is a complete match for <i>G. lacera</i> , a species endemic to New Zealand. Koyama further states that <i>G. lacera</i> likely arrived on Lanai, either intentionally or unintentionally, through the restoration efforts of George Munro, the Resident Manager of Lanai Ranch from 1914 to 1930... Born and raised in New Zealand, Munro is known to have used seeds of New Zealand's native plants for reforestation efforts on Lanai... <i>G. lacera</i> [is] a species endemic to New Zealand where it is known to be common... we support the proposed rule... to delist <i>G. lanaiensis</i> due to error in the original listing" (5-Year, p. 10).

**Table 2: Original Data Error Species CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting Date	Years Listed	Notes (bold text added for emphasis.)
Utah valvata snail	<i>Valvata utahensis</i>	Snail	12/14/1992	9/24/2010	17.8	USFWS reports that it listed the species "due to threats from proposed hydroelectric development, operation of existing hydroelectric dams, degraded water quality, diversion of water for irrigation and aquaculture, lack of regulatory protections for spring habitats, and invasion of the introduced New Zealand mudsnail." "USFWS reports it delisted the species as recent surveys indicate the species is now known to be more widespread than thought at the time of listing, and it is tolerant of a variety of habitat conditions such as reservoirs, springs and riverine habitats without spring influence." 4 BO's since 2009 - 2.17 and two 16 pages.
Idaho springsnail	<i>Pyrgulopsis idahoensis</i>	Snail	12/14/1992	9/5/2007	14.7	"At the time of listing, the Idaho springsnail was known from only 35 river miles in the middle Snake River. We have learned through genetic studies that the species listed in 1992 is now grouped with a new species, <i>Pyrgulopsis robusta</i> that is comprised of four groups of freshwater springsnails living in Idaho, Oregon, Washington and Wyoming. <b>This newly-combined species is distributed over a wider geographic area than in the original listing, and is no longer considered to be a separate species in need of protection under the Act.</b> Because the Idaho springsnail is now considered to be a member of the species <i>Pyrgulopsis robusta</i> , it was delisted September 5, 2007."
Arizona agave	<i>Agave arizonica</i>	Plant	5/18/1984	6/19/2006	22.1	The US Forest Service opposed listing in 1984, stating the Arizona agave was a hybrid (Listing, p. 21056). The USFS petitioned to delist the Arizona agave one year after listing stating again that the plant was a hybrid (J.B. Hiltman, Associate Deputy Chief, USFS, petition, 5/3/85; <a href="https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/petition/818.pdf">https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/petition/818.pdf</a> , accessed 11/15/23). Twenty years later, USFWS delisted the Arizona agave as a hybrid: "evidence collected subsequent to the listing indicates that plants attributed to <i>Agave arizonica</i> do not constitute a distinct species but rather are individuals that have resulted from recent and sporadic instances of hybridization between two species (Delisting, p. 35195).
Truckee Barberry	<i>Berberis</i> (= <i>Mahonia</i> ) <i>sonnei</i>	Plant	12/6/1979	10/1/2003	23.8	"This determination is based on a thorough review of all available data, which indicate that this plant is not a discrete taxonomic entity and does not meet the definition of a species (which includes subspecies and varieties of plants) under the Endangered Species Act of 1973, as amended (Act)(16 U.S.C. 1531, et seq.). <b><i>Berberis sonnei</i> has been synonymized with <i>B. repens</i>, a common and wide-ranging taxon with a distribution from California northward to British Columbia and Alberta, and eastward to the Great Plains.</b> " ( <a href="https://www.govinfo.gov/content/pkg/FR-2003-10-01/pdf/03-24858.pdf#page=1">https://www.govinfo.gov/content/pkg/FR-2003-10-01/pdf/03-24858.pdf#page=1</a> )
Coastal cutthroat Trout	<i>Oncorhynchus clarkii clarkii</i>	Fish	9/13/1996	4/26/2000	3.6	According to the delisting, "The National Marine Fisheries Service... <b>has determined that the Umpqua River cutthroat trout population, formerly identified as an ESU of the species, is part of a larger population segment that previously was determined to be neither endangered nor threatened</b> " (Delisting, p. 24421)
Dismal Swamp southeastern shrew	<i>Sorex longirostris fisheri</i>	Mammal	9/26/1986	2/28/2000	13.4	"New data confirm that <b>this species is more widely distributed than previously believed, is fairly abundant within its range, occurs in a wide variety of habitats, and is genetically secure.</b> " (Delisting, p. 10420)
Lloyd's hedgehog cactus	<i>Echinocereus lloydii</i>	Plant	11/28/1979	6/24/1999	19.6	"Recent evidence indicates that Lloyd's hedgehog cactus is <b>not a distinct species but rather a hybrid or cross</b> which is not evolving independently of its parental species" (Delisting, p. 33798).
Bidens cuneata	<i>Bidens cuneata</i>	Plant	2/17/1984	2/6/1996	12.0	"Extensive studies associated with a recent revision of the Hawaiian members of the genus have concluded that <b><i>Bidens cuneata</i> is an outlying population of <i>Bidens molokaiensis</i>, which is common along the windward cliffs of the Island of Molokai.</b> " ( <a href="https://www.govinfo.gov/content/pkg/FR-1996-02-06/pdf/96-2488.pdf#page=1">https://www.govinfo.gov/content/pkg/FR-1996-02-06/pdf/96-2488.pdf#page=1</a> )
McKittrick pennyroyal	<i>Hedeoma apiculatum</i>	Plant	7/13/1982	9/22/1993	11.2	"Because of the range, the number of known populations, and the remote and inaccessible nature of the habitat, the Service believes that McKittrick pennyroyal is not in danger of becoming extinct throughout all or a significant portion of its range now or in the foreseeable future." (Proposed Delisting, p. 43673) "Threats to the species at the time of listing were described as limited distribution, low numbers, and low reproductive potential, which made the species vulnerable to habitat disturbance. <b>Since the listing, additional surveys in the Guadalupe Mountains in New Mexico and Texas have shown the plant to be more widespread and abundant than previously known.</b> " (Proposed Delisting, p. 49245). "A total of 13 Texas and 23 New Mexico locations are known at this time in an area approximately 21 km (13 mi) north to south by 8 km (5 mi) east to west in the Guadalupe Mountains of New Mexico and Texas. At the time of listing in 1982, plant numbers were estimated at 1,100. Although accurate counts and estimates are difficult to make, <b>about 5,000 counted plants now comprise the 36 known locations. Approximately 5-10 percent of an estimated 5,668 ha (14,000 ac) of potential habitat has been surveyed</b> for the McKittrick pennyroyal, mostly along trails and canyon bottoms. <b>Potential habitat is abundant, but very difficult to survey</b> because of the steep broken terrain and the remoteness of the areas. It is likely that numerous groups of plants remain undiscovered throughout the suitable habitat and that additional surveys will continue to result in the discovery of new locations for the species" (Proposed Delisting, p. 43674).

**Table 2: Original Data Error Species CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Delisting Date	Years Listed	Notes ( bold text added for emphasis.)
Spineless hedgehog Cactus	<i>Echinocereus triglochidiatus</i> var. <i>inermis</i>	Plant	12/7/1979	9/22/1993	13.8	USFWS reports that the spineless hedgehog cactus is a spineless form of the red-flowered hedgehog cactus that "is a common variety with a widespread distribution from northern Utah and Colorado south to the States of Durango and San Luis Potosin in central Mexico." (Delisting, p. 49242)
Tumamoc globeberry	<i>Tumamoca macdougalii</i>	Plant	4/29/1986	6/18/1993	7.1	"Given the large range of the species, its non-specific habitat requirements, the number of known populations, the remote nature of much of the habitat, and the ability of the species to withstand some habitat degradation, the Service determines that the Tumamoc globeberry is not in danger of extinction throughout all or a significant portion of its range" (Delisting) p. 33562). "In 1986, when the species was listed as endangered... thirty isolated populations of Tumamoc globeberry had been located in <b>Pima County, Arizona and five were known from Sonora, Mexico. The total number of known individuals was 2,300 in the U.S. and 60 in Mexico ...</b> All populations were found in the Arizona Upland Subdivision of Sonoran Desertscrub Biotic Community." "Our understanding of Tumamoca was greatly increased by a survey and study in the U.S. and Mexico contracted by the Bureau of Reclamation" (Proposed Delisting, p. 37942). "The southern boundary, while not yet fully defined, was extended south to within 80 kilometers (50 miles) of the northern border of Sinaloa, Mexico. The northern boundary was extended to include southern Pinal and Maricopa Counties, Arizona... estimated the potential habitat of Tumamoca in the U.S. and Mexico to be 72,862 square kilometers (27,959 square miles)." "Tumamoca is less habitat-specific than was believed at the time it was listed" (Delist, p. 33562). "A statistically reliable extrapolation of the U.S./Mexico survey data can not be made due to sampling constraints; however, many more plants and populations almost certainly exist" (Delisting, p. 33563). "The study was required by a June 30, 1986, <b>jeopardy biological opinion under Section 7</b> of the Act on the Central Arizona Project (pipeline and canal) and was conducted during the summers of 1988 and 1989" (Proposed Delisting, p. 37942). This project was to provide water for Tucson. "To comply with reasonable and prudent alternatives of a jeopardy biological opinion for this project issued by the Service June 30, 1986, <b>(the Bureau of Reclamation) purchased a 32 hectare (80 acre) preserve for Tumamoca, transplanted plants in the path of the aqueduct into the preserve, and monitored the success of the transplants for five years ...</b> " (Proposed Elisting, p. 37943).
Purple-spined Hedgehog cactus	<i>Echinocereus engelmannii</i> var. <i>purpureus</i>	Plant	10/11/1979	11/27/1989	10.1	The purple-spined Hedgehog cactus "is a sporadically occurring dark-colored and short-spined phase" of Engelmann's hedgehog cactus that is common and has a broad distribution in the Mojave Desert of Arizona, California, Nevada, and Utah" (Delisting, p. 48749).
Rydberg milk-vetch	<i>Astragalus perianus</i>	Plant	5/27/1978	9/14/1989	11.3	"When the species was federally listed in 1978 it was known only from the type location in Bullion Canyon, Piute County, Utah, and one population on top of Mt. Dutton, Garfield County, Utah. Extensive studies have been conducted for the last 9 years resulting in <b>the discovery of 11 additional populations and current estimates of well over 300,000 plants</b> " (Delisting, p. 37941).
Bahama swallowtail butterfly	<i>Heraclides anдраemon borhotei</i>	Insect	4/28/1976	8/31/1984	8.3	When delisting the species USFWS reported that "The Bahama swallowtail is only a sporadic resident of the United States" and "is not subspecifically distinct from the non-threatened Bahaman population of this species" (Delisting, p. 34501).
Pine barrens treefrog	<i>Hyla andersonii</i>	Amphibian	12/18/1977	11/22/1983	5.9	The frog was delisted and its critical habitat rescinded because "the species is much more widely distributed than originally known" (Delisting, p. 52740).
Mexican duck	<i>Anas diazi</i>	Bird	3/11/1967	7/25/1978	11.4	USFWS's delisting reports that "phenotypes, such as the 'Mexican ducks' in the United States are not interbreeding solely among themselves, since they are only identifiable segments of the entire population, just as brown-eyed and blue-eyed individuals are phenotypic segments of the human species" and that "the Service has no data demonstrating a decline in the total United States or Mexican populations of the Mexican ducks or the hybrids. On the contrary, data now available shows at least a stable population in most areas and an increase in overall distribution of these ducks in Arizona and Texas." (Delisting, p. 32259). Some later works describe <i>Anas diazi</i> is valid as does ITIS.
Chorro shoulderband snail	<i>Helminthoglypta morroensis</i>	Mussel	12/15/1994	NA	?	The Chorro shoulderband snail was thought to be extinct when listed but was found to be sufficiently abundant that the USFWS simply quit regulating it by issuing a "position paper." "At the time of listing (Service 1994: entire), the banded dune snail included <i>Helminthoglypta walkeri</i> and a more inland subspecific taxon referred to as <i>H. w. morroensis</i> (Chorro shoulderband snail)... While there remain some differences in opinion regarding the taxonomic rank assigned to these entities... there is a clear consensus that both snail taxa are valid biological entities of at least the subspecies rank... As such, the Service accepted this new specific nomenclature and issued a position paper in 2004 stating that we would regulate only <i>Helminthoglypta walkeri</i> (Morro shoulderband snail) under the Endangered Species Act" (SSA 2019, p. 10). USFWS thought at the time of listing that the Chorro shoulderband snail "was extinct and speculated that there may have been as few as several hundred individuals" of the Morro shoulderband snail (SSA 2018, p. 1). Subsequently USFWS reports "living (Chorro shoulderband snail) individuals have been documented at other locations from northern Morro Bay south and inland through the City of San Luis Obispo" (SSA 2019, p. 8). "Its range is estimated to be approximately 70,650 acres" (SSA 2019, p. 21). In a 2006 review USFWS opined that "it does not warrant listing" (F-YR, p. 46).

**Table 3: Extinct Species**

Common Name	Scientific Name	Group	Listing Date	Delisting Date	Years Listed	Occurred	Delisting Basis	Accurate Attribution	Notes (bold text added for emphasis.)
Bachman's warbler (=wood)	<i>Vermivora bachmanii</i>	Bird	3/11/1967	10/18/2023	56.6	Al, FL, GA, NC, SC, TN	Extinct	Extinct	"Populations were probably never large and were found in "some numbers" between 1890 and 1920, but afterwards populations appeared to be very low" (Delisting, 54303). <b>"The last confirmed nest was documented in 1937"</b> (Delisting, 54303) "Between 1975 and 1979, an exhaustive search was conducted in South Carolina, Missouri, and Arkansas. No Bachman's warblers were located... The last (though unconfirmed) sighting in Florida was from a single bird observed near Melbourne in 1977" (Delisting, p. 54303) "After 1962, reports of the Bachman's warbler in the United States have not been officially accepted, documented observations." (Delisting 54304).
Bridled white-eye	<i>Zosterops conspiciatulus conspiciatulus</i>	Bird	8/27/1984	10/18/2023	39.2	Mariana Islands	Extinct	Extinct	"Endemic only to Guam, within the Mariana Islands" (Delisting 54304). "By the early- to mid-1970s, the bridled white-eye was found only in the forests in the very northern portion of Guam" (Delisting 54304). "as its related subspecies on the other Mariana Islands" (Delisting, 54305). "The species remains undetected since the <b>last observation</b> in Pajon Basin in <b>1983</b> " (Delisting, 54305).
Kauai akialoo (honeycreeper)	<i>Akialoa stejnegeri</i>	Bird	3/11/1967	10/18/2023	56.6	HI	Extinct	Extinct	" <b>The last confirmed observation of the species was in 1965</b> " (delisting, 54307). "Its historical range included nearly all Kauai forests visited by naturalists at the end of the 19th century. After a gap of many decades, the species was seen again in the 1960s, when one specimen was collected... It has not been seen since..." (delisting, 54308). "It is highly likely avian disease is the primary causal factor for the disappearance of many species of Hawaiian honeycreepers from forested areas below 4,500 feet on the islands of Kauai, Oahu, Molokai, and Lanai (Delisting, 54308).
Kauai nukupuu	<i>Hemignathus hanapepe</i>	Bird	3/11/1967	10/18/2023	56.6	HI	Extinct	Extinct	" <b>The last confirmed observation</b> (based on independent expert opinion and physical evidence) of the species was in <b>1899</b> " (Delisting, 54309).
Large Kauai (=kamao) Thrush	<i>Myadestes myadestinus</i>	Bird	10/13/1970	10/18/2023	53.0	HI	Extinct	Extinct	"The last credible sighting of the large Kauai thrush occurred in <b>1987</b> " (Delisting, 543011).
Maui dkepa	<i>Loxops ochraceus</i>	Bird	10/13/1970	10/18/2023	53.0	HI	Extinct	Extinct	" <b>The last confirmed record</b> , as defined above, of Maui dkepa was from Hanawi NAR in <b>1988</b> " (Delisting, 543011).
Maui nukupuu	<i>Hemignathus affinis</i>	Bird	10/13/1970	10/18/2023	53.0	HI	Extinct	Extinct	"All records from late 19th and early 20th centuries... noted the restricted distribution and low population density of Maui nukupuu." (Delisting, 543013). "reported an adult male in <b>1996</b> " (Delisting, 543014).
Molokai creeper	<i>Paroreomyza flammea</i>	Bird	10/13/1970	10/18/2023	53.0	HI	Extinct	Extinct	"...by the 1930s, they were considered in danger of extinction... the species was last detected in 1963" (Delisting, 543015).
Po'ouli (honeycreeper)	<i>Melamprosops phaeosoma</i>	Bird	10/28/1975	10/18/2023	48.0	HI	Extinct	Extinct	"The po'ouli was first discovered in 1973... <b>three po'ouli were color-banded in 1996 and 1997, and subsequently observed... but no other individuals have been observed since then</b> " (Delisting, 543016).
Scioto madtom	<i>Noturus trautmani</i>	Fish	10/28/1975	10/18/2023	48.0	OH	Extinct	Extinct	" <b>No Scioto madtoms have been observed since 1957</b> " (Proposed elisting, p. 18). "It should also be noted that the northern madtom ( <i>Noturus stigmosus</i> ) was first observed in Big Darby Creek in 1957, the same year the last Scioto madtom was collected... Both species likely feed on small invertebrates and shelter in openings in and around rocks and boulders. Given the apparent small population size and highly restricted range of the Scioto madtom in the 1940s and 1950s, it is possible that the species was unable to successfully compete with the northern madtom for the same food and shelter resources" (Proposed elisting, p. 18).



**Table 3: Extinct Species CONTINUED**

Common Name	Scientific Name	Group	Listing Date	Delisting Date	Years Listed	Occurred	Delisting Basis	Accurate Attribution	Notes (bold text added for emphasis.)
San Marcos gambusia	<i>Gambusia georgei</i>	Fish	7/14/1980	10/18/2023	43.3	TX	Extinct	Extinct	"However, as fewer <i>G. georgei</i> individuals existed in the wild and therefore encountered each other, the chances of hybridization with the much more common <i>G. affinis</i> increased" (Proposed Delisting, 54317). "...fish from that captive population were used to establish a captive population at our Dexter National Fish Hatchery in 1980. Both captive populations later became contaminated with another Gambusia species. The fish hybridized, and the pure stocks were lost" (Proposed Delisting, 54317). "From 1981 to 1984, efforts were made to relocate populations and reestablish a culture of individuals for captive refugia. Too few pure San Marcos gambusia and hybrids were found to establish a culture, although attempts were made with the few fish available..." (Proposed Delisting, 54317). "Intensive searches for San Marcos gambusia were conducted in ... <b>1990</b> , but were <b>unsuccessful in locating any pure San Marcos gambusia</b> " (Proposed Delisting, 54317).
Little Mariana fruit bat	<i>Pteropus tokudae</i>	Mammal	8/27/1984	10/18/2023	39.2	Guam	Extinct	Extinct	"By <b>1945</b> , fruit bats were difficult to locate even in the northern half of Guam, where they were largely confined to forested cliff lines along the coasts" "...increased survey efforts during the late 1970s and early 1980s reported no confirmed sightings of the little Mariana fruit bat" (Delisting 54301) " <b>not been verifiably observed after 1968</b> " (Delisting, 54302). "... hunters and (later) poachers to easily locate and kill the little Mariana fruit bat and, with the introduction of firearms, kill them more efficiently" "...Based on the earliest records, the species was already rare in the early 1900s"; "...possibly competition with the related Mariana fruit bat for the same resources" (Delisting, 54302).
Flat pigtoe	<i>Pleurobema marshali</i>	Mussel	4/7/1987	10/18/2023	36.6	AL, MS	Extinct	Extinct	"Prior to listing, freshly dead shells of flat pigtoe were collected in <b>1980</b> , from the Tombigbee River, Lowndes County, Mississippi... And a <b>1984</b> survey of the Gainesville Bendway of Tombigbee River also found shells of the flat pigtoe" (Delisting, 54320).
Green blossom (pearly mussel)	<i>Epioblasma torulosa gubernaculum</i>	Mussel	6/14/1976	10/18/2023	47.4	TN, VA	Extinct	Data Error	"The last known record for the green blossom was a live individual collected in <b>1982</b> " (Proposed Delisting, p. 54325). ITIS indicates the taxon is an "invalid junior synonym" (ITIS, accessed 10/24).
Southern acornshell	<i>Epioblasma othcatogensis</i>	Mussel	3/17/1993	10/18/2023	30.6	AL, GA, TN	Extinct	Extinct	"Prior to listing, southern acornshell was observed during surveys in the upper Coosa River drainage in Alabama and Georgia in <b>1966-1968 and in 1971- 1973</b> " (54321).
Strirupshell	<i>Quadrula stapes</i>	Mussel	4/7/1987	10/18/2023	36.6	AL, MS	Extinct	Extinct / Data Error?	"The strirupshell has not been collected alive since the Sipsey River was surveyed in <b>1978</b> " (54322). ITIS indicates the taxon is invalid because of "subsequent name/combination" (ITIS, accessed 10/24).
Tuberled blossom (pearly mussel)	<i>Epioblasma torulosa torulosa</i>	Mussel	6/14/1976	10/18/2023	47.4	GA, TN, WV	Extinct	Extinct / Data Error?	"The last individuals were collected live or freshly dead in <b>1969</b> " (Proposed Delisting, p. 54326). ITIS indicates the taxon is invalid because of "subsequent name/combination" (ITIS, accessed 10/24).
Turgid blossom (pearly mussel)	<i>Epioblasma turgidula</i>	Mussel	6/14/1976	10/18/2023	47.4	AR, TN	Extinct	Extinct	"The last known collection of the turgid blossom was a freshly dead specimen found in the Duck River, Tennessee, in <b>1972</b> " (Proposed Delisting, p. 54326).
Upland combshell	<i>Epioblasma metastrata</i>	Mussel	3/17/1993	10/18/2023	30.6	AL, TN	Extinct	Extinct	"No living populations of the upland combshell have been located since the <b>mid-1980s</b> " (Proposed Delisting 54323).
Yellow blossom (pearly mussel)	<i>Epioblasma florentina florentina</i>	Mussel	6/14/1976	10/18/2023	47.4	TN	Extinct	Extinct / Data Error?	"This species was last collected live from Citico Creek in <b>1957</b> , and the Little Tennessee River in the 1966" (Proposed Delisting, p. 54327) ITIS indicates the taxon an invalid because of "subsequent name/combination" (ITIS, accessed 10/24).
Kauai 'o'o (honeigater) Moho braccatus	<i>Moho braccatus</i>	Bird	3/11/1967	10/18/2023	56.6	HI	Extinct	Extinct	"The last plausible record of a Kauai 'o'o was a vocal response to a recorded vocalization played by a field biologist on April 28, 1987" (Delisting, 54305). The <b>last credible sighting was in 1987</b> . (Delisting, 54310).

**Table 3: Extinct Species CONTINUED**

Common Name	Scientific Name	Group	Listing Date	Delisting Date	Years Listed	Occurred	Delisting Basis	Accurate Attribution	Notes (bold text added for emphasis.)
Eastern puma (cougar)	<i>Puma (=Felis) concolor cougar</i>	Mammal	6/4/1973	1/23/2018	44.7	Eastern US	Extinct	Data Error	According to the Integrated Taxonomic Information System (ITIS), <i>Puma concolor cougar</i> is an invalid taxa. ( <a href="https://www.itis.gov/service/SingleRpt/SingleRpt?search_topic=ITSN&amp;search_value=952781#null">https://www.itis.gov/service/SingleRpt/SingleRpt?search_topic=ITSN&amp;search_value=952781#null</a> , ITIS, accessed 10/24).
Caribbean monk seal	<i>Monachus tropicalis</i>	Mammal	4/10/1979	10/28/2008	29.6	Gulf Coast	Extinct	Extinct	"the last confirmed sighting at Seramilla Bank, between Jamaica and the Yucatan Peninsula, in 1952." "1911: An expedition off the coast of Mexico killed approximately 200 seals for scientific study and collection" (Delisting, p. 63904).
Guam broadbill	<i>Miyagra freyacheti</i>	Bird	8/27/1984	2/23/2004	19.5	Guam	Extinct	Extinct	"The last sightings of this species took place in 1984." (Delisting, p. 8117).
Mariana mallard	<i>Anas oustaletii</i>	Bird	12/8/1977	2/23/2004	26.2	Mariana Islands	Extinct	Extinct	"The Mariana mallard's range reduction and eventual extinction have been attributed to habitat loss and hunting, especially during and immediately after World War II." "During the Japanese occupation of Saipan and Tinian between 1914 and 1945, most wetlands were channelized and converted to rice paddies." (Delisting, p. 8177). "On Saipan, the last wild Mariana mallards were observed in 1979 by our biologist Eugene Kridler (1979). (Delisting, p. 8117).
Dusky seaside sparrow	<i>Ammodramus maritimus nigrescens</i>	Bird	3/11/1967	12/12/1990	23.8	FL	Extinct	Extinct	"When Merritt Island was flooded in an attempt to reduce mosquito populations around Kennedy Space Center, the sparrows' nesting grounds were flooded and their numbers started to collapse. Later, the marshes surrounding the St. John's River were drained to facilitate highway construction which caused the population to collapse further...By 1979, only six dusky seaside sparrows were known to exist – all of them were male the last female was sighted in 1975"; (USFWS, ECOS) "When it became apparent that no female dusky seaside sparrows were likely to be found, some work was done crossing the dusky males with females of Scott's seaside sparrow ( <i>Ammodramus maritimus peninsulare</i> ), a subspecies found on the west coast of Florida; several birds were produced as the result of crosses and subsequent backcrosses. In 1982, however, the Service decided that because such hybrid offspring were not listed under the Endangered Species Act, such progeny should not be released on the refuge. However, the Service agreed to give custody of the birds to another party... Discovery World, assisted by the Florida Audubon Society... The advanced age of the captive dusky males resulted in difficulties with the cross breeding program, and the last dusky male died of natural causes on June 16, 1987. All offspring also died or were lost by accident by the summer of 1989" (Delisting, p. 51113).
Amistad gambusia	<i>Gambusia amistadensis</i>	Fish	4/30/1980	12/4/1987	7.6	TX	Extinct	Extinct	"Captive populations of <i>G. amistadensis</i> were maintained, but have since died or been eliminated through hybridizations with and predation by the mosquitofish ( <i>Gambusia affinis</i> )" (Delisting, p. 46084). "specimens collected in 1968" (Delisting, p. 46084).
Sampson's pearl mussel	<i>Epioblasma sampsoni</i>	Mussel	6/14/1976	1/9/1984	7.6	IL, IN	Extinct	Extinct	"No specimens have been collected in over 50 years despite repeated sampling within its range" which would be prior to 1934 (Delisting, p. 1057).
Santa Barbara song sparrow	<i>Melospiza melodia graminea</i>	Bird	6/4/1973	10/12/1983	10.4	CA	Extinct	Data Error	<b>The Santa Barbara song sparrow was not listed as a DPS and the subspecies <i>Melospiza melodia graminea</i> is reported by ITIS as invalid. This bird occurs on other Channel Islands and the mainland. The proposed delisting states that "it formerly occurred only on Santa Barbara Island, Los Angeles County, California" (Proposed Delisting, p. 34436). Similarly the delisting notice states, "this subspecies of the song sparrow was known only from 2.6 km2 (640 acres) Santa Barbara Island, Los Angeles County, California. This island is part of the Channel Islands National Monument. Since a 1959 fire which devastated most of the island, no Santa Barbara song sparrows have been observed" (Delisting, p. 46337). However, according to NPS "the Channel Islands endemic subspecies, [<i>Melospiza melodia graminea</i>], is found on San Miguel, Santa Rosa, and Anacapa Islands. It was a former resident of Santa Barbara Island." (NPS – <a href="https://www.nps.gov/places/000/channel-islands-song-sparrow.htm">https://www.nps.gov/places/000/channel-islands-song-sparrow.htm</a>, accessed 11/5/23).</b>

**Table 3: Extinct Species CONTINUED**

Common Name	Scientific Name	Group	Listing Date	Delisting Date	Years Listed	Occurred	Delisting Basis	Accurate Attribution	Notes (bold text added for emphasis.)
Longjaw cisco	<i>Coregonus alpinus</i>	Fish	3/11/1967	9/2/1983	16.5	IL, IN, MI, NY, OH, PA, WI	Extinct	Extinct	"The decline of the longjaw cisco and the cisco fishery in general is usually attributed to fishery and environmental problems. The history of the cisco fishery in the Great Lakes is one of increasing exploitation and decreasing stocks. As the ciscos decreased in abundance, there was an increase in the fishery effort along with a decrease in net mesh size. This resulted in further depletion of cisco stocks. In addition to the increased fishing pressure, predation by the sea lamprey and degradation of the habitat further reduced cisco populations. In recent years, problems resulting from hybridization between some species of cisco has contributed to this decline." (Delisting, p. 39942). "The most recent collection of this species in Lake Michigan was in <b>1967</b> " (Delisting, p. 39942).
Blue pike	<i>Stizostedion vitreum glaucum</i>	Fish	3/11/1967	9/2/1983	16.5	MI, NY, OH, PA	Extinct	Data Error	"The historic ' <b>blue pike</b> ' is <b>indistinguishable from walleye</b> , indicating that <b>taxonomic designation is not warranted</b> " (Haponski, Amanda E, and Carol A Stepien, A population genetic window into the past and future of the walleye <i>Sander vitreus</i> : relation to historic walleye and the extinct 'blue pike'. <i>S. v. 'glaucus</i> .'" BMC evolutionary biology vol. 14 133. 17 Jun. 2014, <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4229939/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4229939/</a> ). According to ITIS <i>Stizostedion vitreum glaucum</i> is an invalid taxa. (accessed 11/5/23)
Tecopa pupfish	<i>Cyprinodon nevadensis caldwe</i>	Fish	10/13/1970	1/15/1982	11.3	CA	Extinct	Extinct	Could not be found in <b>1972</b> (Delisting, p. 2317).
Ivory-billed woodpecker	<i>Campephilus principalis</i>	Bird	3/11/1967	10/18/2023	566	AR	N/A	N/A	Was proposed Extinct, under further consideration, (Proposed Removal of 23 Extinct Species From the Lists of Endangered and Threatened Wildlife and Plants ( <a href="https://www.federalregister.gov/documents/2021/09/30/2021-21219/endangered-and-threatened-wildlife-and-plants-removal-of-23-extinct-species-from-the-lists-of">https://www.federalregister.gov/documents/2021/09/30/2021-21219/endangered-and-threatened-wildlife-and-plants-removal-of-23-extinct-species-from-the-lists-of</a> , accessed 11/19/23)). "The <b>last commonly agreed-upon sighting</b> of the species was on the Singer Tract in the Tensas River region of northeast Louisiana in <b>April of 1944</b> ." (Proposed Delisting, p. 54306).
no common name	<i>Phyllostegia glabra</i> var. <i>lanaiensis</i>	Plant	9/20/1991	9/30/2021	30.0	HI	N/A	N/A	Was proposed Extinct, under further consideration, (Proposed Removal of 23 Extinct Species From the Lists of Endangered and Threatened Wildlife and Plants ( <a href="https://www.federalregister.gov/documents/2021/09/30/2021-21219/endangered-and-threatened-wildlife-and-plants-removal-of-23-extinct-species-from-the-lists-of">https://www.federalregister.gov/documents/2021/09/30/2021-21219/endangered-and-threatened-wildlife-and-plants-removal-of-23-extinct-species-from-the-lists-of</a> , accessed 11/19/23)). "At the time of listing, <b>no wild individuals had been seen since 1914</b> " (Proposed Delisting, p. 54328).

**Table 4: Selected Downlisted Species**

Common Name	Scientific Name	Group	ESA Listing Date	Years Listed at ESA 50th	Downlisting Date	Years to Downlist	Notes (bold text added for emphasis.)
Palo de Rosa	<i>Ottoschulzia rhodoxylon</i>	Plant	4/10/1990	33.7	11/4/2022	32.6	At listing there were <b>nine know adult individuals</b> (FYR, p. 3). Subsequently USFWS reported <b>54 populations and an "estimated number of adult individuals [of] at least 963"</b> (FYR, p. 5).
Smooth Cone Flower	<i>Echinacea laevigata</i>	Plant	11/28/1979	44.1	7/6/2022	42.6	"In 1995, when the recovery plan was written, <i>Echinacea laevigata</i> was known from <b>24 sites</b> (or what are now considered element occurrences) in GA, NC, SC and VA. Since that time, <b>additional sites or sub-populations have been discovered within the historic range of the species. A total of 68 populations are considered extant...</b> " (2011 FYR, p. 12).
Beach laylia	<i>Laylia carnosa</i>	Plant	6/22/1992	31.5	3/31/2022	29.8	"Mostly informal estimates of populations made across the range prior to 1998 totaled some <b>300,000 plants</b> (USFWS 1998). Based on our current population estimate ( <b>likely in excess of 10 million</b> ), the 1998 estimate <b>may have been a gross underestimate</b> " (2011 FYR, p. 21)
Stephen's kangaroo rat	<i>Dipodomys stephensi</i> (incl. <i>D. cascus</i> )	Mamal	9/30/1988	35.3	2/17/2022	33.4	"The Stephens' kangaroo rat is endemic to the Peritis and San Jacinto Valleys in western Riverside County and the San Luis Rey and TemeculaValleys in northern San Diego County" (Listing, p. 38465). "At the time of listing in 1988, the known geographic range of the species included 11 general areas in Riverside and San Diego Counties, California. Since 1988, additional populations have been found due to increased survey efforts as a result of listing the species. Currently the species is extant or presumed extant in 18 areas..." (Downlisting, p. 50993).
Morro shoulderband snail	<i>Helminthoglypta walkeriana</i>	Snail	12/15/1994	29.1	2/3/2022	27.2	When the banded dune snail was listed it "was considered a single species composed of two subspecies," one of which, the Chorro shoulderband, was thought to be extinct. The other, the Morro shoulderband snail, was believed to merit endangered status. "While cautioning that not enough data were available to make a more accurate estimate, Roth (1985) <b>speculated that as few as several hundred individuals then existed in the remaining population of Morro shoulderband snails.</b> " Subsequently, the two subspecies were recognized as full species. The snail thought to be extinct was found at "40 locations;" "was observed to be common to abundant at approximately 20 locations within its distribution" with a range "approximately 24 miles..long by 8 miles...wide" (2019 SSA, p. 1). USFWS recommended delisting this snail. Instead, USFWS deregulated it by issuance of a position paper. The other snail, <b>the Morro shoulderband, was found to have a total population that "far exceeded] what was thought at" listing, was determined to have a range of "approximately 7,700 acres" (2019 SSA, p. 1). "Additional individuals of the species in the Los Osos area are being found every year and in a wider variety of habitat types"</b> (2006 FYR, p. 6). "It meets recovery criteria for downlisting" (2006 FYR, p. 15).
No common name	<i>Eugenia Woodburyana</i>	Plant	9/9/1994	29.3	10/21/2020	26.1	"At the time of listing, the species' abundance was estimated at <b>45 individuals</b> ... When the recovery plan was approved, the abundance of <i>E. woodburyana</i> was estimated at around 150 plants... Since 1998, additional individuals of <i>E. woodburyana</i> have been found in the municipalities of Cabo Rolo, Lajas, Guánica, Guanilla, Peñuelas, Yauco, and Salinas. Additionally, the species has been successfully propagated under tree nursery conditions and planted in the wild. We have been able to detect new individuals of <i>E. woodburyana</i> , through the CRI project, and the population is now <b>estimated at around 2,597 individuals</b> in Puerto Rico." (FYR, p. 4). Whether the later number includes "over 333 individuals" that were planted is unclear (FYR, p. 11).
American burying beetle	<i>Nicrophorus americanus</i>	Insect	7/13/1989	34.5	10/15/2020	31.3	When listing USFWS reported " <b>two extant populations</b> are known, one on a <b>New England</b> island and the other in <b>eastern Oklahoma</b> " (Listing, p. 29652). Subsequently USFWS reported "biased on the last 15 years of surveys, the American burying beetle is known to occur in portions of <b>Arkansas, Kansas, Oklahoma, Nebraska, South Dakota, and Texas; on Block Island off the coast of Rhode Island.</b> " (Downlisting, p. 19015)
Tobusch fishhook cactus	<i>Sclerocactus brevihatatus</i> ssp. <i>Tobuschii</i>	Plant	12/18/1979	44.1	5/15/2018	38.5	"[N]o more than <b>200 plants</b> " (Listing, p. 64736). Subsequently USFWS reported "Tobusch fishhook cactus populations are now confirmed in eight central Texas counties.... In 2009, the Texas Native Diversity Database listed <b>105 element occurrences, areas in which the species was present...totaling 3,395 individuals</b> " (Proposed Delisting, p. 95934).

**Table 4: Selected Downlisted Species CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Years Listed at ESA 50th	Downlisting Date	Years to Downlist	Notes ( bold text added for emphasis.)
Kunzler hedgehog cactus	<i>Echinocereus fendleri</i> var. <i>kuenzleri</i>	Plant	11/28/1979	44.1	5/11/2018	38.5	According to USFWS "[w]hen listed as endangered, <b>the known range of this cactus consisted of a single population of approximately 200 individuals</b> . As such, it was perceived to be upon the brink of extinction based on the threats at the time of listing" (90 Day Finding, 55047). USFWS reported "[i]n reality, <b>Kunzler hedgehog cactus exists across a much broader geographic range in numerous populations that exceed the 5,000 plant downlisting criteria</b> based on observed abundance in the limited area surveyed." (2005 FYR, p. 14). "At the time of listing, the most serious threat to such a small population was the elimination of plants in the wild by commercial and hobbyist collectors" (2005 FYR, p. 14).
Columbian white-tailed deer	<i>Odocoileus virginianus leucurus</i>	Mammal	3/11/1967	56.8	10/17/2016	49.6	This is one of two distinct population segments of a "dubious" subspecies of a plentiful species, the white-tailed deer. (Cronin MA (1991) Mitochondrial and nuclear genetic relationships of deer ( <i>Odocoileus spp.</i> ) in western North America. Can J Zool 69:1270–1279).
Santa Cruz cuprus	<i>Cupressus abramsiana</i>	Plant	1/8/1987	37.0	2/19/2016	29.1	" <b>Five small populations</b> " (Listing, p. 675). Estimate at time of recovery plan (1988) was <b>5,100 and 2005–2007 estimates 47,135</b> (2009 FYR, p. 5). "All three populations sampled cover a smaller aerial extent and support larger populations than previously thought" (2009 FYR, p. 4–5).
Wood bison	<i>Bison bison athabasca</i>	Mammal	6/2/1970	53.6	5/3/2012	41.9	According to ITIS <i>Bison bison athabasca</i> is an invalid junior taxon of <i>Bison bison</i> (the 'buffalo').
Tulotoma snail	<i>Tulotoma magnifica</i>	Snail	1/9/1991	33.0	6/2/2011	20.4	According to USFWS, "when listed, tulotoma populations were known from the lower Coosa River below Jordan Dam, and Onatchee, Weogulka, Hatchet, and Kelly Creeks. In the year since, populations have been discovered in Choccolocco Creek, Yealowlaf creek, Weoka Creek, and most recently, in the Alabama River below Claiborne Lock and Dam.... In addition, the Kelly Creek population has been extended into the Coosa River above and below the confluence of the stream..." (FYR, p. 6).
Mariana fruit bat	<i>Pteropus mariannus mariannus</i>	Mammal	8/27/1984	39.4	1/6/2005	20.4	"At the time the Guam population was listed, fruit bats on the various islands in the Marianas were believed to represent separate, discrete populations of <i>Pteropus mariannus mariannus</i> . <b>Since the listing of the Mariana fruit bat on Guam in 1984, additional information pertaining to the biology of the Mariana fruit bat has become available</b> , particularly with regard to the <b>movement of bats between islands</b> . Inter-island movement of the Mariana fruit bat between the islands of the Mariana archipelago is not a rare event. <b>Based on this information</b> , the Service believes it is <b>biologically inappropriate to consider fruit bats on each island as distinct populations</b> , and the Service believes that the fruit bats in the Mariana Islands should be managed as one population" (Downlisting, 14646- 14647). "However, <b>when viewed in the context of representing a portion of the entire Mariana fruit bat population in the Marianan Islands, rather than as a distinct population as previously thought, reclassification from endangered to threatened is appropriate and biologically justified</b> " (Downlisting, 14647).
Missouri bladderpod	<i>Physaria filiformis</i>	Plant	1/8/1987	37.0	10/15/2003	16.8	" <b>Restricted to... nine sites within Greene, Dade, and Christian Counties</b> . It is believed to be extirpated in Jasper and Lawrence Counties, Missouri" (Listing, p. 679). " <b>New discoveries of Missouri bladderpod sites have increased the number of known populations of the species by more than eight times</b> " (2015 FYR, p. 5). "[T]he <b>species is known from 66 sites in Missouri and 10 sites in Arkansas</b> " (2015 FYR, p. 4). At the largest bladderpod site in Missouri, "plants fluctuated from a few thousand in 1990, to 261,000+ in 1991, to a few thousand in 1992, to zero in 1993 and 1994, and then rebounded to highs of between 30,000+ and 137,000+ in 1995, and between 42,000+ and 114,000+ in 2011" (2015 FYR, p. 5).
Large flowered scullcap	<i>Scutellaria montana</i>	Plant	6/20/1986	37.5	1/14/2002	15.6	The large flowered scullcap "is known from only ten locations in Georgia and Tennessee, and is endangered by timber harvesting" (Proposed Listing, p. 46797). Subsequently, USFWS reported "[w]hen the <b>Service reclassified S. montana from endangered to threatened in 2002, there were 48 populations</b> known, of which 22 were considered protected.... <b>There currently are 164 extant occurrences known from Tennessee... and there are 52 extant occurrences known from Georgia</b> " (FYR, p. 11).
MacFarlane's four-o'clock	<i>Mirabilis macfarlanei</i>	Plant	11/29/1979	44.1	3/15/1996	16.3	"This plant is known only from three populations with a total of <b>20–25 individual plants</b> " (Listing, p. 61912). " <b>Since this species was first listed, seven additional M. macfarlanei populations have been discovered in Idaho and Oregon</b> " (RP, p. 1). The Recovery Plan reported populations of plant ramets (stems) of non-introduced populations <b>numbered from 17,360 to 19,260</b> . (RP, p. 18–20). Ramets per genet (genetic individual plant) varies. "Barnes (1996) estimated a mean of 4.88 ramets per genet." (RP, p. 10).

**Table 4: Selected Downlisted Species CONTINUED**

Common Name	Scientific Name	Group	ESA Listing Date	Years Listed at ESA 50th	Downlisting Date	Years to Downlist	Notes ( bold text added for emphasis.)
Virginia roundleaf birch	<i>Betula uber</i>	Plant	9/9/1982	41.3	11/16/1994	12.2	When listing, USFWS reported "In the summer of 1975, the Virginia round-leaf birch was rediscovered along Cressy Creek in Smyth County. Searches along Cressy Creek revealed 14 mature trees, 1 sapling" (Listing, p. 17914). When downlisting USFWS reported, "Ten additional populations have been established in suitable habitat; these populations have showed an average survival rate of > 75% over a 5 to 8 year period and have reached the stage of initiating reproduction" (Proposed Downlisting, p. 64283). USFWS subsequently reported that "the single natural population had been declining [to a single tree] due to presumed natural mortality and lack of reproduction. Since then, no seedlings or evidence of reproduction have been observed either at the natural population site or any of the progeny plots.... The last format report on the progeny plots in 2008 showed a 37.5% decline in total seedlings planted that included both, round-leaf and sweet birch individuals" (FYR, p. 5). "Debate continues regarding whether <i>B. uber</i> is a species or a variety of <i>B. lenta</i> " (FYR, p. 5). "It is apparently allied to <i>B. lenta</i> ...whether it constitutes a separate species or simply mutant individuals of <i>B. lenta</i> is a matter of controversy. Seeds obtained from the original single extant population of 17 trees and grown at the U.S. National Arboretum have produced an apparent hybrid swarm of offspring varying in leaf characteristics from those of <i>B. uber</i> to those of <i>B. lenta</i> (with which it occurs);" ( <a href="http://efloras.org">efloras.org</a> online database, search of "betula uber", accessed October19, 2023)).
Small whorled pogonia	<i>Isotria medeoloides</i>	Plant	9/9/1982	41.3	10/6/1994	12.1	The listing indicated the plant occurred in <b>15 counties in 10 states and one county in Ontario, Canada</b> , and total <b>less than 500 plants</b> (Listing, p. 39627). Subsequently USFWS reports the plant is " <b>known or believed" to be in over 140 counties and 17 states</b> (ECOS). USFWS reported 179 sites in 2008 (SSA, p. 13).
Siler pincushion cactus	<i>Pediocactus</i> (= <i>Echinocactus</i> , = <i>Utahia sileri</i> )	Plant	11/26/1979	44.1	12/27/1993	14.1	"At the time of listing (1979), the amount of habitat was unknown and there were <b>thought to be less than 1,000 individuals</b> " (Listing, p. 61786). "They currently estimate there are <b>34,189 acres of habitat and have documented over 10,000 individuals</b> (BLM 2006)" (2008 FYR, p. 9). "We have no information on the extent of habitat or populations of Siler pincushion on Kaibab-Paiute lands or Utah State trust lands" (2008 FYR, p. 9).
Louisiana pearlshell	<i>Margaritifera hembeli</i>	Mussel	2/5/1988	35.9	9/24/1993	5.6	"Since the initial listing, the species has been discovered in the Red River drainage of Grant Parish. The Service conducted surveys of this drainage in 1991 and 1992 in an effort to completely define the range of the species. The <b>1991 survey located the species at 12 sites in 8 streams that are tributary to the Red River</b> . The 1992 survey confirmed these findings, extended the range within these streams" (Downlisting, p. 49935).

## Endnotes

- <sup>1</sup> Endangered and Threatened U.S. Listings as of 11/27/23 per FWS ECOS “Boxscore.”
- <sup>2</sup> USFWS, Environmental Conservation Online System (ECOS and cited as such hereafter), “boxscore.” (<https://ecos.fws.gov/ecp/report/boxscore>, accessed 10/31/23). For simplicity, unless needed, endangered and threatened species, two different levels of listing under the ESA are lumped together as “endangered.” As a practical matter, USFWS has eliminated much of the distinction between the two levels of protection Congress had devised by applying the “take” prohibition to all threatened species unless a 4(d) rule is promulgated to prescribe its application to a specific species. This is the converse of the ESA’s design. For a discussion of the distinction between endangered and threatened see: Rob Gordon, [Take it Back: Extending the Endangered Species Act’s “Take” Prohibition to All Threatened Animals Is Bad for Conservation](#), The Heritage Foundation, 2017; and see: Jonathan Wood, “Take it to the Limit: The Illegal Regulation Prohibiting the Take of Any Threatened Species Under the Endangered Species Act,” *Pace Environmental Law Review*, Vol. 33, No. 1, Fall 2015. (<http://digitalcommons.pace.edu/cgi/viewcontent.cgi?article=1784&context=pehr>, accessed 10/31/23).
- <sup>3</sup> ESA Sec. 3(3). ESA available at: (<https://www.fws.gov/media/endangered-species-act>, accessed 11/15/2023).
- <sup>4</sup> ESA, Sec. 4(f)(3). USFWS Report(s) to Congress on the Recovery of Threatened and Endangered Species (RTC) (<https://www.fws.gov/library/collections/recovery-reports-congress>, accessed 11/15/2023).
- <sup>5</sup> ESA Sec.4(c).
- <sup>6</sup> USFWS, ECOS (<https://ecos.fws.gov/ecp/>, accessed 10/31/23). Each listed species has a “profile” (record) on ECOS. Species that are focused upon in the text are bolded and underlined in the citations. The link following a bolded, underlined species is to the species’ ECOS profile. The profile includes information about the species and links to proposed and final listing (Listing) and delisting (Delisting) rules, Recovery Plans (RP), Five Year Reviews (FYR), Species Status Assessments (SSA), Post Delisting Monitoring Plans (PDMP) and other documents. In the following citations these document are simply referred to as indicated above within parentheses. The documents can be retrieved from the provided link or from the species’ profile. Documents cited in this manner preceded by USFWS or NMFS to indicate the author. Lists of species downloaded from USFWS’s ECOS are just cited as ECOS and accompanied by a link.
- <sup>7</sup> Somewhat confusingly, NMFS can also be referred to as “NOAA Fisheries.” NOAA is an acronym for National Oceanic and Atmospheric Administration. USFWS and NMFS share responsibility for implementing the ESA. “The National Marine Fisheries Service (NMFS) has jurisdiction for whales, seals, and sea lions. NMFS also has jurisdiction for sea turtles in the water; the Service has jurisdiction on land. Jurisdiction varies between NMFS and the Service for anadromous fish such as salmon, trout, steelhead, and sturgeon. The Service has jurisdiction for listed marine mammals such as the West Indian manatee and southern sea otter, as well as all sea birds.” (<https://www.fws.gov/node/267045>, accessed 11/2/23).
- <sup>8</sup> NOAA Fisheries and U.S. FWS Memorandum of Understanding on Sea Turtles, July 18, 1977. (<https://www.fisheries.noaa.gov/resource/document/noaa-fisheries-and-us-fws-memorandum-understanding-sea-turtles>, accessed 10/31/23).
- <sup>9</sup> Kate Morgan, “Black bears in the backyard: Why they’re everywhere, and what to do,” *The Washington Post*, 10/10/23. (<https://www.washingtonpost.com/home/2023/10/10/black-bears-backyard-sightings/>; accessed 11/1/23.)
- <sup>10</sup> Ibid.
- <sup>11</sup> Connecticut Department of Energy and Environmental Protection, “Black bear (*Ursus americanus*),” n.d. (<https://portal.ct.gov/DEEP/Wildlife/Fact-Sheets/Black-Bear>, accessed 11/15/23). Massachusetts Division of Fisheries and Wildlife, “Learn about black bears,” n.d. (<https://www.mass.gov/info-details/learn-about-black-bears>, accessed 11/1/23).

- <sup>12</sup> International Union for the Conservation of Nature (IUCN), IUCN Redlist. American black bear, (<https://www.iucnredlist.org/species/41687/114251609>, accessed 10/31/23). Like ECOS, the IUCN Redlist may be searched using a species' common or scientific name.
- <sup>13</sup> USFWS, National Digital Library. (<https://digitalmedia.USFWS.gov/digital/collection/natdiglib/id/10930/rec/27>, accessed 9/26/23).
- <sup>14</sup> Ibid. (<https://digitalmedia.fws.gov/digital/collection/natdiglib/id/25273/rec/5>, accessed 9/26/23).
- <sup>15</sup> US Geological Survey, Species Range and Predicted Habitat Data. (<https://gapanalysis.usgs.gov/apps/species-data-download/>, accessed 11/16/23).
- <sup>16</sup> USFWS, ECOS, "USFWS-Listed U.S. Species by Taxonomic Group – Mammals." (<https://ecos.fws.gov/ecp/report/species-listings-by-tax-group?statusCategory=Listed&groupName=Mammals&total=80>, accessed 9/26/23). Additionally, some listed animals have more than one entry on the List. For example, there are two entries each for the wood bison (an invalid taxon according to Integrated Taxonomic Information System (ITIS)), the Sonoran pronghorn, the Mexican wolf, and the black footed ferret. Many species managed by NMFS or jointly by NMFS and USFWS are listed as DPSs (e.g. sea turtles, whales, salmonids). In addition to multiple listings of distinct population segments, multiple listings for a single species can result from a separate listing for an "experimental population." The experimental population listing (or "10j" from the relevant ESA provision) allows for different regulatory rules to be applied to a discrete geographically defined subunit of a listed species.
- <sup>17</sup> Robert Zink and Lukas B. Klicka, The Taxonomic Basis of Subspecies Listed as Threatened and Endangered under the Endangered Species Act, Working Paper, The Center for Growth and Opportunity, Utah State University, June 2022. (<https://www.thecgo.org/research/the-taxonomic-basis-of-subspecies-listed-as-threatened-and-endangered-under-the-endangered-species-act/>, accessed 11/1/23).
- <sup>18</sup> Robert Zink and Lukas B. Klicka.
- <sup>19</sup> ESA Sec.3(16).
- <sup>20</sup> Liebesman, Lawrence and Rofe Dentson, Endangered Species Deskbook, the Environmental Law Reporter, Washington, D.C. 2003, pp. 13–14.
- <sup>21</sup> USFWS, 2022 FYR for the American Crocodile, Figure 7, p. 9. ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/3977.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3977.pdf), accessed 11/7/23).
- <sup>22</sup> USFWS, National Digital Library. (<https://digitalmedia.fws.gov/digital/collection/natdiglib/id/9679/rec/1>, accessed 9/26/23).
- <sup>23</sup> USFWS, ECOS, "USFWS Species Listed as Distinct Population Segments (DPS)." (<https://ecos.fws.gov/ecp/report/dps>, accessed 9/26/23). Despite the ECOS report's name, the list includes species under NMFS jurisdiction. NMFS has also listed evolutionarily significant units of Chinook salmon, *Oncorhynchus tshawytscha*, for the Upper Columbia spring-run, Lower Columbia River, Snake River spring/summer-run, Snake River fall-run, Central Valley spring-run, Sacramento River winter-run, Puget Sound, California Coastal, and Upper Willamette River.
- <sup>24</sup> Ibid.
- <sup>25</sup> Ibid.
- <sup>26</sup> Ibid. This same source documents that 5 Atlantic sturgeon, 11 steelhead (rainbow trout), 4 coho salmon, 4 scalloped shark, 5 humpback whale, 11 green sea turtle, 9 loggerhead sea turtle, and 3 California tiger salamander distinct populations segments are listed.
- <sup>27</sup> ESA Sec.4(a).
- <sup>28</sup> ESA Sec.3(6) and (20).



- <sup>29</sup> See note 1.
- <sup>30</sup> ESA Sec.4(b).
- <sup>31</sup> USFWS, Colorado Hookless Cactus Delisting, p. 21583. (<https://www.govinfo.gov/content/pkg/FR-2023-04-11/pdf/2023-07119.pdf#page=1>, accessed 11/15/2023).
- <sup>32</sup> USFWS, Endangered and Threatened Wildlife and Plants; Regulations for Listing Species and Designating Critical Habitat, August 27, 2019, p. 45020. (<https://www.fws.gov/policy/library/2019/2019-17518.pdf>, accessed 11/15/23).
- <sup>33</sup> See, for example: Rob Gordon, Correcting Falsely “Recovered” and Wrongly Listed Species and Increasing Accountability and Transparency in the Endangered Species Program, the Heritage Foundation, April, 16, 2018. (<https://www.heritage.org/environment/report/correcting-falsely-recovered-and-wrongly-listed-species-and-increasing>, accessed 11/16/23).
- <sup>34</sup> USFWS, Hine’s emerald dragonfly FYR, pp. 4–10. (<https://ecos.fws.gov/ecp/species/7877>, accessed 11/7/23).
- <sup>35</sup> USFWS *Echinocereus reichenbachii* var. *albertii*, ECOS. (<https://ecos.fws.gov/ecp/species/5560>, accessed 11/7/23).
- <sup>36</sup> USFWS *Echinocereus reichenbachii* var. *albertii*, FYR, p. 11. ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/1320.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1320.pdf), accessed 11/16/23).
- <sup>37</sup> Integrated Taxonomic Information System (ITIS) record for *Echinocereus reichenbachii* var. *albertii* reports “not accepted.” Like ECOS records, ITIS records (simply cited as ITIS hereafter) can be searched by the species scientific or common name. (<https://www.itis.gov>, accessed 11/16/23).
- <sup>38</sup> ITIS, Landing Page and “About,” “Organizational Information,” and “Organization and Partners.” (<https://www.itis.gov/>, accessed 11/1/23).
- <sup>39</sup> USFWS, Monarch butterfly 12 Month Finding. (<https://www.govinfo.gov/content/pkg/FR-2020-12-17/pdf/2020-27523.pdf>, accessed 11/7/23).
- <sup>40</sup> Dennis Normile, Monarch butterfly is not endangered, conservation authority decides, *Science*, 3/10/23. (<https://www.science.org/content/article/monarch-butterfly-not-endangered-conservation-authority-decides>, accessed 10/31/23).
- <sup>41</sup> Douglas W. MacCleery, *American Forests: A History of Resilience and Recovery*, Durham, NC: Forest History Society, 2011, pp. 1–2 and 14.
- <sup>42</sup> Bill McKibben, “An Explosion of Green,” *The Atlantic*, April 1995.
- <sup>43</sup> USFWS, ECOS, “boxscore.”
- <sup>44</sup> USFWS, ECOS, “USFWS-Listed U.S. Species by Taxonomic Group – Insects.” (<https://ecos.fws.gov/ecp/report/species-listings-by-tax-group?statusCategory=Listed&groupName=Insects&total=98>, accessed 9/26/23). This includes: the American burying beetle (with an experimental population), Comal Springs dryopid beetle, Comal Springs riffle beetle, Helotes mold beetle, Hungerford’s crawling water beetle, Kretschmarr Cave mold beetle, Miami tiger beetle, Mount Hermon June beetle, northeastern beach tiger beetle, Ohlone tiger beetle, Puritan tiger beetle, *Rhadine exilis*, *Rhadine infernalis*, Salt Creek Tiger beetle, Tooth Cave ground beetle, and the valley elderberry longhorn beetle.
- <sup>45</sup> Gough, H.M., Duran, D.P., Kawahara, A.Y. and Toussaint, E.F.A. (2019), A comprehensive molecular phylogeny of tiger beetles (*Coleoptera*, *Carabidae*, *Cicindelinae*). *Syst Entomol*, 44: 305–321. (<https://doi.org/10.1111/syen.12324>, accessed 9/26/23).
- <sup>46</sup> USFWS, National Digital Library, (<https://digitalmedia.fws.gov/digital/collection/natdiglib/id/11004/rec/6>, accessed 9/26/23).

- <sup>47</sup> USFWS 2012 RTC, p. “from the Director.” (<https://www.fws.gov/sites/default/files/documents/recovery-report-to-congress-fiscal-years-2013-2014.pdf>, accessed 11/1/23).
- <sup>48</sup> USFWS, Gopher tortoise 2022 Finding, p. 61835. (<https://www.govinfo.gov/content/pkg/FR-2022-10-12/pdf/2022-21659.pdf>); USFWS IUCN Gopher tortoise 2011 12 month finding, p. 45145. (<https://www.govinfo.gov/content/pkg/FR-2011-07-27/pdf/2011-18856.pdf>, accessed 11/15/2023).
- <sup>49</sup> USFWS, Picture-Wing Flies From the Hawaiian Islands Listing, p. 26835. (<https://www.govinfo.gov/content/pkg/FR-2006-05-09/pdf/06-4299.pdf>, accessed 11/17/23).
- <sup>50</sup> USFWS, Picture-Wing Flies From the Hawaiian Islands Listing, p. 26836.
- <sup>51</sup> Ibid.
- <sup>52</sup> ESA Sec.4(f)(1)(B)(iii).
- <sup>53</sup> USFWS’s 2013–14 Report to Congress (<https://www.fws.gov/media/recovery-report-congress-fiscal-years-2013-2014>) lists the following species as having 10 or fewer (in parentheses) years to recovery: Cheat Mountain Salamander, Hawaiian coot, Hawaiian duck, Hawaiian common moorhen, Mexican spotted owl, Hawaiian stilt, Curtis pearlymussel (4), Santa Cruz cypress, California freshwater shrimp, American heart’s-tongue fern (6), Clover Valley speckled dace (7), desert dace (4), Independence Valley speckled dace (7), Kendell Warm Spring’s dace (5), Cherokee dater, Etowah darter, goldline darter, leopard darter, vermilion darter, Neosho madtom (5), Devil’s River minnow (9), Delta smelt (3), Railroad Valley springfish (7), Apache trout (3) – now delisted, greenback cutthroat trout (5), Paiute cutthroat trout (9), decurrent false aster (7), Ruth’s golden aster (6), Knieskern’s beaked-rush (4), lyrate bladderpod (5), Missouri bladderpod (7), prairie bush-clover (5) water Howellia (9) – now delisted, Minnesota dwarf trout lily (3), Furbish lousewort (7), northern wild monkshood (3), Catesbaea melanocarpa, western prairie fringed orchid, Kneeland prairie penny cress, Todsen’s pennyroyal, Yreka phlox, small whorled pogonia, leafy prairie-clover, Cumberland rosemary (9), Leedy’s roseroot, Cumberland sandwort (9) – now delisted, Virginia spiraea (5) Mitchell’s satyr butterfly (10), Anastasia Island beach mouse (9), southeastern beach mouse (9), Northern Idaho ground squirrel (8), Atlantic salt marsh snake (7), Banbury springs limpet, painted rocksnail, round rocksnail, Bliss rapids snail, Iowa Pleistocene snail (3), Snake River physa snail – now delisted, Tulotoma snail, Alamosa springsnail, and Socorro springsnail.
- <sup>54</sup> USFWS, **Iowa Pleistocene Snail**. (ECOS Profile: <https://ecos.fws.gov/ecp/species/534>).
- <sup>55</sup> As an example of a lengthy time that can follow proposed delisting, the Inyo brown towhee, a bird, was proposed for delisting in November of 2013, a decade ago, but remained listed as of October 24, 2023. (USFWS, Inyo brown towhee ECOS Profile: <https://ecos.fws.gov/ecp/species/3912>, accessed 11/16/23).
- <sup>56</sup> Jeffrey C. Nekola, Overview of the North American Terrestrial Gastropod Fauna, *American Malacological Bulletin*, 32(2), 225–235, 9/1/14, p. abstract. (<https://bioone.org/journals/american-malacological-bulletin/volume-32/issue-2/006.032.0203/Overview-of-the-North-American-Terrestrial-Gastropod-Fauna/10.4003/006.032.0203.short>, accessed 10/31/23).
- <sup>57</sup> USFWS, Iowa Pleistocene Snail RP, p. ii and 6. ([https://ecos.fws.gov/docs/recovery\\_plan/840322.pdf](https://ecos.fws.gov/docs/recovery_plan/840322.pdf), accessed 11/15/2023).
- <sup>58</sup> USFWS, Iowa Pleistocene Snail Listing, p. 28932–5. (<https://www.govinfo.gov/link/fr/43/28932?link-type=pdf>, accessed 11/15/2023).
- <sup>59</sup> USFWS, Iowa Pleistocene Snail Proposed Listing, p. 17744. (<https://www.govinfo.gov/link/fr/41/17742?link-type=pdf>).
- <sup>60</sup> Ibid.
- <sup>61</sup> Ibid.

- <sup>62</sup> USFWS, Iowa Pleistocene Snail 2020 5YR, pp. 2–3. ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/2949.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2949.pdf), accessed 11/16/23).
- <sup>63</sup> Ibid, p. 4.
- <sup>64</sup> CNN reported in 2008 that “researchers feared only around 50,000 Western lowland gorillas left worldwide” until they found an estimated 125,000 Western lowland gorillas, “double the number of the endangered primates thought to survive worldwide.” (CNN, “More Than 100,000 Rare Gorillas Found in Congo,” August 6, 2008. (<https://www.cnn.com/2008/WORLD/africa/08/05/congo.gorillas/index.html>, accessed 10/1/23).
- <sup>65</sup> From *Outdoor Illinois*, Illinois Department of Natural Resources. (<https://outdoor.wildlifeillinois.org/articles/rare-algific-slopes-could-still-harbor-endangered-snail>, accessed 11/15/23).
- <sup>66</sup> USFWS Iowa Pleistocene Snail 2013 FYR, p. 7. ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/2154.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2154.pdf), accessed 11/15/2023).
- <sup>67</sup> Ibid, p. 4
- <sup>68</sup> USFWS, 2013 FYR, p. 14.
- <sup>69</sup> USFWS, 2020 FYR, p. 5.
- <sup>70</sup> Ibid. pp. 2, 5.
- <sup>71</sup> Ibid. From table on pp. 3–4.
- <sup>72</sup> USFWS, RP, p. 10.
- <sup>73</sup> USFWS, 2009 FYR, p. 2. ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/1483.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1483.pdf), accessed 11/17/23).
- <sup>74</sup> Ibid.
- <sup>75</sup> Ibid.
- <sup>76</sup> USFWS, 1990 RTC, p. vii. (<https://www.fws.gov/media/recovery-report-congress-fiscal-years-1990-1991>, accessed 11/15/2023).
- <sup>77</sup> USFWS, California Condor 2023 FYR, n.p.n., from figure 2. ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/7272.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/7272.pdf), accessed 11/16/23).
- <sup>78</sup> Pimm, Stuart, Conservation: The California Condor A Saga of Natural History and Conservation N. Snyder and H. Snyder. *Science*-New York then Washington, 2000, pp. 2289–2289.
- <sup>79</sup> James Roelle et al., eds., “Recovery of the Black-Footed Ferret: Progress and Continuing Challenges, proceedings of the Symposium on the Status of the Black-Footed Ferret and Its Habitat,” U.S. Geological Survey, January 28–29, 2004. (<https://pubs.er.usgs.gov/publication/sir20055293>, accessed October 5, 2023).
- <sup>80</sup> James Roelle et. al., p. 9.
- <sup>81</sup> Ibid p. 8.
- <sup>82</sup> USFWS Black-footed ferret 2020 FYR, p. 2. ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/3374.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3374.pdf), accessed 11/15/2023).
- <sup>83</sup> USFWS Black-footed ferret RP, p. 30. ([https://ecos.fws.gov/docs/recovery\\_plan/20131108%20BFF%202nd%20Rev.%20Final%20Recovery%20Plan.pdf](https://ecos.fws.gov/docs/recovery_plan/20131108%20BFF%202nd%20Rev.%20Final%20Recovery%20Plan.pdf), accessed 11/15/2023).
- <sup>84</sup> USFWS, National Digital Library. (<https://digitalmedia.fws.gov/digital/collection/natdiglib/id/11266/rec/40>, accessed 9/26/23).
- <sup>85</sup> Ibid.

- <sup>86</sup> USFWS, West Indian Manatee Downlisting, pp. 1668–16704. (<https://www.govinfo.gov/content/pkg/FR-2017-04-05/pdf/2017-06657.pdf>, accessed 11/15/2023).
- <sup>87</sup> USFWS, Nelson’s Checker-mallow Delisting, pp. 25197–25209. (<https://www.govinfo.gov/content/pkg/FR-2022-04-28/pdf/2022-09106.pdf>, accessed 11/15/2023). USFWS, Apache Trout Delisting, pp. 54548–54564 (<https://www.govinfo.gov/content/pkg/FR-2023-08-11/pdf/2023-15689.pdf>, accessed 11/15/2023).
- <sup>88</sup> USFWS, “Fish and Wildlife Service Delists 21 Species from the Endangered Species Act due to Extinction,” Press Release, 10/16/23. (<https://www.fws.gov/press-release/2023-10/21-species-delisted-endangered-species-act-due-extinction>, accessed 10/31/23).
- <sup>89</sup> For example, in a paper by Greenwald et. al., the authors’ list of extinct or possibly extinct species that were or are listed includes numerous species for which the taxon has been subsequently reported as invalid according to ITIS. ITIS was searched for the following previously listed species by scientific name on 10/25/23: the blue pike (*Stizostedion vitreum glaucum*), green blossom (pearly mussel) (*Epioblasma torulosa gubernaculum*), stirrupshell (*Quadrula stapes*), tubercled blossom (pearly mussel) (*Epioblasma torulosa torulosa*), yellow blossom (pearly mussel) (*Epioblasma florentina florentina*), eastern puma (*Puma concolor cougar*), and curtis pearly mussel (*Epioblasma florentina curtisii*). ITIS indicated these taxons are invalid. With at least this number of taxonomic invalid species among just the extinct species, the number of taxonomically invalid listed species is likely substantial as reported by Zink and Klica. (Greenwald N, Suckling KF, Hartl B, A. Mehrhoff. 2019. Extinction and the U.S. Endangered Species Act. PeerJ 7:e6803. (<https://doi.org/10.7717/peerj.6803>., accessed 11/15/2023). Supplementary data available at: ([https://dfzljdn9uc3pi.cloudfront.net/2019/6803/1/Greenwald\\_et\\_al\\_Supplementary\\_Info.pdf](https://dfzljdn9uc3pi.cloudfront.net/2019/6803/1/Greenwald_et_al_Supplementary_Info.pdf), accessed 11/15/2023)). If properly understood, Greenwald et. al. reported removing those species that they categorized as having gone extinct or having presumably gone extinct before being listed. The remaining listed species in addition to those that were officially recovered and delisted composed a pool of “extant species.” The authors reported multiplying a theoretical worldwide extinction risk “estimated as an average of 67% over 100 years” by the number of “extant listed species,” and then by the “proportion of a century in which species were protected by the ESA,” reportedly average value of 0.25 centuries. As the online supplementary materials do not include the list of “extant species” the results cannot be reproduced from the online material.
- <sup>90</sup> USFWS, Penland’s beardtongue Listing, p. 29659. (<https://www.govinfo.gov/content/pkg/FR-1989-07-13/pdf/FR-1989-07-13.pdf#page=140>, accessed 11/16/23). USFWS Heliotrope milkvetch Listing, p. 42653 (<https://www.govinfo.gov/content/pkg/FR-1987-11-06/pdf/FR-1987-11-06.pdf#page=32>, accessed 11/17/23).
- <sup>91</sup> Natureserve, Penland’s beardtongue. ([https://explorer.natureserve.org/Taxon/ELEMENT\\_GLOBAL.2.139970/Penstemon\\_penlandii](https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.139970/Penstemon_penlandii), accessed 11/16/23). “Estimates from Ecotone 2010 surveys indicated there are approx. 1.4 million individuals. 12,000+ individuals were estimated in 2008 using different census methods (CNHP 2022).”
- <sup>92</sup> Natureserve, Heliotrope milkvetch. ([https://explorer.natureserve.org/Taxon/ELEMENT\\_GLOBAL.2.1142811/Astragalus\\_montii](https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.1142811/Astragalus_montii), accessed 11/16/23).
- <sup>93</sup> NMFS **Johnson’s Seagrass**, (Profile: <https://ecos.fws.gov/ecp/species/4227>). NMFS, Johnson’s Seagrass Proposed Delisting, 12/23/21, p. 72909. (<https://www.govinfo.gov/content/pkg/FR-2021-12-23/pdf/2021-27631.pdf>, accessed 11/15/23).
- <sup>94</sup> NMFS, Proposed Delisting, p. 72908–72910. (<https://www.govinfo.gov/content/pkg/FR-2021-12-23/pdf/2021-27631.pdf>, accessed 11/16/23).
- <sup>95</sup> NMFS Johnson’s Seagrass Proposed Delisting, p. 72910.
- <sup>96</sup> NMFS Johnson’s Seagrass Listing 49037. (<https://www.govinfo.gov/content/pkg/FR-1998-09-14/pdf/98-24357.pdf#page=1>, accessed 11/16/23).

- <sup>97</sup> NMFS Johnson’s Seagrass CH, p. 17789–17790. (<https://www.govinfo.gov/content/pkg/FR-2000-04-05/pdf/00-8394.pdf#page=2>, accessed 11/16/23).
- <sup>98</sup> NMFS Johnson’s Seagrass CH, p. 17789–17790. (<https://www.govinfo.gov/content/pkg/FR-2000-04-05/pdf/00-8394.pdf#page=2>, accessed 11/16/23).
- <sup>99</sup> NMFS, Frequently Asked Questions on the Removal of Johnson’s seagrass from the Endangered Species Act. (<https://www.fisheries.noaa.gov/southeast/endangered-species-conservation/frequently-asked-questions-removal-johnsons-seagrass>, accessed 11/17/23). The Smithsonian Environmental Research Center this seagrass was not noticed in Florida until the 1950’s and “so far, *H ovalis* has a limited range in Florida, and no known impacts” ([https://invasions.si.edu/nemesis/species\\_summary/38959](https://invasions.si.edu/nemesis/species_summary/38959)).
- <sup>100</sup> Aaron M. Haines, Matthias Leu, Delaney M. Costante, Tyler C. Treakle, Carli Parenti, Jennifer R. B. Miller, and Jacob W. Malcom, Benchmark for the ESA: Having a Backbone Is Good for Recovery, *Frontiers in Conservation Science*, 28 January 2021. (<https://www.frontiersin.org/articles/10.3389/fcosc.2021.630490/full>, accessed 11/15/23). The delisting of about half of the species in the data set used by Haines et. al is more accurately attributable to data error as is subsequently demonstrated. Accepting USFWS official statements of recovery, clearly confounds the conclusions. The “recovered species” Haines et. al. analyzed included glaring data errors such as Hoover’s woolly-star, Johnston’s Frankenia, the Monito Gecko and Maguire Daisy. After listing, a metapopulation of Hoover’s woolly-star was found to contain more than 100,000,000 plants. After listing Johnston’s Frankenia population estimates changed from about 1,000 to four to nine million. After listing, the Monito gecko, for which day time population surveys were used in listing, was found to be nocturnal. The Maguire daisy was determined after listing to be an invalid taxon, combined with another, and consequently, determined to be more abundant and widespread than had been believed.
- <sup>101</sup> See Note 3.
- <sup>102</sup> ESA Sec. 4(f)(3).
- <sup>103</sup> USFWS, 2005–6 Recovery Report to Congress. (<https://www.fws.gov/sites/default/files/documents/recovery-report-to-congress-fiscal-years-2005-2006.pdf>).
- <sup>104</sup> USFWS 2009–10 RRTC, p. 5. (<https://www.fws.gov/media/recovery-report-congress-fiscal-years-2009-2010>).
- <sup>105</sup> Implementation of the Endangered Species Act of 1973, Majority staff, pp. 120–206, within Threatened and Endangered Species Recovery Act; Report together with Additional and Dissenting Views, House Committee on Natural Resources, 109th Congress, 9/27/05. (<https://www.congress.gov/109/crpt/hrpt237/CRPT-109hrpt237.pdf>, accessed 11/4/23).
- <sup>106</sup> USFWS, 1990 Report to Congress, p. 17. (<https://www.fws.gov/media/recovery-report-congress-fiscal-years-1990-1991>).
- <sup>107</sup> NMFS, Recovering Threatened and Endangered Species FY 2019–2020 Report to Congress, p. 7. (<https://media.fisheries.noaa.gov/2022-01/NOAA%20Endangered%20Species%202021%20Final.pdf>, accessed 11/1/23).
- <sup>108</sup> Aaron M. Haines, Matthias Leu, Delaney M. Costante, Tyler C. Treakle, Carli Parenti, Jennifer R. B. Mille, and Jacob W. Malcom, Benchmark for the ESA: Having a Backbone Is Good for Recovery, *Frontiers in Conservation Science*.
- <sup>109</sup> USFWS, 2020 Report to Congress, p. 17. (<https://www.fws.gov/media/report-congress-recovery-threatened-and-endangered-species-fiscal-years-2017-2020>).
- <sup>110</sup> USFWS, 2009–10 Report to Congress, p. 1. (<https://www.fws.gov/media/recovery-report-congress-fiscal-years-2009-2010>).
- <sup>111</sup> USFWS, Golden cocqui RP. ([https://ecos.fws.gov/docs/recovery\\_plan/840419c.pdf](https://ecos.fws.gov/docs/recovery_plan/840419c.pdf), accessed 11/1/23); USFWS California red-legged frog RP. ([https://ecos.fws.gov/docs/recovery\\_plan/020528.pdf](https://ecos.fws.gov/docs/recovery_plan/020528.pdf), accessed 11/1/23).

- <sup>112</sup> USFWS, National Digital Library. (<https://digitalmedia.fws.gov/digital/collection/natdiglib/id/18319/rec/3>, accessed 11/4/23).
- <sup>113</sup> USFWS, 2009–10 Report to Congress, p. 1.
- <sup>114</sup> USFWS, 2020 Report to Congress, p. 17.
- <sup>115</sup> Ibid.
- <sup>116</sup> USFWS, Valley Elderberry Longhorn Beetle RP, p. 14; and **bull trout** DPS ECOS Implementation Schedule, p. ix. For number of bull trout actions, while in ECOS, go to the box for “current recovery plan” and then select “view implementation schedule.” (<https://ecos.fws.gov/ecp/species/8212>, accessed 11/4/23).
- <sup>117</sup> USFWS, Colorado Butterfly Plant FYR, p. 4. ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/2017.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2017.pdf), accessed 10/5/23).
- <sup>118</sup> USFWS, 2020 Report to Congress, p. 7.
- <sup>119</sup> The number reported by USFWS and tallied from other reported numbers in the 2020 Report to Congress appear to differ by 1.
- <sup>120</sup> USFWS, Cumberland sandwort Listing, p. 23745. (<https://www.govinfo.gov/link/fr/53/23745?link-type=pdf>); USFWS, Cumberland sandwort Delisting, p. 45687. (<https://www.govinfo.gov/content/pkg/FR-2021-08-16/pdf/2021-17468.pdf#page=1>).
- <sup>121</sup> USFWS, Etonia rosemary Proposed Listing, p. 21371. (<https://ecos.fws.gov/ecp/species/5841>, accessed 11/17/23). USFWS, Etonia rosemary 2019 FYR, p. 3. ([https://ecos.fws.gov/docs/recovery\\_plan/Etonia%20Rosemary%20Recovery%20Plan%20Amendment\\_1.pdf](https://ecos.fws.gov/docs/recovery_plan/Etonia%20Rosemary%20Recovery%20Plan%20Amendment_1.pdf), accessed 11/17/23).
- <sup>122</sup> USFWS, *Mitracarpus polycladus* Proposed Downlisting, p. 37477. (<https://www.govinfo.gov/content/pkg/FR-2022-06-23/pdf/2022-13229.pdf#page=1>).
- <sup>123</sup> USFWS, Northeastern bulrush Proposed Listing, p. 46963. (<https://www.govinfo.gov/link/fr/55/46963?link-type=pdf>).
- <sup>124</sup> USFWS, Northeastern bulrush SSA, p. 12. (<https://ecos.fws.gov/ServCat/DownloadFile/166510>).
- <sup>125</sup> Ibid, p. 10.
- <sup>126</sup> USFWS, National Digital Library. (<https://digitalmedia.fws.gov/digital/collection/natdiglib/id/31103/rec/2>, accessed 11/3/23).
- <sup>127</sup> USFWS, Tidewater goby 2007 FYR, p. 14. ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/1111.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1111.pdf), accessed 11/1/23).
- <sup>128</sup> USFWS, Tidewater goby 2014 SSA, p. 14342. (<https://www.govinfo.gov/content/pkg/FR-2014-03-13/pdf/2014-05335.pdf#page=1>, accessed 11/1/23).
- <sup>129</sup> These include: the American burying beetle, beach layia, *Eugenia woodburyia*, Foscett speckled dace, Hawaiian hawk, Inyo California towhee, Kuenzler hedgehog cactus, interior least tern, Monito gecko, Morro shoulderband snail, Nashville crayfish, palo de rosa, running buffalo clover, Santa Cruz cypress, smooth coneflower, Tobusch fishhook cactus, Tulotoma snail, and water Howellia. These species are addressed subsequently.
- <sup>130</sup> USFWS, Colorado Hookless Cactus Delisting, p. 21583. (<https://www.federalregister.gov/documents/2023/04/11/2023-07119/endangered-and-threatened-wildlife-and-plants-removal-of-the-colorado-hookless-cactus-from-the>).
- <sup>131</sup> Jo Warrick, “Babbitt sets plan to pare endangered species list,” *The Washington Post*, May 6, 1998. (<https://www.washingtonpost.com/archive/politics/1998/05/06/babbitt-sets-plan-to-pare-endangered-species-list/6c82824d-e20c-478a-8e38-f17be7e6a969/>, accessed 11/1/23).

- <sup>132</sup> [Ibid](#)
- <sup>133</sup> Al Kamen, Death Leaps, In the Loop, *The Washington Post*, July, 15, 1998.
- <sup>134</sup> Per ECOS the following species remained listed as of 11/1/23: Ash Meadows amargosa pupfish, Ash Meadows gumplant, Ash Meadows sunray, Eureka Valley dune grass, Ewa Plains akoko, Heliotrope milk vetch, Loch lomond coyote thistle, Missouri bladderpod, Oahu tree snail (3 different species), parhump poolfish, spring-loving centaury, tidewater goby, Virginia roundleaf birch, and gray wolf.
- <sup>135</sup> USFWS, National Digital Library. (<https://digitalmedia.fws.gov/digital/collection/natdiglib/id/4533/rec/1>, accessed 11/24/23).
- <sup>136</sup> Gaid, N. US endangered-species recovery surges to record high. *Nature* (2016). (<https://doi.org/10.1038/nature.2016.20448>, accessed 11/2/23).
- <sup>137</sup> [Ibid](#).
- <sup>138</sup> USFWS, 2014 Report to Congress, p. “from the director.” (<https://www.fws.gov/media/recovery-report-congress-fiscal-years-2013-2014>).
- <sup>139</sup> USFWS, 2020 Report to Congress, p. 2 “from the director.” (<https://www.fws.gov/media/report-congress-recovery-threatened-and-endangered-species-fiscal-years-2017-2020>, accessed 11/17/23).
- <sup>140</sup> The species mentioned included: the white-haired goldenrod, turquoise parakeet, scarlet-chested parakeet, Eureka Valley evening primrose, black-capped vireo, lesser long-nosed bat, Hidden Lake bluecurls, Deseret milkvetch, Fosskett speckled dace, Monito gecko, Kirtland’s warbler, Colorado butterfly plant, Hawaiian hawk, and Borax Lake chub.
- <sup>141</sup> USFWS, ECOS, “Species Proposed for Status Change or Delisting.” (<https://ecos.fws.gov/ecp/report/species-listings-proposed-change-delisting>, accessed 11/2/23.)
- <sup>142</sup> See note 5.
- <sup>143</sup> USFWS, Morro shoulderband Snail and Chorro shoulderband snail 2019 SSA, version 1.1, February, 2019., p. 1. (<https://ecos.fws.gov/ServCat/DownloadFile/173393>, accessed 11/4/23).
- <sup>144</sup> [Ibid](#), p. 10.
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## About the Author

Rob Gordon has worked on environmental issues for over three decades. He served as Senior Advisor to the Director of the USGS, as Deputy Assistant Secretary of Policy and Environmental Management at the Department of the Interior, Staff Director of the Subcommittee on Oversight & Investigations, Senior Advisor on Endangered Species for the House Natural Resources Committee, and as Professional Staff for the Committee when his primary role was crafting major provisions of H.R.3824, the *Threatened and Endangered Species Recovery Act*. Rob has been an Adjunct Fellow at the Competitive Enterprise Institute, served as a Visiting Fellow, Senior Research Fellow, and as Senior Advisor for Strategic Outreach at The Heritage Foundation, and founded and served as Executive Director of the National Wilderness Institute. He served for two terms as a Board Member of the Commonwealth of Virginia's Board of Conservation and Recreation.

## About the Western Caucus Foundation

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410 First Street, SE  
Washington, DC 20003  
[westerncaucusfoundation.org](http://westerncaucusfoundation.org)  
[info@westerncaucusfoundation.org](mailto:info@westerncaucusfoundation.org)

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