



SAVING ENDANGERED SPECIES: Voluntary Solutions to Conservation



STRATA

February 2017

Primary Investigators:

Randy T Simmons, PhD, Utah State University

Megan E. Hansen, MS, Strata Policy

Grant Patty, BS, Strata Policy

Student Research Associates:

Jacob Caldwell

Matthew Crabtree

Jordan Floyd

Melissa Funk

Ryan Lee

Richard W. Poll

Madison Smith

Table of Contents

Executive Summary	1
Government Action and the Endangered Species Act	1
Does the ESA Help Species?.....	2
Recovery	2
Preventing Extinction.....	2
Improving Population Status	2
Economic Impacts of the ESA.....	3
Perverse Incentives.....	4
Private Action: Efficient Voluntary Species Conservation.....	5
The Coral Restoration Foundation	6
Conservation Northwest, Defenders of Wildlife, and the Gray Wolf	7
Private Conservation of Non-Charismatic Species.....	10
Private Conservation of the Torreya Taxifolia.....	11
Safe Harbor Agreements and the Houston Toad.....	12
The American Prairie Reserve.....	13
Conclusion	18

Executive Summary

The stated purpose of the Endangered Species Act (ESA) is to protect and recover endangered species and their ecosystems that “are of esthetic, ecological, educational, historical, recreational, and scientific value.”¹ The ESA cites “economic growth and development untempered by adequate concern and conservation” as the driving forces behind species extinction.² Over the course of 43 years and four amendments, the stated purpose and goals of the ESA have not changed.

While the act has had some success protecting species, this success comes at a cost that can extend to entire communities. The ESA also creates perverse incentives that inadvertently encourage individuals and the public to preemptively destroy species and their habitats. In such cases, the ESA may actually do the opposite of what policymakers intended, and harm the species it was designed to protect. Absent ESA reform in the foreseeable future, voluntary private action may be a viable alternative to help species recover.

Voluntary private action can avoid some of these pitfalls while still providing for species conservation. Private actors are often more local and therefore able to take advantage of relationships with local citizens. Private action can be more flexible as it is not bound to the specific bureaucratic processes of the ESA. Finally, private action can also create positive incentives for citizens to conserve species voluntarily.

This report examines some of the problems and unintended consequences of the ESA and highlights key advantages of private conservation of species by exploring six case studies featuring private actors working to protect endangered species. These case studies demonstrate how private conservation of species can and does occur. Voluntary action should be considered a viable option for protecting endangered species and their habitats. The case studies include:

- The Coral Restoration Foundation—a group that has grown and replanted over 36,000 corals.
- Conservation Northwest and Defenders of Wildlife—two organizations that work to reduce conflicts between humans and wolves.
- The Ugly Animal Preservation Society and EDGE of Existence—two groups that promote the conservation of non-charismatic species.
- The Torreya Guardians—a group of conservationists working to save one of the oldest evergreen species on Earth.
- Local Texas landowner Bob Long’s use of the ESA’s safe harbor agreements to conserve the Houston toad.
- The American Prairie Reserve—an organization dedicated to preserving one of the world’s last temperate grasslands by purchasing private land and grazing rights in Montana.

Government Action and the Endangered Species Act

The ESA is simultaneously a powerful and ineffectual piece of legislation. The act has been granted wide-reaching powers by federal courts and Congress, and while it has had some positive impact in stopping the decline of some species, the act has been largely ineffective at ensuring recovery for species’ populations over the past 43 years. At the same time, the high costs for private landowners and local economies caused by the ESA have created perverse incentives that discourage landowners from conserving species.

1 U.S. Fish and Wildlife Service. (2015, December 15) *Endangered Species Act, Overview*. Retrieved from: <http://www.fws.gov/endangered/laws-policies/>; U.S. Fish and Wildlife Service. (2003, November 24) *Endangered Species Act of 1973*. Retrieved from: <http://www.fws.gov/endangered/esa-library/pdf/ESAall.pdf>

2 U.S. Fish and Wildlife Service. (2003, November 24) *Endangered Species Act of 1973*. Retrieved from: <http://www.fws.gov/endangered/esa-library/pdf/ESAall.pdf>

Does the ESA Help Species?

To answer this question, we must first decide which criteria will be used to evaluate the success of the ESA. The act's success can be measured in several different ways, including whether the act leads to species recovery, whether it prevents extinction, and whether it leads to improving population status for a given species.

Recovery

The full recovery of a species is the best possible outcome under the ESA. By this measure, the ESA has largely failed. Over 40 years, just 34 species out of more than 2,245 have been delisted due to recovery.³ Recovered species account for just 1.5 percent of all species listed.

Of the few species that have recovered, experts have attributed recovery for several of them to events independent of the ESA. The recovery of the bald eagle, peregrine falcon, and the eastern brown pelican are likely a result of the 1972 ban of DDT, a pesticide that is toxic to many waterfowl and birds of prey.⁴ Other species that were officially listed as recovered were actually never endangered in the first place. The milk-vetch flower and the American alligator were both found to have been incorrectly listed based on faulty population data.⁵

Preventing Extinction

Another way to measure the success of the ESA is to look at whether it has helped prevent species from going extinct. By the time species are listed, it may be too late for them to establish permanent populations or to achieve full recovery.⁶ When judged based on its ability to prevent extinction, rather than outright recovery, the ESA has been much more successful. To date, only nine species listed under the ESA have ever gone extinct.⁷

While the ESA may have prevented many species from going extinct, the act may not be a long-term solution. A large portion of listed species are considered conservation-reliant, meaning that without continued funding and support from conservation organizations, these species' populations could collapse toward extinction.⁸

Improving Population Status

Using only recovery or extinction rates to evaluate the ESA, however, oversimplifies the real impact of the act and fails to offer insight into the status of the 2,245 species that remain listed.⁹ Another commonly used measure of the effectiveness of the ESA is population data, which attempts to quantify how many of each species currently exist. The U.S. Fish and Wildlife Service (FWS) creates status reports for each species, which designate each species as "improving, stable, declining, or

3 U.S. Fish and Wildlife Service. (2016). *Delisting Report*. Retrieved from: https://ecos.fws.gov/tess_public/reports/delisting-report

4 Adler, J.H., (2011). "The Leaky Ark: The Failure of Endangered Species Regulation on Private Land." *Rebuilding the Ark: New Perspectives on Endangered Species Act Reform*. American Enterprise Institute. 6-31.

5 Seasholes, Brian. (2007, September) *Bad for Species, Bad for People: What's Wrong with the Endangered Species Act and How to Fix It*. Natural Center for Policy Analysis.

6 Neel, M.C., Leidner, A.K., Haines, A., Goble, D.D., Scott, J.M. (2012, July). *By the Numbers: How is Recovery Defined by the US Endangered Species Act?* BioScience.

7 Langpap, Christian, and Kerkvliet, Joe. (2010). *Allocating Conservation Resources Under the Endangered Species Act*. Agricultural and Applied Economics Association.

8 Doremus, H., Pagel, J.E. (2001, October). *Why Listing May Be Forever: Perspectives on Delisting under the U.S. Endangered Species Act*. *Conservation Biology*. 15(5): 1258-1268.; Adler, J.H. (2011). "The Leaky Ark." *Rebuilding the Ark: New Perspectives on Endangered Species Act Reform*. American Enterprise Institute. 10.

9 U.S. Fish and Wildlife Service. (2016). *Delisting Report*. Retrieved from: https://ecos.fws.gov/tess_public/reports/delisting-report

unknown.”¹⁰ These status reports have become a common resource for evaluating the success of the ESA.¹¹ Studies analyzing FWS data find a strong relationship between a species receiving federal funding and “improving” status over time.¹²

This population data, however, is incomplete and even nonexistent for many species.¹³ Of the 650 species considered capable of full recovery by the FWS, as much as 71 percent have no population data at all.¹⁴ Data on habitat decline for specific species is crucial in listing and delisting species, however, this data is “virtually nonexistent.”¹⁵ Adding to the problem, population reports for different species often rely on different methodologies, making it difficult to compare how different species are doing.¹⁶ Unfortunately, quantifying the ESA’s impact on species requires relying on incomplete FWS data.

Analyzing whether the ESA is helping endangered species requires relying on an imperfect measure of success. Each of the above criteria has its weaknesses, making it difficult to determine whether the ESA is achieving its intended goal of protecting species. In addition to evaluating the ESA according to its intended goal, however, we must also examine the unintended consequences that have resulted from the act. These include negative economic impacts for landowners and local communities as well as perverse incentives that sometimes lead to species being harmed rather than helped.

Economic Impacts of the ESA

Since its passage in 1973, federal courts and Congress have regularly extended the ESA’s power to regulate the behavior of private landowners.¹⁷ Under Section 9 of the ESA, listed species are protected from any form of “taking.” Section 3 defines “take” as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect.”¹⁸ In 1975, the Secretary of Interior broadened the term “harm” to include actions that disrupt normal behaviors like “breeding, feeding, or sheltering” and to include “significant environmental modification.” The Supreme Court reinforced this statement in *Babbitt v. Sweet Home* when it ruled that habitat alteration fell under the definition of “take.”¹⁹

The ESA permits the Secretary of the Interior to designate specific land as critical habitat, a designation that marks the area as vital to a species’ survival and in need of protection.²⁰ Because regular use or maintenance of land classified as critical

10 Taylor, M.F.J., Suckling, K.F., and Rachlinski, J.J. (2005, April) *The Effectiveness of the Endangered Species Act: A Quantitative Analysis*. *BioScience*. 55(4): 360-367.

11 Taylor, M.F.J., Suckling, K.F., and Rachlinski, J.J. (2005, April) *The Effectiveness of the Endangered Species Act: A Quantitative Analysis*. *BioScience*. 55(4): 360-367.; Langpap, C., and Kerkvliet, J. (2007) *Allocating Conservation Resources Underneath the Endangered Species Act*. Agriculture and Applied Economics Association. Retrieved from: <http://ageconsearch.umn.edu/bitstream/9784/1/sp071a03.pdf>

12 Male, T.D., and Bean, M.J. (2005). *Measuring progress in US endangered species conservation*. *Ecology Letters*. 8: 986-992; Clark, J.A., Hoekstra, J.M., Boersma, P.D. & Kareiva, P. (2002). *Improving U.S. endangered species act recovery plans: key findings and recommendations*. *Conservation Biology*. 16: 1510-1519.

13 Gibbs, K.E., and Currie, D.J. (2012, May 2). *Protecting Endangered Species: Do the Main Legislative Tools Work?* *PLoS ONE*. 7(5): e35730.

14 Neel, M.C., Leidner, A.K., Haines, A., Goble, D.D., Scott, J.M. (2012, July) *By the Numbers: How is Recovery Defined by the US Endangered Species Act?* *BioScience*.

15 Ibid.

16 Abbitt, R.J.F., Scott, J.M. (2001, October). *Examining Differences between Recovered and Declining Endangered Species*. *Conservation Biology*. 1274-1284.; Seasholes, Brian. (2007, September). *Bad for Species, Bad for People: What’s Wrong with the Endangered Species Act and How to Fix It*. Natural Center for Policy Analysis.

17 Prior to the passage of the 1973 Endangered Species Act, Congress had passed the Endangered Species Act of 1966 and the Endangered Species Conservation Act of 1969. The protections created were minimal, forbidding the importation of endangered species and taking of species on land within the National Wildlife Refuge System and permitting the government to purchase land on behalf of the species; see Schiff, Damien M. (2014, July) *The Endangered Species at 40: A Tale of Radicalization, Politicization, Bureaucratization, and Senescence*. *Environs*. Retrieved from: <http://environs.law.ucdavis.edu/volumes/37/2/Articles/Schiff.pdf>

18 Endangered Species Act of 1973, 16 U.S.C. §§ 1531-1544 (1973).

19 Michael, D. L. (2003, April). *Preemptive Habitat Destruction Under the Endangered Species Act*. *Journal of Law and Economics*.

20 U.S. Fish and Wildlife Service. (2003, November 24) Endangered Species Act of 1973. Pg. 5. Retrieved from: <http://www.fws.gov/endangered/esa-library/pdf/ESAall.pdf>

habitat can be considered a “taking” of the protected species, critical habitat designations can severely restrict property rights.

Critical habitat designations can have an appreciable impact beyond individual landowners. Local industries and communities that rely heavily on land use are also affected. Critical habitat designations in Texas, the Rocky Mountains, North Carolina, and the Pacific Northwest have all reduced the amount of usable land available for landowners and businesses.²¹ Cases involving critical habitats often dominate the conversation of the ESA’s influence on local economies and landowner behavior.

The consequences of a critical habitat designation can directly affect thousands of people by restricting local economic activity. For example, the 1990 designation of the northern spotted owl, followed by the 1992 critical habitat designation in Pacific Coast forests in Oregon and Washington, received intense opposition from the local logging community. One 1991 study estimated that the spotted owl’s critical habitat designation would result in over 28,000 lost jobs by 2000 and losses totaling hundreds of millions of dollars.²² From 1990 to 2000, employment in the Pacific Northwest timber industry declined by 30,000 jobs.

This decline, while significant, is not entirely the result of species protection in the region. Various external factors including species protection, industry automation, industry globalization, and others, all contributed to regional industry decline from the 1980s into the 1990s. Whether the economic impacts of the spotted owl are over or underestimated, it is likely that critical habitat designations have had a negative impact on local economies.

At the same time, the ESA has done little to ensure the spotted owl’s survival. From 1985 to 2013, the population of the northern spotted owl declined by 3.8 percent annually.²³ The ESA seems to have failed to achieve its intended goal of protecting the northern spotted owl, while at the same time leading to negative economic consequences for local communities.

Perverse Incentives

In addition to negative impacts for local communities, the ESA also creates perverse incentives that can actually make things worse for the species it aims to preserve and protect. The ESA’s restrictions often involve fines or a restriction of personal property rights, which can create animosity between landowners and federal conservation efforts. Landowners regularly protest the listing of species and critical habitat designations near their property.²⁴ Because strong protests from concerned citizens often have little effect on whether a species is listed, many landowners turn to methods like preemptive habitat destruction in an effort to avoid ESA regulation.

The threat of land-use restrictions following critical habitat designation can cause landowners to act in ways that harm both their own economic interests and the recovery prospects of endangered species. A study on the harvesting of timber in North

21 Seasholes, B. (2007, September). Bad for Species, Bad for People: What’s wrong with the Endangered Species Act and How to Fix It. Retrieved from National Center for Policy Analysis: <http://www.ncpa.org/pdfs/st303.pdf>

22 Brown, G.M. Jr., and Shogren, J.F. (1998). *Economics of the Endangered Species Act*. The Journal of Economic Perspectives. 12(3): 3-20.; From 1990 to 2000, employment in the Pacific Northwest timber industry declined by 30,000 jobs. This decline, while significant, is not entirely the result of species protection in the region. Various external factors including species protection, industry automation, industry globalization, and others, all contributed to regional industry decline from the 1980s into the 1990s. Whether the economic impacts of the spotted owl are over- or underestimated, it is likely that critical habitat designations have had a negative impact on local economies.; Industrial Economics Incorporated. (2012, November). *Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl*. IEC. U.S. Fish and Wildlife Service. pg. ES-6.; Kirschner, A.R. (2010, June). *Understanding poverty and unemployment on the Olympic Peninsula after the Spotted Owl*. The Social Science Journal 47(2): 344-358.; Industrial Economics, Incorporated. (2012, May 29). *Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl*. Retrieved 2016, from Fish and Wildlife Service : <https://www.fws.gov/oregonfwo/species/Data/NorthernSpottedOwl/Documents/DraftEconAnalysis.5.29.12.3.pdf>

23 Katie M. Dugger, et.al., (2016, February). The effects of habitat, climate, and Barred Owls on long-term demography of Northern Spotted Owls. The Condor: Ornithological Applications, 118(1), 57-116

24 Kirschner, A.R. (2010, June). *Understanding poverty and unemployment on the Olympic Peninsula after the Spotted Owl*. The Social Science Journal 47(2): 344-358.; Simmons, R. (1999). *The Endangered Species Act: Who’s Saving What?*. The Independent Review. 3(3): 309-326.

Carolina found that the closer a population of ESA-protected red-cockaded woodpeckers is to a landowner's property, the more likely the landowner will prematurely harvest their timber resource, thereby decreasing the woodpecker's habitat.²⁵ The landowner successfully avoids ESA regulation by harvesting their timber in inefficient and costly ways.²⁶

Similar anecdotes describing preemptive habitat destruction and surreptitious harming of endangered species have been repeatedly examined in multiple papers that are critical of the ESA, and such activity is often informally referred to as "shoot, shovel, and shut up." Many landowners would rather risk the potential punishment of taking a species than deal with land-use restrictions from the federal government.²⁷ Unfortunately, quantifying the overall impact of preemptive habitat and species destruction is difficult as landowners do not record or advertise these activities.

Whether a species lives on federal or private land or a mix of the two plays a crucial role in its recovery status. According to a study by economists Gardner M. Brown, Jr. and Jason Shogren, "The ratio of declining species to improving species is 1.5 to 1 on federal lands, and 9 to 1 on private lands."²⁸ As of 2007, the habitat of 78 percent of listed species fell partially or completely within private land.²⁹ Another reason for the difference in species improvement between public and private land is that the FWS has greater access to and much more information about public land than private. Lack of access to private land decreases agencies' ability to determine species' populations.³⁰

The only real tool the FWS has for protecting species on private land is discouraging harmful actions through threats of punitive regulation.³¹ Critical habitat designation, one of the few powers the FWS has on private land, has little influence on a species' status.³² The punitive nature of federal conservation efforts on private land fosters distrust and discourages cooperation between federal agencies and landowners.³³ Despite these challenges, many private individuals and organizations have taken action to conserve endangered species.

Private Action: Efficient Voluntary Species Conservation

There is popular support among many scholars for making the ESA less punitive and increasing the flexibility of agencies to cooperate with landowners in mutually beneficial ways.³⁴ Programs that provide positive incentives or negate perverse

25 Lueck, D.L., Michael, J.A. (2003, April). *Preemptive Habitat Destruction Under the Endangered Species Act*. The Journal of Law and Economics. 46(1).

26 Ibid.

27 Dolan, M. (1992, December). "Nature at Risk in a Quiet War." Los Angeles Times. Retrieved from: http://articles.latimes.com/1992-12-20/news/mn-4616_1_endangered-species-act

28 Brown, G.M. Jr., and Shogren, J.F. (1998). *Economics of the Endangered Species Act*. The Journal of Economic Perspectives. 12(3): 3-20.; Hatch, L., Uriarte, M., Fink, D., Aldrich-Wolfe, L., Allen, R.G., Webb, C., Zamudio, K., Power, K. (2002, June). *Jurisdiction over Endangered Species' Habitat: The Impacts of People and Property on Recovery Planning*. Ecological Applications. 12(3): 690-700.

29 Seasholes, B. (2007, September). Bad for Species, Bad for People: What's wrong with the Endangered Species Act and How to Fix It. Retrieved from National Center for Policy Analysis: <http://www.ncpa.org/pdfs/st303.pdf>

30 Wilkins, R.N., (2011). "Improving the ESA's Performance on Private Land." *Rebuilding the Ark: New Perspectives on Endangered Species Act Reform*. American Enterprise Institute. 59-60.

31 Adler, J.H. (2011). "The Leaky Ark." *Rebuilding the Ark: New Perspectives on Endangered Species Act Reform*. American Enterprise Institute. 6-31.

32 Male, T.D., and Bean, M.J. (2005). *Measuring progress in US endangered species conservation*. Ecology Letters. 8: 986-992; Clark, J.A., Hoekstra, J.M., Boersma, P.D. & Kareiva, P. (2002). *Improving U.S. endangered species act recovery plans: key findings and recommendations*. Conservation Biology. 16: 1510-1519.

33 Main, M.B., Roka, F.M., Noss, R.F. (1999, December). *Evaluating Costs of Conservation*. Conservation Biology. 13(6): 1262-1272.

34 Adler, J.H., (2011). "The Leaky Ark: The Failure of Endangered Species Regulation on Private Land." *Rebuilding the Ark: New Perspectives on Endangered Species Act Reform*. American Enterprise Institute. 6-31. See also from the same book: Huffman, J.L. (2011). "Protecting Species through the Protection of Water Rights." 136-163.; Dana, D.A. (2011). "Reforming Section 10 and the Habitat Conservation Program." 32-55.; Nash, J.R. (2011). "Mark to Ecosystem Service Market: Protecting Ecosystems through Revaluing Conservation Easements." 117-135.

incentives, like compensation for decreased land values, can significantly increase private conservation efforts.³⁵ Reforms to water rights regulations, habitat conservation plans, and tax deductions are just a few of the proposed reforms that could potentially decrease the negative impacts of the ESA on private landowners.³⁶

Absent major reform in the foreseeable future, non-governmental action may be a better option to help species recover. Government agencies' over-reliance on litigation to define the powers of the ESA, high voter support for the act, and increasing legislative partisanship leave little room for members of Congress of any political affiliation to pass a significant overhaul of the act.³⁷

Efficient private organizations are able to more effectively target unique problems facing species. These voluntary efforts are more flexible than federal legislation, and often work to help species that get overlooked by government efforts. This report includes five in-depth case studies that explain how private organizations are working to help conserve species and their habitats.

The Coral Restoration Foundation

Ken Nedimyer went on his first ocean dive in 1969. Inspired by the beauty of ocean life and the coral reefs, Nedimyer would go on to dedicate his career to coral conservation.³⁸ This decision came at a critical time for coral reefs. Since 1970, local coral populations have decreased by 98 percent due to oceanic contaminants and environmental stressors, such as the first documented outbreak of White Band disease in 1977 and decreasing water temperatures which caused most of the coral reefs to die.³⁹ Those that survived the cold front were weakened and became more susceptible to fatal diseases.⁴⁰ Nedimyer recognized the importance of preserving these coral reefs and took action. He founded the Coral Restoration Foundation (CRF) in 2007. The CRF continues to operate today as a non-profit organization dedicated to restoring and preserving the endangered elkhorn and staghorn corals in the Florida Keys area.⁴¹

35 Langpap, C., Wu, J. (2003, June 6). *Voluntary conservation of endangered species: when does no regulatory assurance mean no conservation?*. Journal of Environmental Economics and Management. 47: 435-457.

36 Huffman, J.L. (2011). "Protecting Species through the Protection of Water Rights." *Rebuilding the Ark: New Perspectives on Endangered Species Act Reform*. American Enterprise Institute. 136-163. (for "water rights..."); Dana, D.A. (2011). "Reforming Section 10 and the Habitat Conservation Program." *Rebuilding the Ark: New Perspectives on Endangered Species Act Reform*. American Enterprise Institute. 32-55. (for "habitat conservation plans,"); Mannix, B.F. (2011). "Dumb Queues and Not-So-Bright Lines: The Use and Abuse of Science in the Endangered Species Act." *Rebuilding the Ark: New Perspectives on Endangered Species Act Reform*. American Enterprise Institute. 164-179. (for "administrative functions,"); Nash, J.R. (2011). "Mark to Ecosystem Service Market: Protecting Ecosystems through Revaluing Conservation Easements." *Rebuilding the Ark: New Perspectives on Endangered Species Act Reform*. American Enterprise Institute. 117-135. (for "tax deductions,").

37 Tulchin, B., Krompak, B., Brunner, K. (2016, July). *Endangered Species Act National Survey Results*. Tulchin Research. Retrieved from: <http://earthjustice.org/sites/default/files/files/PollingMemoNationalESASurvey.pdf>; Mannix, B.F. (2011). "Dumb Queues and Not-So-Bright Lines: The Use and Abuse of Science in the Endangered Species Act." *Rebuilding the Ark: New Perspectives on Endangered Species Act Reform*. American Enterprise Institute. 164-179. (for "Agencies' over-reliance..."); Andris, C., Lee, D., Hamilton, M.J., Martino, M., Gunning, C.E., Selden, J.A. (2015, April 21). *The Rise of Partisanship and Super-Cooperators in the U.S. House of Representatives*. Santa Fe Institute. (for "increasing partisanship in Washington..."). See also: Bump, P. (2016, January 13). "The unprecedented partisanship of Congress, explained." *The Washington Post*. Retrieved June 26, 2016.

38 Lucus, Nancy. (2008, May 5). *Staghorn Coral's Best Friend*. Retrieved from The Florida Keys and Key West : <http://www.fla-keys.com/news/news.cfm?sid=7107>

39 Coral Restoration Foundation. (n.d.). *Threats to Reefs*. Retrieved from Coral Restoration Foundation. Retrieved from: <http://www.coralrestoration.org/threats-to-reefs/>

40 Haag, Ed. (2009, November/December). *CORAL Interview: Ken Nedimyer*. Reef to Rainforest Media. Retrieved from: <http://www.reef2rainforest.com/2009/11/30/coral-interview-ken-nedimyer/>

41 Coral Restoration Foundation. (n.d.). *Meet Our Team*. Retrieved from Coral Restoration Foundation: <http://www.coralrestoration.org/about/meet-the-team/>; Coral Restoration Foundation. (2015, May). *Coral Restoration Foundation Executive Director Position Description*. Retrieved from Coral Restoration Foundation : <http://www.coralrestoration.org/wp-content/uploads/2015/05/Coral-Restoration-Foundation-Executive-Director-Position-Description-May-2015.pdf>

Corals have the ability to reproduce asexually and can regenerate from a small piece to grow into maturity. The CRF uses this process to help restore damaged corals. The Florida Keys National Marine Sanctuary gives the foundation permits to collect coral fragments that have fallen from the reefs to their offshore nurseries.⁴² The fragments are then hung from frameworks that resemble trees.⁴³ These artificial frames can hold anywhere from 100 to 160 coral fragments and allow each piece to safely grow.⁴⁴ The fragments stay in the nursery for six to nine months until they are mature enough to be reattached to the reef.⁴⁵ Once the coral has been re-attached, the foundation's staff labels and tracks each fragment to document its location and progress.⁴⁶

In 2012, the first ever nursery-raised elkhorn reefs were restored by the CRF. The 18 first-generation corals were the first nursery-raised corals to be replanted from the nurseries to a reef south of Key Largo.⁴⁷ The corals have been closely monitored and have shown successful growth.⁴⁸ In 2015, the CRF successfully outplanted 21,500 staghorn and 15,000 elkhorn corals.⁴⁹

Conservation Northwest, Defenders of Wildlife, and the Gray Wolf

Leisa Hill spends each of her summer months trekking some 1,000 miles, either by ATV or horseback, in an effort to protect ranchers' livestock. Hill is part of the Range Rider Pilot Program run by Conservation Northwest. The organization uses and promotes non-lethal methods, including range riders like Leisa Hill, to reduce conflict between wolves and ranchers.⁵⁰

In 1978 the gray wolf was listed as endangered under the ESA, though certain subspecies in the Rocky Mountain states were eventually delisted in 2011.⁵¹ The gray wolf was eventually reintroduced in the Mountain West, specifically in Yellowstone National Park and central Idaho, and since then has spread into surrounding states including Montana.⁵²

With their re-establishment throughout North America, wolves have expanded their territory onto grazing lands. Without physical boundaries to separate wolves from livestock, attacks on livestock have become problematic.⁵³ The ESA has no

42 Florida Keys National Marine Sanctuary. (2014, April). *Sanctuary Permits*. Retrieved from Florida Keys National Marine Sanctuary : <http://floridakeys.noaa.gov/permits/welcome.html> ; Florida Keys National Marine Sanctuary Advisory Council (n.d.) *Working Group Recommendations: Coral Reef Ecosystem Restoration Working Group and Shallow Water Wildlife and Habitat Protection Working Group*. Pg. 139-143. Retrieved from <http://floridakeys.noaa.gov/Recommendations-for-SAC.pdf>

43 Coral Restoration Foundation. (n.d.). *Coral Tree Nursery*. Retrieved from Coral Restoration Foundation. Retrieved from: <http://www.coralrestoration.org/coral-tree-nursery/>

44 Coral Restoration Foundation. (n.d.). *The CRF Bonaire Project*. Retrieved from Coral Restoration Foundation Bonaire: <http://crfbonaire.org/the-crf-bonaire-project/>

45 Coral Restoration Foundation. (n.d.). *Coral Tree Nursery*. Retrieved from Coral Restoration Foundation. Retrieved from: <http://www.coralrestoration.org/coral-tree-nursery/>

46 Coral Restoration Foundation. (n.d.). *Coral Outplanting Methods*. Retrieved from Coral Restoration Foundation: <http://www.coralrestoration.org/outplanting-methods/>

47 Ibid.

48 Ibid.

49 Coral Restoration Foundation. (2015). *Evolution the Leap Forward Annual Report 2015*. Retrieved from Coral Restoration Foundation: <http://www.coralrestoration.org/wp-content/uploads/2016/04/CRF.AnnualReport.2015.pdf>

50 Kramer, Becky, (2013, Nov 10) *Cattle ranchers track wolves with GPS, computers*. The Spokesman Review. Retrieved from: <http://www.spokesman.com/stories/2013/nov/10/cattle-ranchers-track-wolves-with-gps-computers>

51 U.S. Fish and Wildlife Service. (2016, May) *Species Profile for Grey Wolf (Canis Lupus)*. Retrieved from: http://ecos.fws.gov/tess_public/profile/speciesProfile?spcode=A00D ; U.S. Fish and Wildlife Service. (n.d.) *Northern Rocky Mountain (NRM) Gray Wolf Recovery Timeline*. Retrieved from: <https://www.fws.gov/mountain-prairie/es/species/mammals/wolf/20120828NRMTimeline.pdf>

52 U.S. Fish and Wildlife Service. (2007, February) *Wolf Recovery Under the Endangered Species Act*. Retrieved from: https://www.fws.gov/home/feature/2007/gray_wolf_factsheet-region2-rev.pdf

53 Stevens County Cattlemen. (2016, March 30) *More Wolves, More Carnage*. Retrieved from: <https://stevenscountycattlemen.com/2016/03/30/more-wolves-more-carnage/>

mechanism for reimbursing ranchers when a wolf kills their cattle or sheep. As a result, many ranchers feel that in order to protect their livelihood, they have no choice but to illegally kill wolves on or near their land.

Federal and state governments have attempted to control wolf populations in response to the heightened conflict between wolves and ranchers. For example, in the summer of 2016 the Washington Department of Fish and Wildlife confirmed that they were killing members of a local wolf pack to try to reduce conflict with ranchers and their livestock.⁵⁴

Conservation Northwest established the Range Rider Pilot Project in 2012 to reduce wolf predation. Their primary tactic is simply employing people on horseback or ATV to patrol in and around the land where cattle graze. Range riding calms cattle while disrupting wolf hunting patterns.⁵⁵

Since 2012, Conservation Northwest has encouraged ranchers to use non-lethal practices like their range riders by covering up to \$10,000 per year, or half of the cost of a range rider.⁵⁶ Conservation Northwest has also provided support for colored ribbons to scare wolves away from cattle pastures.⁵⁷ Beyond aiding ranchers financially, Conservation Northwest also hosts educational forums to explain wolf recovery and conservation methods.⁵⁸

Conservation Northwest's project has successfully reduced incidents between wolves and livestock throughout Washington. Ranchers near Teanaway, Washington reported losing only one cow during the program's three seasons of operation despite the use of land shared by wolves and cattle.⁵⁹ Ranchers throughout this area, like John Dawson and his family, have started using the Range Rider program.⁶⁰ Dawson, a proponent of the program, said, "[While] I think [range riding] would work for a good share of other ranchers, they have to be open-minded enough to want it to work."⁶¹

According to Dawson, not only have wolves stopped encroaching on his land but his cattle are also heavier and healthier because they are less stressed. A stressed herd of cattle often eats less and weighs less, something that many ranchers consider an even greater loss than losing an entire cow to a wolf.⁶² Healthier herds are one of the key contributions private programs offer to help reduce wolf-rancher conflict. "The success the Dawsons have had has gone a long way to helping promote non-lethal means and proactive measures to reduce conflict," said Jack Field, executive vice president of the Washington Cattlemen's Association.⁶³

Though Conservation Northwest was originally launched as a privately funded project, in 2013 funding was expanded to assist the Washington Department of Fish and Wildlife with its wolf management efforts. Today, Conservation Northwest

54 Associated Press. (2016, September 1) *Group protests eradication of Profanity Peak wolf pack*. Retrieved from: <http://mynorthwest.com/382751/group-protests-eradication-of-profanity-peak-wolf-pack/>

55 Conservation Northwest. (2016, May) *Range Rider Pilot Project*. Retrieved from: <http://www.conservationnw.org/what-we-do/wildlife-habitat/range-riders>

56 Conservation Northwest. (2014, June 27) *Summer News From the Range*. Retrieved from: <http://www.conservationnw.org/news/updates/range-riders-update>

57 Conservation Northwest. (May 16, 2014) *Fladry protects wolves and livestock in Teanaway*. Retrieved from: <http://www.conservationnw.org/news/updates/fladry-protects-wolves-and-livestock-in-teanaway?searchterm=fladry>

58 Conservation Northwest. (2014, December 3) *Wolf Science Panel at the University of Washington*. Retrieved from: <http://www.conservationnw.org/news/updates/wolf-science-panel-at-the-university-of-washington/?searchterm=SCIENCE%20PANEL>

59 Conservation Northwest (2015, July 21) *Cow depredation confirmed within territory of Teanaway wolves*. Retrieved from: <http://www.conservationnw.org/news/updates/cow-depredation-confirmed-within-territory-of-teanaway-wolves>

60 Kramer, Becky, (2013, Nov 10) *Cattle ranchers track wolves with GPS, computers*. The Spokesman Review. Retrieved from: <http://www.spokesman.com/stories/2013/nov/10/cattle-ranchers-track-wolves-with-gps-computers/>

61 Ibid.

62 Ibid.

63 Kramer, Becky, (2013, Nov 10) *Cattle ranchers track wolves with GPS, computers*. The Spokesman Review. Retrieved from: <http://www.spokesman.com/stories/2013/nov/10/cattle-ranchers-track-wolves-with-gps-computers/>

works with state and federal wildlife agencies to promote long-term cooperation between people and wildlife within the state.⁶⁴

Another private organization, Defenders of Wildlife, reimbursed ranchers across the northern Rockies from 1987 to 2011 for livestock losses due to wolves. Reimbursements were given through the Bailey Wildlife Foundation Wolf Compensation Trust, filling the gap left by the ESA.⁶⁵

In addition to these reimbursements, Defenders also used the wolf compensation fund to help ranchers and landowners with projects aimed at reducing incidents involving wolves. These projects included the erection of fencing and use of guard dogs. Defenders of Wildlife President Rodger Schlickeisen argued that “proactive conservation keeps carnivores and livestock apart and that keeps them both alive.”⁶⁶ On September 10, 2010, Defenders of Wildlife ended the Bailey Wildlife Foundation Wolf Compensation Trust because federal funding became available through the Omnibus Public Lands Management Act. Since ending their program, Defenders has now shifted its focus to assisting state governments with developing their own wolf management programs, as well as collaborative efforts to help ranchers and their livestock peacefully coexist with wolves.⁶⁷

The Omnibus Public Lands Management Act of 2009 authorized the FWS to compensate state governments up to \$1 million for losses due to wolves and wolf predation deterrence.⁶⁸ To be eligible to receive this funding, states must provide at least 50 percent of the funding. Defenders of Wildlife is helping states through its cost-sharing program. Defenders has awarded funding to states that would otherwise be ineligible, including Arizona, Idaho, Michigan, Minnesota, Montana, New Mexico, Oregon, Washington, Wisconsin, and Wyoming.⁶⁹

More recently, Defenders also created the Proactive Carnivore Conservation Fund.⁷⁰ The fund operates in Montana, Idaho, Wyoming, New Mexico, and Arizona, and connects ranchers with state programs in their respective areas. The fund is aimed at developing non-lethal methods for avoiding wolf predation cases.⁷¹

The voluntary actions taken by these private groups have helped mitigate some of the ESA’s flaws by encouraging private landowners to conserve species rather than destroying them or their habitat. Conservation Northwest and Defenders of Wildlife illustrate that voluntary action can be a viable means for achieving species conservation goals.

64 Conservation Northwest. (n.s.) *Wolf Recovery License Plates*. Retrieved from: <http://www.conservationnw.org/getinvolved/wolf-friendly-license-plates>; Conservation Northwest. (n.d.) *What we are doing for Wolves*. Retrieved from: <http://www.conservationnw.org/what-we-do/wildlife-habitat/gray-wolf/gray-wolves-and-recovery-in-washington/?searchterm=washington%20wolves>

65 Stone, Suzanne (2008, February 13) *Defenders of Wildlife Celebrates 20th Anniversary of Wolf Compensation Program*. Retrieved from: <http://www.defenders.org/press-release/defenders-wildlife-hails-support-wolf-grizzly-conservation-bailey-wildlife-foundation> ; Philanthropy Roundtable. (n.d.) *Using Economic Incentives to Sustain Predators*. Retrieved from: http://www.philanthropyroundtable.org/almanac/nature/1987_using_economic_incentives_to_sustain_predators

66 Gearino, Jeff. (2003, May 27) *Defenders Complete Carnivore Projects*. Casper Star Tribune. Retrieved from: http://trib.com/news/state-and-regional/defenders-complete-carnivore-projects/article_8b9bcadb-2b43-59ac-9180-8b93161bf1c8.html

67 Howl Colorado. (2010, August 27) *Defenders stops paying reimbursement; focuses on working with ranchers*. Retrieved from: <http://howlcolorado.org/2010/08/27/defenders-stops-paying-reimbursement-focuses-on-working-with-ranchers/>

68 111th Congress. (2009, March 30) Omnibus Public Lands Management Act. Public Law 111-11. 123 Stat. 1171-1183. Codified as amended at 7 USC 6201-1132. Pg. 181-193. Retrieved from: http://www.blm.gov/style/medialib/blm/wo/Law_Enforcement/nlcs.Par.9712.File.dat/PublicLaw111-11.pdf

69 Motsinger, J. Lazaroff, C. (2010, August 20) *Defenders Shifts Focus to Wolf Coexistence Partnerships*. Retrieved from: <http://www.defenders.org/press-release/defenders-shifts-focus-wolf-coexistence-partnerships>

70 Lazaroff, Cat. (2000, December 21) *Defenders of Wildlife Launches Fund to Reduce Wolf Deaths*. Retrieved from: <http://www.defenders.org/press-release/defenders-wildlife-launches-fund-reduce-wolf-deaths>

71 Fisher, Hank. (2001) *Who Pays for Wolves*. Property and Environment Research Center. Retrieved from: <http://www.perc.org/articles/who-pays-wolves> ; Defenders of Wildlife. (2000, December 21) *Defenders of Wildlife Launches Fund to Reduce Wolf Deaths*. Retrieved from: <http://www.defenders.org/press-release/defenders-wildlife-launches-fund-reduce-wolf-deaths>

Private Conservation of Non-Charismatic Species

Hidden in the depths of the ocean near Australia, the blobfish achieved cult media stardom in 2013 when it was deemed the “world’s ugliest animal” by the Ugly Animal Preservation Society.⁷² The blobfish surpassed its competitors with the help of comedian Paul Foot, who championed the species during the society’s comedic campaign. Upon winning, the blobfish was featured in headlines of media outlets worldwide including CNN, BBC, and The Guardian.⁷³ As a result, many around the world learned of the blobfish’s existence for the first time.

The blobfish’s award may be humorous, but it carries a purposeful message. Simon Watt, president of the Ugly Animal Preservation Society and orchestrator of the world’s ugliest animal campaign, used the blobfish’s strange appeal to draw attention to other non-charismatic species, that is, species without cultural significance or public appeal. Charismatic species like pandas, wolves, and grizzly bears receive the vast majority of attention by research funders, conservation researchers, and the general public.⁷⁴ Using the mantra, “We can’t all be pandas,” Watt created the “world’s ugliest animal” campaign as a way to promote his conservation message: “ugly” animals need attention too.⁷⁵

Since its “world’s ugliest animal” campaign, the Ugly Animal Preservation Society has continued to promote the conservation of non-charismatic species. The society consists of a group of comedians who perform regularly at comedy clubs and events. These performances aim to encourage people to donate to conservation organizations in the name of “ugly” animals. The society also promotes other organizations including the World Land Trust and the IUCN Red List of Threatened Species.⁷⁶

While the Ugly Animal Preservation Society works to conserve non-charismatic species through comedy, the EDGE (Evolutionarily Distinct and Globally Endangered) of Existence program works to conserve species that are genetically unique. In 2016, the EDGE program had 12 projects focusing on conserving “some of the world’s most extraordinary and unique amphibians and mammals that are receiving little or no conservation attention.”⁷⁷ The EDGE program also plays an advocacy role by implementing educational programs in areas inhabited by non-charismatic species.

The Chinese Giant Salamander and the Sagalla Caecilian are two animals EDGE has been able to preserve in the absence of other conservation efforts. EDGE developed a conservation action plan for the salamander at the International Conservation Workshop in Xi’an, China, and provided funding to bolster “disease diagnostic research capacity.”⁷⁸ EDGE has also worked to combat invasive species that threaten the livelihood of the Sagalla Caecilian and trained farmers on techniques that minimize their impact on the species’ habitat.⁷⁹

72 Cripps, K., & Thompson, C. (2013, September 13). *Blobfish declared world’s ugliest animal*. Retrieved from: <http://www.cnn.com/2013/09/12/travel/blobfish-ugly-animal/>

73 Gill, V. (2013, September 12). *Blobfish wins ugliest animal vote*. Retrieved from: <http://www.bbc.com/news/science-environment-24040130>; Cripps, K., & Thompson, C. (2013, September 13). *Blobfish declared world’s ugliest animal*. Retrieved from: <http://www.cnn.com/2013/09/12/travel/blobfish-ugly-animal/>; Starkey, N. (2013, September 12). *Blobfish voted world’s ugliest animal*. Retrieved from: <https://www.theguardian.com/environment/2013/sep/12/blobfish-world-ugliest-animal>

74 Martín-López, B., González, J., & Montes, C. (2011). *The pitfall-trap of species conservation priority setting*. *Biodiversity & Conservation*, 20(3), 663-682.

75 Nabi, S. (2015, May 1). *Using humor to protect ‘ugly’ animals, because they can’t all be as cute as pandas*. Retrieved from: <http://www.pbs.org/newshour/updates/using-humor-to-protect-ugly-animals-because-they-cant-all-be-as-cute-as-pandas/>

76 The Ugly Animal Preservation Society. (2016). *About*. Retrieved from: <http://uglyanimalsoc.com/>

77 Evolutionarily Distinct and Globally Endangered. (n.d.). *Current Projects*. Retrieved from: http://www.edgeofexistence.org/conservation/current_projects.php

78 Evolutionarily Distinct and Globally Endangered. (n.d.). *Conserving the Chinese Giant Salamander*. Retrieved from: http://www.edgeofexistence.org/conservation/conservation_project.php?id=111

79 Evolutionarily Distinct and Globally Endangered. (n.d.). *Sagalla Caecilian Conservation in Kenya*. Retrieved from: http://www.edgeofexistence.org/conservation/conservation_project.php?id=113

The Ugly Animal Preservation Society and EDGE are two examples of private organizations filling gaps left by the ESA. EDGE implements projects that focus on specific species and addresses their conservation needs through education and research, while the Ugly Animal Preservation Society makes the conservation of non-charismatic species a public issue through advocacy in their comedy routines and online campaign. This private conservation work helps address the conservation needs of non-charismatic species that, despite ESA protection, are often overlooked by conservation researchers and funders.

Private Conservation of the *Torreya taxifolia*

The ESA lists 2,280 species as threatened or endangered internationally, and 906 of those species are plants.⁸⁰ According to a study conducted by Vivian Negrón-Ortiz, a botanist at the Panama City Ecological Services Office, these species receive considerably less attention than more well-known species, particularly when compared to charismatic megafauna. Negrón-Ortiz found that “[w]hile the majority of species listed under the ESA are plants, they received less than 5 percent of the total funding for species recovery from federal and state agencies.”⁸¹ In response to the lack of government support, private groups are taking action to help endangered species survive. One such organization is the Torreya Guardians, a self-organized group of naturalists, ecologists, and botanists founded by Connie Barlow. Barlow dedicated herself to the tree known as the Torreya taxifolia after visiting Florida and learning about its endangered state.⁸²

The Torreya taxifolia is a prehistoric evergreen conifer dating back 160 million years.⁸³ Today the tree is only found along a 35 km segment of the Apalachicola River near the Florida-Georgia border.⁸⁴ Scientists estimate that the tree’s population of over 600,000 has been reduced by 98 percent in the last century.⁸⁵ The Torreya taxifolia stopped producing its own seeds in the wild for unknown reasons in the 1960s.⁸⁶ Theories for the tree’s decline include various diseases in the Florida area.⁸⁷ The Torreya Guardians are searching for and testing new areas that might allow this plant to grow to maturity and reproduce in the wild. To do this, they use assisted migration, a process that involves moving a species from its native environment and introducing it into a new one.⁸⁸ The Guardians take seeds that have been collected from healthy specimens grown in greenhouses and transplant them to areas that can best support them. Areas where they have re-planted include Eastern Florida, Michigan, Tennessee, Ohio, and North Carolina.⁸⁹ Connie Barlow monitors the trees, collects data from the various locations, and posts the information on her YouTube channel.⁹⁰

To date, the Guardians’ assisted migration efforts have largely been successful. The most promising site thus far is the Biltmore Estate in North Carolina. According to Bob Zahner, the caretaker of the estate, “They are beautiful, healthy trees, flowering

80 U.S. Fish & Wildlife Service. (2016, November 14). *Listed Species Summary (Boxscore)*. Retrieved from Endangered Species: <http://ecos.fws.gov/ecp0/reports/box-score-report>

81 Negrón-Ortiz, V. (2014). *Pattern of expenditures for plant conservation under the Endangered Species Act*. *Biological Conservation*, 36-43

82 Barlow, C. (n.d.). *History of Torreya Guardians*. Retrieved from Torreya Guardians: <http://www.torreyaguardians.org/guardians.html> ; Marris, E. (2011). *Rambunctious Garden*. London: Bloomsbury Publishing USA.

83 Bruno, H. (n.d.). *Conservation Project: Safeguarding Torreya taxifolia*. Retrieved from Georgia Plant Conservation Alliance: <http://gpca.uga.edu/project1.html>

84 Schwartz, M., & J.J. Hellmann, J. M. (2007). A Framework for Debate of Assisted Migration in an Era of Climate Change. *Conservation Biology*, 297-302.

85 Schwartz, M.W., Hermann, S.M., (1993) *The Continuing Population Decline of Torreya taxifolia Arn*. Pg. 178. Bulletin of the Torrey Botanical Club.

86 IUCN Red List of Threatened Species. (2015). *Torreya taxifolia*. Retrieved from IUCN Red List of Threatened Species: <http://www.iucnredlist.org/details/30968/0>

87 Torreya Guardians. (n.d.). *At the Brink of Extinction*. Retrieved May 2016, from Torreya Guardians : <http://www.torreyaguardians.org/extinction.html>

88 Torreya Guardians (n.d.). *Assisted Migration or Assisted Colonization: What’s in a name?* Retrieved from: <http://www.torreyaguardians.org/assistedmigrationdebate.html>

89 Torreya Guardians. (n.d.). *Rewilding Torreya taxifolia*. Retrieved from Torreya taxifolia: <http://www.torreyaguardians.org/rewilding.html>

90 Torreya Guardians. (n.d.). *Efforts to save Torreya taxifolia*. Retrieved from Torreya Guardians: <http://www.torreyaguardians.org/save.html>

and fruiting well every year that I've checked them."⁹¹ Another site in Greasy Creek, Tennessee has nine successful plantings, and a site in Waynesville, North Carolina has only lost two of their 21 seeds.⁹²

Even though their efforts have proven successful, the group still faces opposition by those who oppose the use of assisted migration. Some conservationists believe that assisted migration will result in the tree becoming an invasive species in its new environment.⁹³ The Guardians argue that the likelihood of this is very small.⁹⁴

Despite being protected by the ESA, many less charismatic species like the *Torreya taxifolia* are overlooked by conservation efforts and funding. The work being done by the *Torreya* Guardians is an example of private individuals helping to fulfill these conservation needs.

Safe Harbor Agreements and the Houston Toad

Few would have expected that “gun-toting, redneck, Texas Republican preacher” Bob Long would become a local conservation leader on his Texas-based ranch.⁹⁵ Because of a Safe Harbor Agreement (SHA), which encourages private landowners to improve their land for the purpose of protecting endangered species, however, this Texan took up the cause of a small endangered amphibian known as the Houston toad.

The FWS began using SHAs to encourage property owners like Long to work with the government to save endangered species. When private property owners apply for a SHA, they agree to maintain or improve their land so that it provides valuable habitat for endangered species. In exchange, the FWS guarantees that it will not further regulate the land while the conditions of the SHA are met.⁹⁶ Instead of incentivizing property owners to eliminate endangered species living on their land, SHAs give landowners assurance that their property rights will be respected if they take actions to protect habitat. Landowners work with the FWS through every step of the drafting process to delineate the actions they will take.⁹⁷ SHAs allow for landowners to draft and propose their agreement to the FWS.⁹⁸

Although SHAs are a softer form of regulation, they provide landowners with more control over their property than top-down dictation from the federal government. Because most endangered species live or rely on private land for the majority of their habitat, SHAs have proven to be an important policy tool.⁹⁹

91 *Torreya* Guardians. (n.d.) *Genus Torreya in North Carolina*. Retrieved from: <http://www.torreyaguardians.org/north-carolina.html> ; *Torreya* Guardians. (n.d.) *Torreya taxifolia*

90-year-old grove in Highlands North Carolina. Retrieved from: <http://www.torreyaguardians.org/highlands.html>

92 *Torreya* Guardians. (n.d.) *Torreya taxifolia Assisted Migration to Tennessee*. Retrieved from: <http://www.torreyaguardians.org/tn.html>; *Torreya* Guardians. (n.d.) *Genus Torreya in North Carolina*. Retrieved from: <http://www.torreyaguardians.org/waynesville-2.html>

93 Williams, M.I., Dumroese, R.K. (2014). *Planning the Future's Forests with Assisted Migration*. Retrieved from: http://www.fs.fed.us/rm/pubs/rmrs_p071/rmrs_p071_133_144.pdf

94 Rogers, K. (2015). *The Quiet Extinction: Stories of North America's Rare and Threatened Plants*. Pg. 109. University of Arizona Press.

95 Lubbock Avalanche Journal. (2003, June 2) *Landowner Dedicates Property to Providing Safe Harbor for Endangered Toad*, Lubbock Avalanche Journal. Retrieved from: http://lubbockonline.com/stories/060203/sta_060203070.shtml#.VzDZARUrLdR

96 U.S. Fish and Wildlife Services. (2015, June 11) *For Landowners Safe Harbor Agreements*. Retrieved from: <http://www.fws.gov/endangered/landowners/safe-harbor-agreements.html>

97 U.S. Fish and Wildlife Services. (2013, July 15) *Safe Harbor Agreements, Frequently Asked Questions*. Retrieved from: <https://www.fws.gov/endangered/landowners/landowners-faq.html>

98 Ibid.

99 Seasholes, B. (2014, September) *Fulfilling the Promise of the Endangered Species Act: The Case for an Endangered Species Reserve Program*. Reason Foundation. Retrieved from: http://reason.org/files/endangered_species_act_reform.pdf

The Houston toad was discovered in the 1950s. Twenty years later, the toad's population had declined significantly and it was added to the endangered species list in 1973.¹⁰⁰ Before Long signed his SHA in 2003, many landowners in his hometown of Bastrop County, Texas were engaged in a tense fight with the FWS due to the threat of regulation under the ESA.¹⁰¹

Long was the first property owner in Bastrop County to enter into an SHA. Long was able to demonstrate to his community how SHAs could be used to reduce the animosity between landowners and the FWS while achieving conservation goals. Under the agreement, Long planted trees and grass on his 550 acres to provide shade and soft soil for the toad to aestivate, or bury itself so it can lower its metabolism during hot and dry conditions.¹⁰² Long also reduced his cattle herd to prevent the cows from scaring or harming the toad, and fenced off ponds during the toad's breeding season to protect tadpoles as much as possible as they develop.¹⁰³ If he maintains these habitat improvements, the FWS no longer interferes, allowing him to ranch and develop his land.

Long demonstrated to other landowners the possibility of cooperation with the FWS. By the end of 2003, two other Bastrop County farmers started working with the FWS on SHAs. Within a year after Long's SHA was signed, more than 1,000 acres of private land in Texas were enrolled to protect both the Houston toad and the property rights of local landowners.¹⁰⁴ By 2012 there were 1,900 acres of land being maintained for the Houston toad.¹⁰⁵ SHAs give landowners the flexibility to work alongside, rather than against the FWS. By 2014, SHAs covered over three million acres of private land across the U.S.¹⁰⁶

SHAs have been successful in aligning conservation incentives for several species including the Houston toad, but despite the efforts of the FWS and landowners, the Houston toad population continues to decline. In 1994 scientists estimated there were nearly 2,000 Houston toads in Bastrop County, but by 2011 there were only an estimated nine toads in the county.¹⁰⁷ Surveys of other counties in 2011 by Dr. Michael Forstner and Dr. James Dixon found less than 12 total Houston toads in Texas.¹⁰⁸ Uncontrollable factors including drought and wildfires have contributed to the decline of the toad throughout Texas.¹⁰⁹ Although it is impossible to know how the Houston toad would have fared if SHAs had not been employed, it seems likely that they have improved the toad's habitat and thus its chances of survival.

The American Prairie Reserve

In 2000, a number of conservation groups gathered in Bozeman, Montana to develop a plan to conserve land and wildlife in the Northern Great Plains, an area that extends from Nebraska to Saskatchewan.¹¹⁰ They were inspired by a Nature

100 "The Houston Toad." Texas Organization for Amphibian Diversity. Retrieved from: http://thehoustontoad.org/?page_id=21

101 "Landowner Dedicates Property to Providing Safe Harbor for Endangered Toad," 2003, June 2. Lubbock Avalanche Journal. Retrieved from: http://lubbockonline.com/stories/060203/sta_060203070.shtml#.VzDZARUrLdR

102 Capiello, D. (2003, June 2) *Unlikely Ally Blazes A Trail For Rare Toads*. Victoria Advocate. Retrieved from: <https://news.google.com/news/papers?nid=861&dat=20030602&id=h7FdAAAAIbAJ&sjid=-F0NAAAAIbAJ&pg=7040,326236&chl=en>

103 Ibid.

104 Wolfe, D. *Houston Toad Recovery*. Cooperative Conservation America. Retrieved from: <http://www.cooperativeconservation.org/viewproject.asp?pid=231>

105 Najvar, P. *Stepping Up Recovery for the Houston Toad*. U.S. Fish and Wildlife Service Endangered Species Program. Retrieved from: <https://www.fws.gov/endangered/news/bulletin-spring2009/recovering-houston-toad.html>

106 U.S. Fish and Wildlife Service. (2014, June 10) *Endangered Species Permits Safe Harbor Agreements*. U.S. Department of Interior. Retrieved from: <https://www.fws.gov/midwest/endangered/permits/enhancement/sha/index.html>

107 U.S. Fish and Wildlife Service. (2011, November) *Houston toad (Bufo houstonensis) Five Year Review: Summary and Evaluation*. Pg. 4. U.S. Fish and Wildlife Service Austin Ecological Services Field Office. Retrieved from: http://www.fws.gov/southwest/es/Documents/R2ES/HoustonToad_5-yr_Review_Nov2011.pdf

108 Ibid.

109 Ibid.

110 Shea, Rachel (2014, June 26) *Sean Gerrity: Making a Home on the Range for Bison and Other Wildlife*. National Geographic. Retrieved from:

Conservancy report that identified 43 highly biodiverse areas within the region as priorities for conservation.¹¹¹ The World Wildlife Fund assigned Dr. Curt Freese, a conservation biologist, to create a plan to restore the area.¹¹² In 2001, Sean Gerrity began working with Dr. Freese to form American Prairie Reserve.¹¹³

American Prairie Reserve is a non-profit organization that aims to create a wildlife preserve that is larger than Yellowstone.¹¹⁴ In the words of Dr. Freese, “A bunch of us got together and said let’s create a big vast place that would match Yellowstone Park in terms of its grandeur — and get all the wildlife back.”¹¹⁵ Gerrity and Freese shared the goal of conserving one of the most important grasslands for biodiversity conservation on earth. The organization exemplifies a private-action driven approach to land and wildlife conservation that could be implemented elsewhere.

American Prairie Reserve raises money to buy private land from willing sellers and works to obtain leases to grazing lands from the Bureau of Land Management (BLM).¹¹⁶ About one-third of Montana land is owned by the federal government, and about one-third of that federal land is managed by the BLM.¹¹⁷ The leases to public grazing lands are tied to private properties which means that American Prairie Reserve must buy private property that already has “preference for the use of public land grazing privileges” to acquire a lease to public grazing lands.¹¹⁸ As of May 2016, American Prairie Reserve had made 25 purchases.¹¹⁹

The total amount of land acquired by American Prairie Reserve is currently 353,104 acres.¹²⁰ About 25 percent of that land is privately owned and 75 percent is leased public land.¹²¹ Acquiring a section of land about the size of Connecticut, or rather, 3.5 million acres, is the American Prairie Reserve’s goal. Reserve personnel chose this size because, according to conservation biologists, a resilient and healthy prairie ecosystem needs to be at least 3.2 million acres in size.¹²² When the reserve is

<http://news.nationalgeographic.com/news/innovators/2014/06/140626-sean-gerrity-prairie-bison-conservation-great-plains/>; Northern Great Plains Steppe Ecoregional Planning Team. (1999, February 4) *Ecoregional Planning in the Northern Great Plains Steppe*. Pg. Viii. The Nature Conservancy. Retrieved from: https://www.conservationgateway.org/ConservationPlanning/SettingPriorities/EcoregionalReports/Documents/ngps_final_feb99.pdf

111 Northern Great Plains Steppe Ecoregional Planning Team. (1999, February 4) *Ecoregional Planning in the Northern Great Plains Steppe*. Pg. 53. The Nature Conservancy. Retrieved from: https://www.conservationgateway.org/ConservationPlanning/SettingPriorities/EcoregionalReports/Documents/ngps_final_feb99.pdf

112 Shea, Rachel (2014, June 26) *Sean Gerrity: Making a Home on the Range for Bison and Other Wildlife*. National Geographic. Retrieved from: <http://news.nationalgeographic.com/news/innovators/2014/06/140626-sean-gerrity-prairie-bison-conservation-great-plains/>

113 American Prairie Reserve. (n.d.) *Our Story*. Retrieved from: <https://www.americanprairie.org/our-story>; Shea, Rachel (2014, June 26) *Sean Gerrity: Making a Home on the Range for Bison and Other Wildlife*. National Geographic. Retrieved from: <http://news.nationalgeographic.com/news/innovators/2014/06/140626-sean-gerrity-prairie-bison-conservation-great-plains/>

114 Roberts, R. (Host) and P. Geddes. (Guest). 2015, September 28. *Pete Geddes on the American Prairie Reserve*. *Econtalk*. Retrieved from: http://www.econtalk.org/archives/2015/09/pete_geddes_on.html

115 Mitchell, Andy. (2010, April 10) *American Serengeti*. National Geographic.

116 Roberts, R. (Host) and P. Geddes. (Guest). 2015, September 28. “Pete Geddes on the American Prairie Reserve.” *Econtalk*. Retrieved from: http://www.econtalk.org/archives/2015/09/pete_geddes_on.html

117 Bjelopera, J.P., Hanson, L.A., Vincent, C.H. (2014, December 29) *Federal Land Ownership: Overview and Data*. Pg. 4. Congressional Research Service. Retrieved from: <https://www.fas.org/sgp/crs/misc/R42346.pdf>

118 Bureau of Land Management. (2016, February 3) *Fact Sheet on the BLM’s Management of Livestock Grazing*. Bureau of Land Management. Retrieved from: <http://www.blm.gov/wo/st/en/prog/grazing.html>

119 American Prairie Reserve. (n.d.) Building the Reserve. Retrieved from: <https://www.americanprairie.org/building-the-reserve>

120 American Prairie Reserve. (n.d.) Building the Reserve. Retrieved from: <https://www.americanprairie.org/building-the-reserve>

121 American Prairie Reserve. (n.d.) *Building the Reserve*. Retrieved from: <https://www.americanprairie.org/building-the-reserve>

122 American Prairie Reserve. (n.d.) *Building the Reserve*. Retrieved from: <https://www.americanprairie.org/building-the-reserve-faqs>

complete, approximately 14 percent will consist of privately owned lands and about 86 percent will consist of leased public lands.¹²³ As of 2016, the organization has acquired about 10 percent of the land needed to reach its goal.¹²⁴

Although American Prairie Reserve is mainly focused on helping all native species by creating a healthy ecosystem, the reserve also takes specific actions to help certain species.¹²⁵ One of the first steps American Prairie Reserve took was to re-introduce bison, a keystone species vital to the health of the prairie ecosystem. Bison are also a near-threatened species, according to the International Union for Conservation of Nature.¹²⁶

Besides being a vital species to the ecosystem, the bison also play an important role in allowing American Prairie Reserve to obtain leases for public grazing lands. The bison allow American Prairie Reserve to acquire 10-year grazing permits on BLM-controlled plots tied to private land they already own.¹²⁷ Leased lands must be used to graze livestock, and because the BLM considers bison livestock, American Prairie Reserve is legally able to graze their bison on the leased lands.¹²⁸

For roughly 100 years, no bison lived in Northeastern Montana until reserve personnel imported 16 animals in 2005 from Wind Cave National Park in South Dakota.¹²⁹ As of 2014, American Prairie Reserve has imported a total of 306 bison to the reserve.¹³⁰ Due to both births and imports, there are now nearly 700 bison living on the reserve.¹³¹ American Prairie Reserve only allows bison that have not bred with cattle and are healthy inside the fenced-in portions of the reserve. Before being released in the reserve, bison are tested for several diseases including brucellosis, a disease that causes miscarriages in cattle, elk, bison, and other hoofed animals.¹³² Reserve personnel take action to prevent brucellosis from harming local ranchers' cattle.

As with many private and public projects, there is opposition to American Prairie Reserve. Some Montanans are opposed to the project because they fear the government will take over the land and turn it into a national monument, which would limit their use of the land. Others are opposed to the project because the land is not being used for traditional cattle ranching and they want to preserve their way of life.¹³³

Because so much of the reserve is on federal land, the future of the reserve depends on the BLM renewing American Prairie Reserve's leases. The leases can only be renewed if the BLM is satisfied with American Prairie Reserve's adherence to the

123 Ibid.

124 Ibid.

125 American Prairie Reserve. (n.d.) *Bison FAQs*. Retrieved from: <https://www.americanprairie.org/bison-faqs>

126 American Prairie Reserve. (2015) *Bison Report*. Pg. 2. Retrieved from: https://www.americanprairie.org/sites/default/files/APR-Bison-Report_2015.pdf

127 Bureau of Land Management. (2016, February 3) *Fact Sheet on the BLM's Management of Livestock Grazing*. Bureau of Land Management. Retrieved from: <http://www.blm.gov/wo/st/en/prog/grazing.html>

128 Bureau of Land Management. (2015, December 28) *BLM issues Proposed Decision on American Prairie Reserve grazing application on Flat Creek Allotment*. Bureau of Land Management. Retrieved from: http://www.blm.gov/mt/st/en/info/newsroom/2015/december/blm_issues_proposed.html

129 Davis, J. (2016, March 29) *American Bison to Return to Northern Montana Reserve For First Time in Over 100 Years.*; American Prairie Reserve. (n.d.) *Bison Restoration*. American Prairie Reserve. Retrieved from: <https://www.americanprairie.org/project/bison-restoration>

130 This figure was found by adding figures for imported bison from 2005 to 2014. American Prairie Reserve. (n.d.) *Bison Restoration Timeline*. American Prairie Reserve. Retrieved from: <https://www.americanprairie.org/project/bison-restoration-timeline>

131 American Prairie Reserve. (n.d.) *Bison Restoration*. American Prairie Reserve. Retrieved from: <https://www.americanprairie.org/project/bison-restoration>

132 American Prairie Reserve. (2015) *Bison Report*. Pg. 3. Retrieved from: https://www.americanprairie.org/sites/default/files/APR-Bison-Report_2015.pdf

133 Montana Community Preservation Alliance. (n.d.) *How MCPA Formed*. Montana Community Preservation Alliance. Retrieved from: <http://www.keepourwayoflife.org/index.html>

lease agreement. Sean Gerrity, president of the reserve, says, “It’s very unlikely that [the BLM] is going to disrupt our path.”¹³⁴ He expects that the reserve will be able to renew its leases indefinitely, though he also hopes the public will visit and cherish the reserve so that if the BLM ever decides not to review the leases, there will be public opposition. Regardless of the BLM’s future decisions on public lands, American Prairie Reserve plans on always being able to properly manage and maintain their private lands.¹³⁵

As a non-profit organization, American Prairie Reserve is funded by donations from individuals, organizations, and businesses worldwide.¹³⁶ Individuals from all 50 states and 12 countries contribute financially to American Prairie Reserve.¹³⁷ For example, The Conservation Fund, a non-profit organization, helps with land acquisition, while High West Distillery, based in Utah, donates 10 percent of its after-tax profits from the sale of a specially branded whiskey to the Reserve.¹³⁸

The board and staff at American Prairie Reserve believe “the best system of management will be a public-private collaboration.”¹³⁹ Many governmental agencies conduct research and collaborate with American Prairie Reserve, including the BLM, Montana Fish, Wildlife & Parks, the FWS, and the Montana Department of State Lands.¹⁴⁰ For example, American Prairie Reserve cooperates with the U.S. FWS to manage controlled burns and restore riparian habitat.¹⁴¹

American Prairie Reserve partners with other private organizations focused on land and wildlife conservation. The Wildlife Conservation Society and World Wildlife Fund both assist American Prairie Reserve by advising how best to manage the habitat.¹⁴² Another group, known as Adventurers & Scientists for Conservation, provides volunteers to help conduct population counts.¹⁴³ These and many other private groups are taking action because they care about the grassland ecosystem and the species that rely on it.

Personnel at American Prairie Reserve recognize that ecosystems are constantly changing and believe the region’s ecological conditions could be improved to provide habitat to even more species.¹⁴⁴ Dr. Freese said about the project, “This is the beginning of a big long journey to recreate something like [what] Lewis and Clark saw when they first got here.”¹⁴⁵ The organization does not prescribe a specific amount of species that should exist on the reserve, but instead tries to follow

134 Gerrity, Sean. (2015, April 14) *American Prairie Reserve*. Talks at Google. Retrieved from: <https://www.americanprairie.org/profile/sean-gerrity>

135 American Prairie Reserve. (n.d.) *Building the Reserve FAQs*. American Prairie Reserve. Retrieved from: <https://www.americanprairie.org/building-the-reserve-faqs>

136 Puckett, Karl. (n.d.) *Prairie Reserve Still Attracting Fans, Foes*. Great Falls Tribune. Retrieved from: <http://www.greatfallstribune.com/story/news/local/2015/06/18/prairie-reserve-still-attracting-fans-foes/28944461/>

137 Ibid.

138 American Prairie Reserve. (n.d.) *The Conservation Fund*. American Prairie Reserve. Retrieved from: <https://www.americanprairie.org/profile/conservation-fund>; American Prairie Reserve. (n.d.) *High West Whiskey*. American Prairie Reserve. Retrieved from: <http://www.highwest.com/products/american-prairie-bourbon.php>

139 American Prairie Reserve. (n.d.) *Building The Reserve FAQs*. Retrieved from: <https://www.americanprairie.org/building-the-reserve-faqs>

140 Ibid.

141 American Prairie Reserve. (n.d.) *Charles M. Russell National Wildlife Refuge*. Retrieved from: <https://www.americanprairie.org/profile/charles-m-russell-national-wildlife-refuge>; American Prairie Reserve. (n.d.) *Restoring Fire to American Prairie Reserve*. American Prairie Reserve. Retrieved from: <https://www.americanprairie.org/news-blog/restoring-fire-american-prairie-reserve>

142 American Prairie Reserve. (n.d.) *Collaborations*. Retrieved from: <https://www.americanprairie.org/profiles/partner-organization-collaborator>

143 American Prairie Reserve. (n.d.) *Adventurers & Scientists for Conservation*. American Prairie Reserve. Retrieved from: <https://www.americanprairie.org/profile/adventurers-scientists-conservation>

144 American Prairie Reserve. (n.d.) *Freese Scale for Grassland Biodiversity, Background Summary*. Pg. 2. American Prairie Reserve. Retrieved from: https://www.americanprairie.org/sites/default/files/APR_Complete_FreeseScale_2014.pdf

145 Mitchell, Andy. (2010, April 10) *American Serengeti*. National Geographic.

ecological principles that will best increase biodiversity. Reserve personnel often look back to journal entries from the late 1700s to 1840 to see what the region resembled.¹⁴⁶

Today, there are about 400 different animal species on the reserve, three of which are currently listed as endangered or threatened: a bat species (the long-eared myotis) and two bird species (the piping plover and the red knot).¹⁴⁷ The endangered black-footed ferret is not yet on the reserve, but the organization is working to re-introduce a staple in the species' diet, the prairie dog.¹⁴⁸ This simultaneously helps other species, including snakes and burrowing owls that live in abandoned prairie dog burrows.¹⁴⁹

American Prairie Reserve is also making their area hospitable to non-endangered species like pronghorn and cougars. They remove old fencing within their properties and alter exterior fencing to make reserve land more wildlife-friendly. New fences include a smooth bottom wire high enough for pronghorn to crawl underneath.¹⁵⁰ The reserve also studies the local cougar population by setting up camera traps to determine where cougars travel and better understand how to help them thrive.¹⁵¹

To measure its success in meeting conservation goals, the reserve manages its land using the Freese Scale developed by Dr. Curt Freese, Dr. Kyran Kunkel, and Dr. Sam Fuhlendorf. The Freese Scale measures 10 factors important to grassland biodiversity including land quality, the presence of fences, the number of species on or near the land, and the frequency of fires.¹⁵² The current mean score for American Prairie Reserve land is 17/70, leaving much room for improvement.¹⁵³ The attainment of a perfect score would require the land to carry more native plant and animal species, have periodic fires, and be contiguous.¹⁵⁴

In addition to actively managing the land, American Prairie Reserve incentivizes nearby ranchers to make their private property more wildlife-friendly through the Wild Sky Beef program.¹⁵⁵ Ranchers who participate in the program agree to manage their property in a wildlife-friendly way, including not tilling the land, not shooting prairie dogs, and installing wildlife-friendly fencing. In return, the rancher receives a payment that depends on their land's Freese Scale score.¹⁵⁶ These payments are funded by a business owned by American Prairie Reserve, Wild Sky Beef LLC. Wild Sky Beef raises grass-fed cattle and sells the beef to restaurants at a premium. Portions of the profit go to both American Prairie Reserve

146 Berry, M. and S. Gerrity. (2012, August 15) *Should Conservation Look Back? Examining Historic Wildlife Populations of America's Serengeti*. National Geographic. Retrieved from: <http://voices.nationalgeographic.com/2012/08/15/should-conservation-look-back-examining-historic-wildlife-populations-of-americas-serengeti/>

147 American Prairie Reserve. (n.d.) *Prairie Species List*. Retrieved from: <https://www.americanprairie.org/sites/default/files/APR-Species-List.pdf>; U.S. Fish & Wildlife Service. (2016, August 26) *Endangered, Threatened, Proposed and Candidate Species Montana Counties*. Retrieved from: https://www.fws.gov/montanafieldoffice/endangered_species/listed_species/countylist.pdf

148 American Prairie Reserve. (n.d.) *Black-Footed Ferrets*. American Prairie Reserve. Retrieved from: <https://www.americanprairie.org/at-risk/black-footed-ferrets>

149 Mitchell, Andy. (2010, April 10) *American Serengeti*. National Geographic.; National Geographic. (2016) *Prairie Dog*. National Geographic. Retrieved from: <http://animals.nationalgeographic.com/animals/mammals/prairie-dog/>

150 American Prairie Reserve. (n.d.) *Pronghorn*. American Prairie Reserve. Retrieved from: <https://www.americanprairie.org/at-risk/pronghorn>

151 American Prairie Reserve. (n.d.) *Big Cats*. American Prairie Reserve. Retrieved from: <https://www.americanprairie.org/at-risk/big-cats>

152 American Prairie Reserve. (n.d.) *Freese Scale for Grassland Biodiversity, Background Summary*. American Prairie Reserve. Pg. 2-17. Retrieved from: https://www.americanprairie.org/sites/default/files/APR_Complete_FreeseScale_2014.pdf

153 American Prairie Reserve. (n.d.) *Freese Scale Rankings 2015*. Retrieved from: https://www.americanprairie.org/sites/default/files/FreeseScale_Rankings2015.pdf

154 American Prairie Reserve. (n.d.) *Freese Scale for Grassland Biodiversity, Background Summary*. Pg. 2-17. American Prairie Reserve. Retrieved from: https://www.americanprairie.org/sites/default/files/APR_Complete_FreeseScale_2014.pdf

155 Wild Sky Beef. (2014) *All Natural 100% Grass-fed Beef*. Retrieved from: <http://wildskybeef.org/>

156 Wild Sky Beef. (n.d.) *Pocket Guide to Wildlife-Friendly Ranching*. Wild Sky Beef. Retrieved from: <http://wildskybeef.org/sites/default/files/rancher-pocket-guide-single-pages.9.11.15.pdf>

and ranchers who are part of the Wild Sky program.¹⁵⁷ American Prairie Reserve's creation of the Wild Sky Beef program is one example of a private organization innovating to incentivize conservation by individuals and create a positive relationship with its neighbors.

The story of American Prairie Reserve demonstrates that private organizations are capable of land and species conservation. The model of private land ownership for the purpose of conservation is a promising one that could be adopted by other organizations or individuals who seek to preserve species and their habitats.

Conclusion

Since the ESA was passed over four decades ago, the federal government's approach to species conservation has been to restrict the actions of individuals and organizations through regulation. This approach has created unintended consequences that often impose real costs on local economies and can negatively impact the same endangered species the ESA is meant to protect.

A flexible and efficient conservation tool has emerged in the form of individuals and organizations that care about species preservation and take action to help. These people invest their own time, money, and effort into conserving endangered species. Creative agency officials have also taken action to help species by finding innovative ways to work with existing regulation to encourage landowners to preserve species and their habitats. These voluntary solutions to species conservation are encouraging to anyone concerned about the preservation of endangered species. Letting these creative solutions grow and thrive will likely benefit species and their habitats well into the future.

157 Wild Sky Beef. (2014) *Rancher Profiles*. Wild Sky Beef. Retrieved from: <http://wildskybeef.org/about/rancher-profiles>