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Accurate Economics to Protect Endangered Species and their Critical Habitats

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ARTICLE

Accurate Economics to Protect Endangered Species and their Critical Habitats

JACOB P. BYL*

Federal agencies currently use a methodology that finds negligible benefits of protecting critical habitat for endangered species, despite the prime real estate that is often involved. The Endangered Species Act already calls for economic analysis, but agencies currently treat it as a meaningless hoop to jump through. Agencies justify this hollow exercise by pointing to the difficulty in quantifying the increment of added protection that comes with critical habitat designation. However, the increment of added protection for critical habitat can be measured using methods already employed by agencies in other environmental analyses. Although the central benefits of critical habitat are improvements to the condition of listed species, accurate economic analysis should also consider the broad benefits of ecosystem services that flow from protected areas to human populations. I propose that agencies use a methodology that weighs the estimated burdens on regulated parties against the estimated benefits of designating lands as critical habitat. My proposed—more accurate—analysis can lead to more effective implementation of the Endangered Species Act by allowing agencies to target limited resources to projects that offer high net conservation benefits. I use a recent cost-benefit analysis for loggerhead turtles to demonstrate that the benefits of conserving habitat include increased protection of the species as well as a larger flow of ecosystem services amounting to at least \$106 million per year in benefits, not the \$0 estimate that federal agencies have arrived at. Accurate economic analysis

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provides useful information to agencies and the public in a way that can improve discussions that are often one-sided because of an emphasis on regulatory costs with little discussion of regulatory benefits.

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I. INTRODUCTION

The beaches of Cape Hatteras stretch for miles. Strips of natural sand flank rolling dunes that offer countless vistas of ocean and shore. The beautiful coastal islands in North Carolina are a destination for sun-seeking vacationers from across the United States. The beaches of Cape Hatteras also attract another type of visitor: loggerhead turtles travel hundreds of miles to lay

their eggs in the sand of these beaches. In fact, without sandy beaches like these, sea turtles are unable to reproduce. And sea turtles are not the only nonhuman residents at Cape Hatteras—the complex ecosystem where the ocean meets the shore is essential to a wide array of species. Yet according to a recent economic analysis commissioned by the National Marine Fisheries Service, the benefits of designating Cape Hatteras as critical habitat for the loggerhead turtle are difficult to measure, but approximately zero.¹ And the analysis covers more than the coastal islands of North Carolina—most of the ocean beaches in the southeast United States, from Cape Hatteras down to Key West, Florida and over to Gulf Shores, Alabama are estimated to provide zero benefits as critical habitat.² As described below, current agency practice does not provide useful information to the agency or to the public—an analysis that shows no meaningful benefits or costs of designating a good portion of the East Coast oceanfront property as critical habitat is not an accurate economic analysis.

In this Article, I describe how proper economic tools can help protect critical habitat for endangered species while lowering burdens on regulated parties. The use of economic tools is called for in the current language of the Endangered Species Act (“ESA”), so agencies can embrace the move toward more effective regulations without waiting for Congress to amend the statute. In this Article, I call for the agencies implementing the ESA to make the move to more accurate economic analysis by quantifying the real costs and benefits of critical habitat designation. In doing so, agencies should recognize that protections for loggerhead turtles are about more than the turtles—benefits of critical habitat stem from protecting the surrounding ecosystem as well as from the endangered species itself.

The ESA is a powerful environmental law that was passed in 1973 with the purpose of protecting “the ecosystems upon which endangered species and threatened species depend.”³ To achieve

1. INDUS. ECON., INC., ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION OF MARINE HABITAT FOR THE NORTHWEST ATLANTIC OCEAN DISTINCT POPULATION SEGMENT OF THE LOGGERHEAD TURTLE 7-2 (2014), <https://perma.cc/X93G-GAE3> [hereinafter *LOGGERHEAD ECONOMIC ANALYSIS*].

2. *See id.* at 6-15.

3. 16 U.S.C. § 1531(b) (2018).

this purpose, Congress delegated authority to the Fish and Wildlife Service (“FWS”) (within the Department of the Interior) and the National Marine Fisheries Service (“NMFS”) (within the Department of Commerce) to regulate public and private parties that engage in activities that affect endangered and threatened species.⁴ The FWS and NMFS work to protect imperiled species by going through regulatory steps to determine whether the species warrant protection by being listed as endangered or threatened. For species that are listed, the agencies implement the statutory provisions that provide legal protections to threatened and endangered species. One of the major regulatory steps that the FWS and NMFS take to protect listed species is to designate critical habitat for those species. Critical habitat designation is done by the FWS and NMFS “on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impact, of specifying any particular area as critical habitat.”⁵

The requirement to take “into consideration the economic impact” of critical habitat designation differs from the section of the ESA that calls for the FWS and NMFS to list species as endangered or threatened based “solely on the best scientific data . . . available.”⁶ The U.S. Supreme Court has interpreted “best scientific data available” to mean that economic analysis should not have any role in the listing decision.⁷ So the FWS and NMFS are charged with listing species as endangered or threatened without engaging in economic analysis but are supposed to consider economic factors when designating critical habitat.

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4. See 16 U.S.C. § 1532(15) (2018). The FWS has authority over species on land and in freshwater. The NMFS has authority over marine species. The two agencies have joint authority over species that spend part of their time in marine environments and part of their time on land or in freshwater. See *Species Information*, NOAA FISHERIES, <https://perma.cc/N4R2-VXT6> (last updated Jan. 29, 2018).
 5. 16 U.S.C. § 1533(b)(2) (2018).
 6. 16 U.S.C. § 1533(b)(1)(A) (2018).
 7. See *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 184–88 (1978) (discussing that Congress “viewed the value of endangered species as ‘incalculable’” and enacted the ESA to combat species extinction, “whatever the cost”).

Thus far, FWS and NMFS have performed economic analysis of critical habitat designation by looking at the change from the “baseline” of protections for listed species.⁸ In practice, this has led to economic analysis that weighs low benefits against low costs because the protections afforded by critical habitat largely overlap with the protections for listed species. In most cases, the FWS and NMFS estimate benefits of proposed critical habitat as zero and costs as limited to some thousands of dollars per year for administrative costs.⁹ Commentators, such as Professor Amy Sinden, have argued that a lack of extensive economic analysis is a good thing because more elaborate weighing of costs and benefits of critical habitat would use agency resources and may result in regulatory paralysis.¹⁰

I propose that more accurate economic analysis of critical habitat designation should instead weigh the broad benefits against the real costs of critical habitat. There are two main reasons why economic analysis should play more of a role in critical habitat decisions. First, statutory interpretation of the ESA points to a Congressional intent that would be best fulfilled with more accurate economic analysis. I define accurate economic analysis as the weighing of costs against benefits of proposed regulations, with measurements of costs and benefits that reflect social values of the expected changes due to the proposed policies. In Part II, I discuss statutory interpretation of the ESA to attempt to discern the intent of Congress when it comes to the role of economic analysis in critical habitat designation.

The second reason why economic analysis should play a more active role in the process of designating critical habitat is that accurate economic analysis can enable ESA regulations to be more efficient, allowing for more conservation with lower burdens on regulated parties. In Part III, I describe how cost-benefit analysis can help lead to win-win results by encouraging more effective ESA regulations. The expertise of economists can contribute to the protection of endangered species by focusing

8. 50 C.F.R. § 424.19 (2018).

9. See *LOGGERHEAD ECONOMIC ANALYSIS*, *supra* note 1, at 3-17, 7-2.

10. Amy Sinden, *The Economics of Endangered Species: Why Less is More in the Economic Analysis of Critical Habitat Designations*, 28 *HARV. ENVTL. L. REV.* 129, 134 (2004).

agency resources on the most promising actions that have the highest net benefits to society.

In Part IV, I turn to methodology for accurately measuring costs and benefits of critical habitat under the ESA. I pay particular attention to measuring benefits, which tend to be more nebulous and difficult to pin down. The current agency estimates of zero benefits and low costs for critical habitat do not accurately reflect social preferences. People value preserving rare species but also value the benefits that flow from the areas protected as critical habitat. The most promising way to measure these benefits is by quantifying the values of ecosystem services like water filtration, carbon sequestration, and recreational opportunities. I argue that the best methodology for measuring benefits of critical habitat is to add together the values people place on: 1) the expected improvements to listed species due to the critical habitat designation and 2) the value of the ecosystem services that are also protected due to the critical habitat designation.

In Part V, I provide an example of how to implement my proposed economic analysis using the recent economic analysis for critical habitat designation of the Northwest Atlantic population segment of the loggerhead turtle. As in most recent agency analyses, the estimates provided by NMFS in this analysis are of zero benefits and low costs. By using published estimates of the values of loggerhead turtles and ecosystem services that are likely protected by the proposed critical habitat, I estimate benefits that more accurately reflect the values people place on the proposed action of designating critical habitat along a major portion of the East Coast of the United States.

In Part VI, I conclude by discussing how more accurate economic analysis of critical habitat designation has the potential to change the dynamics of the oft-lively debate between supporters and opponents of the ESA. With things like timber harvests and construction development at play, there are billions of dollars of economic activity at stake.¹¹ Industries that face regulation under the ESA are quick to discuss how much economic value is lost from restrictions on timber harvest in the

11. PRIVATE PROPERTY AND THE ENDANGERED SPECIES ACT: SAVING HABITATS, PROTECTING HOMES 135 (Jason Shogren ed., 1999) [hereinafter PRIVATE PROPERTY & THE ESA].

Pacific Northwest, solar power in the Mojave desert, or water distribution in California.¹² These quantified estimates lead to press coverage and statistics quoted on Capitol Hill.¹³ On the other side of the conservation debate, proponents of more stringent endangered species protections talk mostly in moral terms about the importance of protecting species like the grey wolf and Karner blue butterfly.¹⁴ Although these justifications for conservation resonate with some audiences, moral arguments tend to provide few quotable statistics and get less press coverage. By engaging in more accurate economic analysis, the FWS and NMFS can help reframe the debate by providing credible statistics for both sides.

At the heart of the endangered species controversies are difficult tradeoffs between conserving rare ecosystems and developing resources in ways that affect quality of life for millions of people. By sidestepping these tradeoffs in economic analysis, the agencies implementing the ESA miss out on an opportunity to target conservation efforts more effectively. Economic analysis can help the agencies improve the effectiveness of conservation efforts in ways that lead to win-win situations compared with the current regime. Accurate economic analyses can foster more balanced discussions of conservation controversies in ways that allow for better public involvement and, ultimately, more effective endangered species protections.

II. INTERPRETING THE ESA'S CALL FOR ECONOMIC ANALYSIS

The ESA requires economic analysis for critical habitat designation, and the current practices of the agencies that

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12. See *Gifford Pinchot Task Force v. U.S. Fish & Wildlife Serv.*, 378 F.3d 1059 (9th Cir. 2004) (Northern spotted owls); *Ctr. for Biological Diversity v. U.S. Bureau of Land Mgmt.*, 746 F. Supp. 2d 1055 (N.D. Cal. 2009) (desert tortoises); *In re Consol. Delta Smelt Cases*, 812 F. Supp. 2d 1133 (E.D. Cal. 2011) (delta smelt).
 13. See, e.g., Philip Shabecoff, *Ideas and Trends; The Battle for the National Forests*, N.Y. TIMES (Aug. 13, 1989) <https://perma.cc/D4VW-L57C> (reporting on expected costs of spotted owl regulations); see also 111 CONG. REC. 5964 (2010) (power company executives testifying about the quantified costs of endangered species regulation for H.R. 221).
 14. See *Protecting Imperiled Species*, DEFENDERS OF WILDLIFE, <https://perma.cc/A682-KFNU>.

implement the ESA follow the letter, rather than the spirit, of the law. This Part considers different interpretations of the ESA and finds that the one that best fits Congress's intent is to have the FWS and NMFS engage in cost-benefit analysis that considers the broad benefits and real costs of critical habitat designations.

A. The Statute and Context

The ESA was passed in 1973 to provide “a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved” and to “provide a program for the conservation of such endangered species and threatened species.”¹⁵ The ESA requires agencies to use the “best scientific and commercial data available” when determining whether to list species as threatened or endangered.¹⁶ In *Tennessee Valley Authority v. Hill*, the U.S. Supreme Court held that this language signified that Congress did not intend for agencies to consider economic factors when deciding whether to list species under the ESA.¹⁷ Congress endorsed this interpretation of the ESA by adding “solely” in front of “scientific and commercial data” to make it clear that the listing decision for species should not include economic factors.¹⁸

Congress was also sensitive to the backlash against the decision in *Tennessee Valley Authority* because many people saw it as wasteful to prevent use of the nearly completed \$100 million Tellico dam for the sake of a commercially worthless fish.¹⁹ So Congress passed a law explicitly exempting the Tellico dam from the ESA and started engaging in discussions about how the ESA should be amended.²⁰ In 1978, Congress amended the ESA to require the implementing agencies to designate critical habitat based on the “best scientific data available *and after taking into*

15. 16 U.S.C. § 1531(b) (2018).

16. 16 U.S.C. § 1533(b)(1)(A) (2018).

17. *Tennessee Valley Auth. v. Hill*, 437 U.S. 153, 184–85 (1978).

18. Endangered Species Act Amendments of 1982, Pub. L. No. 97-304, § 2(a)(2), 96 Stat. 1411, 1411 (codified as amended at 16 U.S.C. § 1533(b)(1)(A) (2018)); H.R. REP. NO. 97-567, at 12 (1982).

19. See James Salzman, *Evolution and Application of Critical Habitat Under the Endangered Species Act*, 14 HARV. ENVTL. L. REV. 311, 318–19, 321 (1990).

20. *Id.*

consideration the economic impact . . . of specifying any particular area as critical habitat.”²¹ The 1978 amendments to the ESA also added a committee that has authority to exempt certain activities from ESA regulations to prevent drastic outcomes like that in *Tennessee Valley Authority*.²² This “God Squad” committee is usually described as an escape valve intended to prevent repeats of the Tellico dam situation.²³

B. Agency and Court Interpretations

As it has stood for over thirty years, the ESA allows for no role of economic analysis in the process of listing a species as threatened or endangered, but the statute requires the FWS and NMFS to engage in economic analysis when designating critical habitat of listed species.²⁴ The FWS and NMFS have interpreted “taking into consideration the economic impact” in critical habitat designation as a call for analysis of the additional protections of critical habitat designation over the protections afforded to listed species.²⁵ Species listed as endangered or threatened are protected from “take” by any person or organization and from “jeopardy” by federal agencies.²⁶ The FWS and NMFS consider these protections to be a baseline, since economic factors are not supposed to be considered at the listing stage.²⁷ Critical habitat adds a protection that federal agencies may not engage in “adverse modification of habitat . . . that is deemed to be critical.”²⁸ As defined by the agencies in regulations, the prohibitions on take and jeopardy almost completely overlap with the adverse modification protection of critical habitat.²⁹ Using this interpretation of the statute, economic analysis is implemented using an “incremental” approach that looks at the

21. 16 U.S.C. § 1533(b)(2) (2018) (emphasis added).

22. *Id.* § 1536(e).

23. Salzman, *supra* note 19, at 321.

24. 16 U.S.C. § 1533(b)(2) (2018).

25. Endangered and Threatened Wildlife and Plants; Revisions to the Regulations for Impact Analyses of Critical Habitat, 78 Fed. Reg. 53,058, 53,062 (Aug. 28, 2013) [hereinafter Critical Habitat Regulations Revisions].

26. 16 U.S.C. §§ 1536(a)(2), 1538(a)(1)(B) (2018).

27. Critical Habitat Regulations Revisions, 78 Fed. Reg. at 53,062.

28. 16 U.S.C. § 1536(a)(2) (2018).

29. 50 C.F.R. § 17.3 (2018).

benefits and costs of the added protections of critical habitat over the protections that come from listing a species as endangered or threatened.³⁰

As a practical matter, the incremental approach leads to a narrow concept of costs and benefits because there is usually no additional increment of legal protection for critical habitat that was not already covered by the take and jeopardy protections of listing.³¹ Costs are usually limited to the administrative costs of handling critical habitat.³² Benefits are usually negligible and often left unquantified but, when quantified, are usually zero.³³ From a logistical standpoint, this allows the FWS and NMFS to avoid using extensive agency resources on economic analysis.³⁴

The incremental approach to cost-benefit analysis was challenged in *New Mexico Cattle Growers Association v. U.S. Fish & Wildlife Service*, prompting the Tenth Circuit to review the FWS's interpretation of the call for economic analysis in the ESA.³⁵ In *New Mexico Cattle Growers*, the court rejected the agency's incremental approach for taking too narrow a view of the costs and benefits of critical habitat.³⁶ According to the *New Mexico Cattle Growers* court, the narrow costs and benefits implied by the incremental approach went against Congress' intent for the FWS to use economic analysis for critical habitat designation.³⁷ The FWS interpretation was not afforded substantial deference because the policy had not been implemented through notice-and-comment rulemaking.³⁸

30. *Id.* § 424.19(b).

31. *See* Sinden, *supra* note 10, at 151. The one scenario in which critical habitat may add an additional layer of protection over listing protections is when areas that do not currently serve as habitat for listed species are designated as critical habitat for those species. This could be the case if part of the historic range of a species is designated even though it is not currently inhabited by the species. The FWS and NMFS avoid doing this to prevent added controversy. *Id.*

32. *See, e.g.*, *LOGGERHEAD ECONOMIC ANALYSIS*, *supra* note 1, at 5-1.

33. *See, e.g., id.* at 7-2.

34. *See* Sinden, *supra* note 10, at 208.

35. *See generally* *New Mexico Cattle Growers Ass'n v. U.S. Fish & Wildlife Serv.*, 248 F.3d 1277, 1283–85 (10th Cir. 2001).

36. *Id.* at 1285.

37. *Id.*

38. *Id.* at 1281.

However, in *Arizona Cattle Growers Association v. Salazar*, the Ninth Circuit upheld FWS's use of the incremental approach as a permissible reading of the ESA.³⁹ When the *Arizona Cattle Growers* court interpreted the ESA, it found the incremental approach to be a permissible reading of the statute's call for economic analysis.⁴⁰ So judicial reviews of the agency interpretation of economic analysis in the ESA have gone both ways, leading to a patchwork of permissible economic analysis for endangered species that required different methodologies in Arizona and New Mexico.⁴¹

In an attempt to achieve a uniform national policy, the FWS and NMFS promulgated a joint rule in 2013 officially interpreting the ESA and used the "incremental" approach with narrowly defined costs and benefits.⁴² The new policy was promulgated by notice-and-comment rulemaking, so it will presumably receive deference under *Chevron v. Natural Resources Defense Council*, which stands for the idea that courts defer to reasonable agency interpretations when those interpretations were made with the force of law.⁴³ This means that the *New Mexico Cattle Growers* case would likely come out differently today because the court would give substantial deference to the agency now that the incremental approach has gone through notice-and-comment rulemaking.⁴⁴ Although the FWS and NMFS have used rulemaking to interpret the ESA to call for economic analysis using the incremental approach, that does not have to be the end of the discussion; there are multiple perspectives on the statutory

39. See generally *Arizona Cattle Growers Association v. Salazar*, 606 F.3d 1160, 1173 (9th Cir. 2010).

40. *Id.* at 1174.

41. *Id.* at 1073 (describing the Ninth Circuit's rejection of the Tenth Circuit's holding). Arizona is in the Ninth Circuit, so the FWS would be allowed to use the incremental approach there. New Mexico is in the Tenth Circuit, so the FWS could not use the incremental approach in the neighboring state. This can be a major problem for the FWS when trying to designate critical habitat for species that cross state lines in those circuits.

42. Endangered and Threatened Wildlife and Plants; Revisions to the Regulations for Impact Analyses of Critical Habitat, 78 Fed. Reg. 53,058 (Aug. 28, 2013) (codified at 50 C.F.R. pt. 424).

43. See generally *Chevron U.S.A., Inc. v. Nat. Res. Def. Council*, 467 U.S. 837 (1984).

44. See *New Mexico Cattle Growers Ass'n v. U.S. Fish & Wildlife Serv.*, 248 F.3d 1277, 1281 (10th Cir. 2001).

language, and the agencies could opt to promulgate new rules with different interpretations in the future.

C. Interpretations by Commentators

Various commentators outside the agencies and courts have also interpreted the ESA's call for economic analysis of critical habitat designation. Many environmental advocates have interpreted the economic analysis provision along the lines of the incremental approach and have applauded the evasion of more involved cost-benefit analysis, as they see the lack of economic analysis in the ESA as one of the law's strengths in protecting the environment.⁴⁵ In this view, the incremental approach allows the agencies to bypass costly analysis that is often a hurdle for new regulations to cross.⁴⁶ Resources that would have to be spent putting prices on things that are inherently valuable can instead be used to "put boots on the ground" to actively conserve listed species.

Professor Amy Sinden argues that it is desirable for the agencies to use "short-cut environmental standards" for economic analysis so that cost-benefit analysis does not have to play a role in the ESA.⁴⁷ Examples of short-cut methods include feasibility standards and limited balancing tests found in the Clean Air Act and Clean Water Act.⁴⁸ Sinden argues that Congress intended these short-cut methods in lieu of formal cost-benefit analysis.⁴⁹ The ESA calls for "consideration [of] . . . economic impact" and also charges the FWS and NMFS to consider other relevant factors "based on such data as may be available at the time."⁵⁰ Sinden reads this language as an intent to give the agencies implementing the law substantial flexibility in how they engage in economic analysis of critical habitat designation so that the agencies can act quickly.⁵¹ Formal economic analysis uses

45. *See, e.g.*, Sinden, *supra* note 10, at 159 (describing environmental groups' successful legal challenges to FWS's declining to designate critical habitat based on cost-benefit analysis).

46. *See id.*

47. *Id.* at 184–87.

48. *Id.* at 186, 188–92.

49. *See id.* at 210.

50. 16 U.S.C. § 1533(b)(2), (6)(C)(ii) (2018).

51. *See* Sinden, *supra* note 10, at 193–94.

substantial resources and is often cited as an excuse for administrative paralysis, so Professor Sinden prefers an ESA that retains an element of absolutist methods to achieve its goals.⁵²

In a similar vein, Jon Souder traces the use of economic analysis for ESA regulations and proposes that critical habitat designation should go through the public comment process spelled out in the National Environmental Protection Act.⁵³ Souder argues that this public involvement is preferable to formal cost-benefit analysis of endangered species regulations.⁵⁴

D. The Closest Fit to Congressional Intent

The current agency interpretation takes the prohibition on economic analysis for listing species as a signal to start the economic analysis of critical habitat designation from a baseline with the species already listed and protected through those legal mechanisms.⁵⁵ But the relationship between listing and designating critical habitat is more complex than baseline protections and additional protections.⁵⁶ Designating critical habitat is required for listed species.⁵⁷ There are many overlaps in the protections, and the legal protections of critical habitat are often the ones that have bite in practice.⁵⁸

When Congress included the requirement for agencies to consider economic factors in the critical habitat designation process, it is unlikely that the added requirement was intended to be a hollow bureaucratic hurdle.⁵⁹ If Congress intended economic analysis the way the FWS and NMFS interpret it, then the requirement to consider economic factors is surplusage—at least

52. *See id.* at 192–94.

53. *See* Jon A. Souder, *Chasing Armadillos Down Yellow Lines: Economics in the Endangered Species Act*, 33 NAT. RESOURCES J. 1095, 1097–98, 1109, 1112–13, 1138 (1993) (arguing that the public comment process established under NEPA should be used for critical habitat designation to supplement a weak cost-benefit analysis).

54. *Id.* at 1138.

55. *See* LOGGERHEAD ECONOMIC ANALYSIS, *supra* note 1, at 2-7.

56. *See* Salzman, *supra* note 19, at 321–23.

57. 16 U.S.C. § 1533(a)(3)(A)(i) (2018).

58. *See* Salzman, *supra* note 19, at 323–27.

59. *See generally id.* at 316–21 (describing public outcry in the wake of *TVA v. Hill* and Congress's adoption of cost-benefit analysis for critical-habitat designation in response).

for practical purposes. This is because an economic analysis that weighs no benefits against almost no costs for *all* proposed critical habitat designations does not provide helpful insight into *any* of those designations; when there is no variation across proposed designations, there is nothing informative about whether some proposals are preferable to others.⁶⁰

In the wake of *Tennessee Valley Authority*, it is more likely that Congress intended to amend the ESA by adding a method to address the important tradeoff between conservation and economic development.⁶¹ The requirement to consider economic factors when designating critical habitat can serve, like the “God Squad,” as an escape valve from drastic outcomes like the Tellico Dam.⁶²

Congressional intent behind the call for economic analysis in critical habitat designation under the ESA can be discerned by considering the context of the 1978 amendments to the ESA and the timeline of agency actions. In the wake of *Tennessee Valley Authority*, Congress was explicit about economic analysis not playing a role in the listing process that, as described above, affords protections to species against take and agency actions that involve jeopardy.⁶³ At the same time, Congress explicitly called for economic analysis of critical habitat designation, which protects against agency actions that may adversely modify habitat.⁶⁴

The FWS and NMFS have interpreted jeopardy and adverse modification to mean similar things, although that is not the only

60. See *New Mexico Cattle Growers Ass’n v. U.S. Fish & Wildlife Serv.*, 248 F.3d 1277, 1285 (10th Cir. 2001) (describing economic analysis done under the baseline approach as “rendered essentially without meaning . . . “ because the agencies defined critical-habitat protection against adverse modification as fully encompassed by listing protection against jeopardy for all species).

61. See *id.* at 320–21 (noting that the cost-benefit provision “changed the designation process from a purely biological assessment to a social policy decision” and that the newly created “God Squad” could exempt projects from § 7 if it determines, *inter alia*, that the action’s societal benefits outweigh the costs of species preservation).

62. See *id.*

63. *Id.* at 323.

64. 16 U.S.C. § 1533(b)(2) (2018).

reasonable interpretation of those terms.⁶⁵ But even taking those terms as identical, it could still make sense for Congress to simultaneously call for no economic analysis when listing species yet for meaningful economic analysis when designating critical habitat. If Congress felt that economic factors were important but should be considered at a later stage and should focus on agency behavior, it would make sense to exempt listing from economic analysis but call for it in critical habitat designation. This interpretation avoids the need to perform economic analysis before listing, which might be important when the agency is trying to quickly protect a species, such as after an imperiled species has just been discovered and is under great threat.⁶⁶ Once species have some protections in place, Congress may have wanted the agencies to then turn to economic factors. Focusing on federal agency behavior also allows the FWS and NMFS to sidestep trying to quantify some of the thorny issues involved in private landowner restrictions.⁶⁷ Under this reading of the ESA, when rare species are discovered they are quickly listed and receive legal protections while the agencies engage in scientific research to determine the conservation needs of the species. The FWS and NMFS then decide where to designate critical habitat, which has a direct impact on federal agencies but not on private landowners, based on economic factors.

As mentioned above, Professor Sinden has argued for the benefits of eschewing cost-benefit analysis when designating critical habitat in favor of short-cut environmental standards.⁶⁸ However, Professor Sinden's interpretation fails to give full effect to Congress's call for economic analysis. The language that she cites as "evidencing Congress's conscious decision to choose prompt agency action over regulatory perfection"⁶⁹ is in a portion of the statute that describes a one-year delay in implementation

65. See *New Mexico Cattle Growers Ass'n*, 248 F.3d at 1285. One could easily imagine definitions of jeopardy and adverse modification that differ in levels of protection, which types of species are targeted, or other substantive differences.

66. This was essentially the situation with the snail darter fish that held up operation of the Tellico Dam in *Tenn. Valley Authority v. Hill*, 437 U.S. 153 (1978).

67. See PRIVATE PROPERTY & THE ESA, *supra* note 11, at 55.

68. See Sinden, *supra* note 10, at 196-97.

69. *Id.* at 194.

of the law to give FWS and NMFS an opportunity to meet the statutory deadlines for critical habitat designation.⁷⁰ Thus, the charge that the FWS “must publish a final regulation[] based on such data as may be available at the time”⁷¹ is not strong evidence that Congress intended for the agencies to always prefer regulatory speed to regulatory effectiveness. Following the principle that courts should interpret statutory terms “in connection with . . . the whole statute,”⁷² it is natural to read language in that portion of the statute about a one-year delay as describing how the agencies should proceed during the one-year delay. Taking language from that portion of the statute and applying it to other sections of the ESA is stripping it of the context of commanding agencies how to implement the law during its nascent year.

Additionally, the language describing the criteria for critical-habitat designation is very similar to the language that describes the criteria for listing species.⁷³ When considering this language within the whole ESA, there is a conflict if the language indicates Congress’s intent for short-cut economic analysis of critical habitat designation—which is Professor Sinden’s preferred interpretation—but Congress uses the same language to show that there should be no role for economic analysis in the listing process.⁷⁴ The U.S. Supreme Court, endorsed by Congress, has read the language in the listing process to mean that economics has no role in the listing decision, so it would be incongruous to have similar language used as a signal for short-cut economic analysis.

Interpreting “consideration of economic factors” in the ESA as a call for cost-benefit analysis is a better way to give effect to the intent of Congress to use economic tools as a factor in the decision to designate critical habitat. As discussed above, the current agency interpretation—the incremental approach—does not lead to economic analysis being a meaningful factor in critical

70. 16 U.S.C. § 1533(b)(6)(C)(ii) (2018).

71. *Id.*

72. *Dada v. Mukasey*, 554 U.S. 1, 16 (2008) (quoting *Brown v. Duchesne*, 60 U.S. (19 How.) 183, 194 (1856)) (internal quotation marks omitted).

73. *Compare* 16 U.S.C. § 1533(b)(1)(A) (establishing the species listing criteria) *with* 16 U.S.C. § 1533(b)(2) (establishing the critical-habitat designation criteria).

74. *See* discussion *supra* Part II.

habitat decisions because the results are always estimates of costs that are relatively low administrative costs weighed against approximately zero benefits.⁷⁵ It is unlikely that Congress intended this result when it called for economic analysis. Instead, congressional intent points to a need for more accurate economic analysis. By measuring costs and benefits using estimates of how much people trade off environmental amenities for other things like money, the agency is able to pursue regulatory policies that best reflect societal values.⁷⁶ With accurate measurements of costs and benefits, economic analysis can serve as the escape valve that Congress likely had in mind in the wake of the Tellico Dam experience.⁷⁷ In addition to following with the intent of Congress, more accurate economic analysis can improve over the current approach by leading toward more effective ESA regulations.

E. How to Measure the Increment

Accurate economic analysis requires a way to measure the costs and benefits of critical habitat designation in relation to the protections against take and jeopardy that come from the listing of species. The current agency methodology assumes that the increment of protection for critical habitat is essentially zero because the adverse modification protection completely overlaps with either the Section 7 protection against jeopardy, the Section 9 protection against take, or both.⁷⁸ However, there are other ways to measure the increment of protection from adverse modification that would give meaning to the language Congress included in the ESA to consider economic factors of critical habitat designation.

1. Nonoverlapping Protection of Adverse Modification

Courts have hypothesized that there can be scenarios in which critical habitat designation provides protections for species

75. See Sinden, *supra* note 10, at 196–97.

76. NICHOLAS A. ASHFORD & CHARLES C. CALDART, ENVIRONMENTAL LAW, POLICY, AND ECONOMICS 148 (2008).

77. Salzman, *supra* note 19, at 320–21.

78. See *New Mexico Cattle Growers Ass'n v. U.S. Fish & Wildlife Serv.*, 248 F.3d 1277, 1285 (10th Cir. 2001).

that would not come from jeopardy and take protections.⁷⁹ When areas are considered “essential to the conservation” of listed species, but those areas are not currently inhabited by the species, there may be an increment of protection added by designating that land as critical habitat.⁸⁰ FWS and NMFS acknowledge this possibility in economic analyses, even when they choose not to designate any land that is not currently occupied by the species.⁸¹ By doing this, the agencies are able to pay tribute to the idea that Congress intended for meaningful economic analysis of critical-habitat designation, but argue that it does not apply in this particular designation. But as this appears to have become standard procedure for the agencies,⁸² congressional intent for economic analysis of critical habitat designation is still not being met with meaningful agency action.

2. Adverse Modification Protection in Isolation

The *New Mexico Cattle Growers* court required FWS to measure costs and benefits of critical habitat even if those costs and benefits also accrued from the protections for listed species.⁸³ This essentially asks the agencies to pretend that jeopardy and take protections do not exist and measure how critical habitat

79. See *Cape Hatteras Access Pres. All. v. Dep’t of Interior*, 344 F. Supp. 2d 108, 129-30 (D.D.C. 2004).

80. See 16 U.S.C. § 1532(5)(A)(ii) (2018) (defining “critical habitat” to include “areas outside the geographical area occupied by the species . . . upon a determination by the Secretary that such areas are essential for the conservation of the species”).

81. See, e.g. INDUS. ECON., INC., ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE NORTHERN SPOTTED OWL 8-13 (2012), <https://perma.cc/5CV6-Z2EV> [hereinafter NORTHERN SPOTTED OWL ANALYSIS]; CARDNO ENTRIX, DRAFT REGULATORY IMPACT REVIEW OF CRITICAL HABITAT DESIGNATION FOR THE ARTIC RINGED SEAL (2014), <https://perma.cc/6AA8-PT7U>. But see *Markle Interests, LLC v. U.S. Fish & Wildlife Service*, 827 F.3d 452, 459 (5th Cir. 2016) (cert petition pending) (discussing FWS designation of unoccupied critical habitat for the dusky gopher frog).

82. See, e.g., INDUS. ECON., INC., ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE ROSWELL SPRINGSNAIL, KOSTER’S SPRINGSNAIL, PECOS ASSIMINEA, AND NOEL’S AMPHIPOD ES-1 (2011), <https://perma.cc/AVN3-N9FG>; INDUS. ECON., INC., ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE GUNNISON SAGE GROUSE ES-2 (2014), <https://perma.cc/PY2L-7E98> [hereinafter IEC GUNNISON SAGE GROUSE].

83. See *New Mexico Cattle Growers Ass’n v. U.S. Fish & Wildlife Serv.*, 248 F.3d 1277, 1281 (10th Cir. 2001).

designation affects behavior. There are two major challenges to this approach. First, measuring the costs and benefits of a proposed action in a vacuum goes against the White House guidance to measure costs and benefits of a proposed action against a baseline of what would occur if that action were not taken.⁸⁴ As such, the methodology for economic analysis of critical-habitat designation would differ in a major way from those used in economic analysis of other major agency actions.

The second major challenge to measuring costs and benefits of critical habitat in isolation is that it would be hard to implement. Species are always listed prior to or concurrently with critical habitat designation, so there are no examples of areas with the adverse modification protection but not the jeopardy and take protections. This makes it impossible to directly measure how the adverse modification protection in isolation affects behavior in the real world. The FWS has attempted to satisfy the *New Mexico Cattle Growers* court by augmenting the standard economic analysis of critical habitat designation with additional information about the estimated costs and benefits of the “baseline,” namely the jeopardy and take protections that come with listing the species.⁸⁵ By doing this, FWS has been able to satisfy the court’s requirement to provide a broader picture of the costs and benefits of ESA protections while continuing to focus on the incremental analysis it uses in other circuits. With the legal and practical challenges associated with measuring the effects of critical habitat in isolation, it is unlikely that this methodology will reemerge in the near future now that FWS has promulgated the 2013 rule specifying the incremental method as the preferred approach to economic analysis.

3. Indirect Effects of Critical Habitat

A third way to measure the increment of protection for critical habitat is to estimate how much adverse modification protection will affect behavior by looking at empirical evidence of how people respond to critical habitat designation. As discussed above, people care about critical habitat designation in ways that suggest there are real-world consequences of these actions. When

84. See *infra* Part III.

85. See, e.g., IEC GUNNISON SAGE GROUSE, *supra* note 82, at 2-2.

engaging in Section 7 consultations for the ESA, the FWS and NMFS estimate what indirect effects the action may have on listed species.⁸⁶ Indirect effects are things that are “reasonably certain to occur” because of an action.⁸⁷ So if the Federal Highway Administration is consulting with the FWS about building a new highway that will run near an endangered frog’s habitat, the agencies estimate how much the frog will be affected directly by road construction and indirectly by development that is spurred by the new road.

Likewise, agencies are charged with estimating indirect effects that are “reasonably foreseeable” to occur because of proposed actions as part of the NEPA review process.⁸⁸ Indirect effects include “growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.”⁸⁹ For example, when the U.S. Forest Service proposes to lease a plot of land for a new ski area, the agency considers how the induced growth of new hotels, retail buildings, and housing outside of Forest Service land will affect nearby environmental amenities.⁹⁰

Since the FWS and NMFS already examine what is reasonably expected to occur because of an action when they engage in Section 7 consultations and NEPA reviews, the agencies already have expertise in making these predictions. Estimating the indirect effects of critical-habitat designation does not pose the same methodological challenges that plague the analysis of critical habitat in isolation because there are real-world examples of areas that first have only listing protections

86. *See* 50 C.F.R. § 402.02(d) (2018).

87. U.S. FISH & WILDLIFE SERV. & NAT’L MARINE FISHERIES SERV., CONSULTATION HANDBOOK: PROCEDURES FOR CONDUCTING CONSULTATION AND CONFERENCE ACTIVITIES UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT 4-29 (1998), <https://perma.cc/G748-3EN7>.

88. WHITE HOUSE COUNCIL ON ENVTL. QUALITY & CAL. OFFICE OF PLANNING & RESEARCH, NEPA AND CEQA: INTEGRATING FEDERAL AND STATE ENVIRONMENTAL REVIEWS 30 (2014), <https://perma.cc/NA75-UEVK>.

89. 40 C.F.R. § 1508.8(b) (2018).

90. *See, e.g.*, U.S.D.A. FOREST SERVICE, BRECKENRIDGE SKI RESORT MULTI-SEASON RECREATION PROJECTS DRAFT ENVIRONMENTAL IMPACT STATEMENT 2-24 (2015), <https://perma.cc/9DRN-RTY3>.

and then add the adverse modification protection.⁹¹ In fact, economists have already used situations like these to estimate how critical habitat affects behavior. As discussed in Section V, these estimates can be used as a starting point for measuring the increment of protection that comes from critical habitat designation.

III. ACCURATE ECONOMIC ANALYSIS CAN LEAD TO MORE EFFECTIVE REGULATIONS

In this Part, I argue that accurate cost-benefit analysis can help achieve win-win results by allowing for more conservation of endangered species while also lowering burdens on regulated parties. I pull from guidance published by the Office of Information and Regulatory Affairs (“OIRA”), an office in the White House that specializes in economic analysis, and draw comparisons to economic analyses of environmental laws performed by other agencies such as the Environmental Protection Agency (“EPA”).

A. Economic Analysis to Promote Effective Regulations

Economic analysis, often in the form of cost-benefit analysis, has the potential to make regulations more effective by encouraging agencies to promulgate rules that have larger benefits and smaller costs. Both Republican and Democratic presidents have endorsed the idea that economic analysis is an important tool for promoting effective regulation.⁹² Cost-benefit analysis was originally introduced by the Reagan administration and has been utilized by every administration since.⁹³ President Clinton issued Executive Order 12,866 calling for cost-benefit

91. *See, e.g.*, LOGGERHEAD ECON. ANALYSIS, *supra* note 1, at ES-1 (describing the listing of the loggerhead sea turtle in 1978, but critical habitat designation not occurring for the Northwest Atlantic Ocean Distinct Population Segment until 2014); Critical-Habitat Designations for the Northwest Atlantic Ocean Loggerhead Sea Turtle the North Pacific Ocean Loggerhead, 79 Fed. Reg. 39,855 (July 10, 2014) (issuing final rule to designate critical habitat for the Northwest Atlantic loggerhead sea turtle).

92. LISA SCHULTZ BRESSMAN, EDWARD L. RUBIN, AND KEVIN M. STACK, *THE REGULATORY STATE* 483 (2010).

93. *Id.*

analysis of all major federal agency actions whenever possible.⁹⁴ Cost-benefit analysis of proposed regulations can ensure that the expected benefits are large enough to justify the expected costs.⁹⁵ There is not a strict rule that regulations must have positive net benefits, but net benefit numbers are seen as indicators of how effectively proposed rules will achieve their regulatory goals.⁹⁶

The current guidance from OIRA, Circular A-4, explains that the goal when estimating impacts of regulation is to measure the entire range of costs and benefits that accrue to people in the United States from proposed regulations.⁹⁷ The preferred method for measuring benefits of regulation is to use measures of what people are willing to pay for improvements in quality of life.⁹⁸ Costs are estimated by adding the expected administrative costs with the additional burdens on regulated parties.⁹⁹

Cost-benefit analysis can help create win-win situations because resources can be focused on places where they are most effective, leading to more of the desired regulatory outcome with lower costs.¹⁰⁰ Circular A-4 explains that the goals of economic analysis are to “(1) learn if the benefits of an action are likely to justify the costs or (2) discover which of various possible alternatives would be the most cost-effective.”¹⁰¹ By choosing the most cost-effective regulations, agencies are able to achieve better regulatory results.¹⁰²

To see how this can lead to a win-win outcome, consider a hypothetical with an agency that is charged with protecting the national tree, the oak.¹⁰³ This agency has the daunting task of figuring out how to protect a national symbol that is important to people and ecosystems but that also forms the basis of livelihoods from forestry to cooperage of wine barrels. Suppose that the

94. Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Sept. 30, 1993).

95. *Id.*

96. ASHFORD & CALDART, *supra* note 76, at 149.

97. OFFICE OF MGMT. & BUDGET, ECEC. OFFICE OF THE PRESIDENT, CIRCULAR A-4 § E(1) (2003), <https://perma.cc/KPV8-M84L> [hereinafter CIRCULAR A-4].

98. *Id.* § E(8).

99. *Id.* § E(2).

100. *See id.* § A.

101. *Id.*

102. *See id.*

103. Press Release, Arbor Day Found., Oak Becomes America’s National Tree (Dec. 10, 2004), <https://perma.cc/C2EN-BDV3>.

agency is interested in pursuing a proposed regulation of X, where X could stand for improvement of oak savannah habitat or some other agency action. To assess whether proposed regulation X to protect oaks is a net benefit to society, the agency can use economic analysis. Circular A-4 calls for the agency to clearly lay out alternatives to the proposed regulation—for example, policy Y that targets improvement of oak savannah habitat on federal land and policy Z that is a no-action alternative.¹⁰⁴ For each of the alternatives, the agency should calculate the expected costs and benefits of the action. Once the expected costs are subtracted from the expected benefits, the agency has an estimate for the net benefit of each alternative. If the expected net benefit of regulation X is -\$50 million, then the rule may not be in the best interest of society. If alternative Y has an expected net benefit of \$50 million and alternative Z has an expected net benefit of \$0, then the economic analysis suggests that regulatory policy Y is the preferred action. Compared with the original proposal of X, policy Y can offer more effective protection of the oak that results in more benefits to society at lower costs. By moving forward with regulations that focus resources where they are most effective, the agency can do a better job at fulfilling its mandate to protect our national tree.

B. Cost-Benefit Analysis of Other Environmental Regulations

The statutory requirements for the FWS and NMFS to consider economic factors in critical habitat designation are similar to the calls for economic analysis in the Clean Air Act and the Clean Water Act, both drafted and enacted around the same time as the ESA.¹⁰⁵ For the past thirty years, agencies and courts have interpreted this language to mean that agencies should use cost-benefit analysis when possible.¹⁰⁶

To measure benefits of proposed regulations, the EPA typically relies on studies that evaluate how much a relevant

104. CIRCULAR A-4, *supra* note 97, § A.

105. *See, e.g.*, 42 U.S.C. § 7521(a)(3)(A)(i) (Clean Air Act analysis provisions for new motor vehicle emission standards); 33 U.S.C. § 1311(b)(2)(A) (same for Clean Water Act effluent permits).

106. *See Mortality Risk Valuation*, EPA, <https://perma.cc/V3KM-WV3H> (last updated Feb. 8, 2018).

population would be willing to pay to achieve a change in regulatory outcomes.¹⁰⁷ To measure costs of proposed regulations, the EPA often relies on data provided by regulated industries to estimate the value of the burdens created by the new regulations.¹⁰⁸

For example, economic analysis of a proposed change in the standard for particulate matter in the air showed that the expected benefits of cleaner air and fewer premature fatalities caused by pollutants outweigh the expected costs by about forty to one.¹⁰⁹ Since the EPA administers the program on air pollution, it considered an alternative standard that would have resulted in higher benefits but also higher costs.¹¹⁰ By using economic analysis, the EPA had valuable information to help choose between the alternatives. Even when an agency chooses an alternative that does not have the highest net benefit, laying out the alternatives and considering the costs and benefits of them can be a valuable exercise in making thoughtful, transparent decisions because the analyses are publicly available.¹¹¹

This is not to say that cost-benefit analysis is without challenge or controversy. Measuring benefits of health and safety regulations often involves estimating the value of saving human lives, which can be a difficult practice because people are fortunately not directly traded on markets.¹¹² Economists estimate values of saving lives by looking at market conditions like wage premiums for risky jobs and willingness-to-pay for safety features in consumer products.¹¹³ However, many view

107. EPA, *supra* note 106; see W. KIP VISCUSI, *FATAL TRADEOFFS: PUBLIC AND PRIVATE RESPONSIBILITIES FOR RISK* 19 (1992).

108. See EPA, *GUIDELINES FOR PREPARING ECONOMIC ANALYSES* 8-13 (2010), <https://perma.cc/BG8M-5SXY> [hereinafter EPA GUIDELINES].

109. EPA, *REGULATORY IMPACT ANALYSIS FOR THE PROPOSED REVISIONS TO THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER* 5-71, 7-12 (2012), <https://perma.cc/95H4-LFUQ> [hereinafter EPA NAAQS ANALYSIS].

110. See *id.* at ES-5, 7; see also EPA, *THE BENEFITS AND COSTS OF THE CLEAN AIR ACT FROM 1990 TO 2020* 2 (2011) <https://perma.cc/8RDV-4CZA> (finding that by 2020 the costs of the 1990 Amendments would reach an annual value of \$65 billion and the benefits nearly \$2 trillion).

111. See, e.g., EPA NAAQS ANALYSIS, *supra* note 109.

112. CIRCULAR A-4, *supra* note 97, § E(8)(b); VISCUSI, *supra* note 107, at 19–20.

113. VISCUSI, *supra* note 107, at 19–20, 34.

estimating the cost of saving lives as a disrespectful practice because it appears to put a price on the value of people.¹¹⁴

Like the EPA, the agencies that implement the ESA are likely to face challenges and controversy when it comes to quantifying costs and benefits of proposed regulations. Despite these downsides, the FWS and NMFS can benefit from the valuable information that is provided by conducting an accurate cost-benefit analysis of proposed critical habitat designations.

IV. MEASURING BENEFITS OF ESA REGULATIONS

The FWS and NMFS only consider narrow categories of costs and benefits of critical habitat. This is a reasonable reading of the ESA, but it also risks missing the forest for the trees. This Part discusses how broader measures of costs and benefits will lead to more accurate cost-benefit analysis that follows the guidance provided by OIRA and parallels the practices of other agencies that use economic analysis for environmental regulations.

A. Measuring Costs of Critical Habitat

The FWS and NMFS estimate that the costs of critical habitat are limited to the burdens on the agency to administer the areas.¹¹⁵ Economics scholars have argued that there are real costs to the ESA, including critical habitat designation. For example, Professor Jason Shogren uses economic theory to show why there are real costs to critical habitat designation for private landowners.¹¹⁶ Economists Jeffrey Zabel and Robert Paterson tried to measure the empirical effect of critical habitat designation by looking at building permits issued in California before and after proposal and designation of critical habitat.¹¹⁷ They found evidence that builders expect development to be more expensive after land becomes critical habitat with a 37-percent decrease in the long-run supply of housing permits.¹¹⁸ This

114. *See id.* at 19–22 (describing criticism of putting values on lives).

115. *See* LOGGERHEAD ECON. ANALYSIS, *supra* note 1, at ES-2.

116. *See* PRIVATE PROPERTY & THE ESA, *supra* note 11, at 54–58.

117. Jeffrey E. Zabel & Robert W. Paterson, *The Effects of Critical Habitat Designation on Housing Supply: An Analysis of California Housing Construction Activity*, 46 J. REGIONAL SCI. 67 (2006).

118. *Id.* at 68.

indicates that, at least on the cost side, the designation of critical habitat matters in the market. I use the estimates of the magnitude of the costs of critical habitat in Part V to help calibrate the scope of benefit estimates.

Regulated industries and their trade associations tend to have strong incentives to quantify the estimated costs of proposed regulations and publicize those as part of their efforts to avoid or weaken regulatory restrictions.¹¹⁹ When it comes to the ESA and critical habitat designation, groups like the American Forest Products Association, the American Builders Association, and the Oil and Gas Production Alliance are likely to be vocal with their (perhaps exaggerated) estimates of the costs.¹²⁰ Because measuring costs is usually more straightforward than measuring benefits and there are already well-informed parties that have incentives to provide estimates of expected costs, I focus on the more vexing issue of how to measure *benefits* of ESA critical habitat.

B. Measuring Benefit Values of Listed Species

Following Circular A-4, the starting point for measuring the benefits of ESA regulation is to use estimates of what people are willing to pay for the survival and recovery of the listed species.¹²¹ The benefit of the existence and revival of species can be measured through willingness-to-pay studies.¹²² These studies use various techniques to elicit from members of a relevant

119. See ASHFORD & CALDART, *supra* note 76, at 156 (describing industry incentive to provide cost estimate and perhaps inflate estimates); Everett Rosenfeld, *Feds Take on Fracking: What Will it Cost Drillers?* CNBC (March 24, 2015), <https://perma.cc/259U-2HFH> (example of industry groups publicizing cost estimates in the popular media).

120. See Salzman, *supra* note 20, at 335–37; see also *Ariz. Cattle Growers' Ass'n v. Salazar*, 606 F.3d 1160, 1172 (9th Cir. 2010), *cert. denied*, 562 U.S. 1216 (2011) (upholding FWS's designation of critical habitat despite industry challenge to designation's economic impact); *Home Builders Ass'n of N. Cal. v. U.S. Fish & Wildlife Serv.*, 616 F.3d 983, 991 (9th Cir. 2010) (finding FWS's critical-habitat designation valid despite industry allegation that designation "failed to properly account for the economic impact . . .").

121. CIRCULAR A-4, *supra* note 97, § E(2).

122. See Leslie Richardson & John Loomis, *The Total Economic Value of Threatened, Endangered and Rare Species: An Updated Meta-Analysis*, 68 *ECOLOGICAL ECON.* 1535, 1535, 1539 (2008).

population how much they value a change in regulatory outcomes. When species are commercially valuable, such as salmon, estimates of benefits can be based on market prices.¹²³ More often, however, species are not traded on markets, and benefit estimates are derived using other methods.¹²⁴ Travel-cost studies look at how much people are willing to pay to travel to a particular place to have an experience interacting with a natural feature, such as how much a family is willing to pay to experience a whale sightseeing tour.¹²⁵ Willingness-to-pay for travel can be used to quantify how much people value the experience of seeing the whales.¹²⁶ This can give researchers a sense for how much people value the existence and success of the species itself.¹²⁷

Stated-preference studies use surveys to ask people from relevant populations how much they are willing to pay for changes in regulatory outcomes.¹²⁸ Stated-preference studies have the benefit of being flexible and allowing researchers to capture values for a range of species and scenarios, but the studies require careful attention to details like wording of questions.¹²⁹ Otherwise, estimates can vary greatly with small changes in methodology.¹³⁰ Despite this drawback, stated-preference surveys are the most common way to measure benefits of endangered species because they are the only way to capture values for some species.¹³¹ For example, there are no market

123. *Id.* at 1539, 1541.

124. *E.g., id.* at 1539 (another method includes benefit transfer).

125. See Matthew J. Kotchen & Stephen D. Reiling, *Estimating and Questioning Economic Values for Endangered Species: An Application and Discussion*, 15 ENDANGERED SPECIES UPDATE 77, 79 (1998).

126. See John Loomis, Shizuka Yorizane & Doug Larson, *Testing Significance of Multi-Destination and Multi-Purpose Trip Effects in a Travel Cost Method Demand Model for Whale Watching Trips*, 29 AGRIC. & RESOURCE ECON. REV. 183 (2000).

127. See *id.*

128. CIRCULAR A-4, *supra* note 97, § E(4) (“The distinguishing feature of [stated-preference studies] is that hypothetical questions about use or non-use values are posed to survey respondents in order to obtain willingness-to-pay estimates relevant to benefit or cost estimation.”).

129. See *id.*

130. Natural Resource Damage Assessments Under the Oil Pollution Act of 1990 – Appendix I: Report of the NOAA Panel on Contingent Valuation, 58 Fed. Reg. 4601, 4603–04 (Jan. 15, 1993) [hereinafter NOAA Panel Report].

131. See Luke M. Brander et al., *The Empirics of Wetland Valuation: A Comprehensive Summary and a Meta-Analysis of the Literature*, 33 ENVTL.

prices to signal the value of a commercially worthless species that people will never encounter. Yet those same people may care about the existence of a bird in the Arctic National Wildlife Refuge that fits this description, even if they never plan to travel there.¹³² If people care enough about that bird to pay money for its protection, then those values should count as benefits of regulatory protections for the bird.¹³³

Economists have estimated values of benefits for over forty different species.¹³⁴ The average respondent in the studies was willing to pay an amount (in 2003 dollars) ranging from roughly \$10 to save the Atlantic salmon in Maine to over \$200 to prevent the extinction of the humpback whale.¹³⁵ These studies can be used to calculate benefit values of protecting the species by extrapolating the survey responses over the relevant populations.¹³⁶

Existing studies that measure willingness-to-pay for species protection provide starting points to estimate the benefits of protecting a species' critical habitat. Although a new study for each species is ideal to estimate the benefits of protecting species, this can be cost and time prohibitive.¹³⁷ Fortunately, it is not necessary to conduct a new study for each species in each specific location; benefits transfer measures can lead to reasonable estimates of benefits of saving species that have not been directly studied.¹³⁸ OIRA's Circular A-4 recommends estimating benefits by using transfer calculations, which provide systematic ways to

& RESOURCE ECON. 223, 228–29 (2006) (describing estimating benefits of wetlands, which share many of the challenges—like a lack of observable market behavior—as measuring benefits of endangered species).

132. See Kotchen, *supra* note 125, at 78 (discussing how individuals derive “nonuse” value from simply knowing that a species is protected despite not having any live interaction with the species).

133. *Id.* at 78–79.

134. KRISTY WALLMO, NAT'L MARINE FISHERIES SERV., THREATENED AND ENDANGERED SPECIES VALUATION: LITERATURE REVIEW AND ASSESSMENT 1 (2002).

135. *Id.* at 7–10.

136. See Robert J. Johnston et al., *Contemporary Guidance for Stated Preference Studies*, 4 J. ASS'N ENVTL. & RESOURCE ECON. 319, 341 (2017).

137. EPA, GUIDELINES FOR PREPARING ECONOMIC ANALYSES 86 (2000).

138. *Id.* But see CIRCULAR A-4, *supra* note 97, § E(5) (stating that transfer benefits have a greater chance of uncertainty and should be used as a last resort with explicit justification).

gather estimates from different contexts and use them to estimate benefits in a new context.¹³⁹

C. Measuring Benefits Values of Habitats with Ecosystem Services

This section describes the importance of implementing economic analysis with a broad sense of benefits. Benefits of endangered species are not limited to the values people place on the listed species themselves, however. The ESA is intended to protect endangered species and the habitats upon which they depend.¹⁴⁰ The benefits of these protections should not be limited to the benefits of the species that are listed under the ESA; when ecosystems are conserved because of the ESA, the benefits that flow from those ecosystems to people should all be counted as benefits of the regulation. For critical-habitat designation, this can be done by using measures of ecosystem services like water filtration and carbon sequestration.¹⁴¹

One way to interpret the language of the ESA is to consider the economic benefits that flow from the listed species and the ecosystems that are conserved because of the listed species. The conflict between loggers and environmentalists in the Pacific Northwest is not just about the listed Northern Spotted Owl; it is also about how we choose to balance economic values of harvesting old-growth timber versus the values of preserving these ecosystems that are unlikely to reappear if destroyed. There is an imbalance in current valuation techniques where the full economic value of harvesting timber is measured but the value of protecting the old-growth forest is limited to the benefits that accrue to a few rare species. A reasonable way to gauge the benefits of endangered species and their habitats is to use economic valuation tools from other fields. Ecologists think of the

139. CIRCULAR A-4, *supra* note 97, § E(5) (explaining that benefit transfer involves transferring existing costs and benefits from other original studies and applying data in a new context).

140. See 16 U.S.C. § 1531(b) (2018) (“The purpose[] of [the ESA is] to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved . . .”).

141. See Claude Gascon et al., *The Importance and Benefits of Species*, 25 CURRENT BIOLOGY 431, 433 (2015) (describing unexpected benefits, such as water filtration and carbon sequestration, of protecting species and their habitats).

benefits that flow from ecosystems to people as ecosystem services.¹⁴² Economists use various techniques to put values on these streams of services.¹⁴³ Using existing estimates of ecosystem services, the FWS and NMFS can start to quantify the benefits from the ecosystems upon which endangered species depend.

When the EPA evaluates benefits of air or water regulations, it measures the benefits of reducing the pollutant at issue.¹⁴⁴ The agency also measures the benefits of lowering co-pollutants—other pollutants that are not the direct subject of a regulation but that are nevertheless predicted to decrease due to the regulation.¹⁴⁵ For example, with air regulations to limit emissions of NO₂ we also see drops in particulate matter and ground-level ozone.¹⁴⁶ Thus, the EPA estimates the benefits of lives saved both from reduced NO_x and from reduced ozone.¹⁴⁷

The FWS and NMFS should follow suit and measure co-benefits of conservation efforts to capture the full range of benefits of critical habitat designation. They have done this a few times in the past when multiple listed species have overlapping critical habitats, like with the Spotted Owl and salmon in the Pacific Northwest.¹⁴⁸ But this still fails to capture all the benefits of the regulations, just as the EPA failing to consider reductions in co-pollutants would not capture the full range of benefits for regulations that reduce NO_x. The most accurate way to record benefits of critical habitat protection is to measure the benefits of critical habitat to listed species but also factor in a category of benefits from the conserved ecosystems.

The most promising way to measure benefits of critical habitat designation is to use metrics of ecosystem services—

142. James Salzman, *Valuing Ecosystem Services*, 24 *ECOLOGY L.Q.* 887, 887–88 (1997).

143. For a survey of such valuation techniques, see Richardson & Loomis, *supra* note 126, at 1535, 1539.

144. See, e.g., EPA GUIDELINES, *supra* note 108, at 7-3 to 7-4 (describing how to determine benefit categories of standard EPA regulations).

145. EPA, FINAL REGULATORY IMPACT ANALYSIS (RIA) FOR THE NO₂ NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) 4-15 (2010), <https://perma.cc/Q8YK-Z8VS>.

146. *Id.*

147. *Id.*

148. See NORTHERN SPOTTED OWL ANALYSIS, *supra* note 81, at 2-4.

carbon sequestration, water filtration and retention, and recreational values of critical habitat—in addition to the existence values of the species themselves. These services greatly benefit people who enjoy clean air, filtered water, and scenic vistas.¹⁴⁹ Professor Gretchen Daily and others have quantified the value of some of these ecosystem services by combining economic and ecological tools.¹⁵⁰ Agencies can use these previously published valuations for ecosystem services to provide an estimate of the benefits that flow because of the protection of critical habitat for endangered species. Going forward, agencies can also encourage more valuation efforts of other ecosystem service benefits.

Not all of the benefits from ecosystems designated as critical habitat should be counted as benefits of such designation. Taken to an extreme, that estimate would approach the property value of the entire critical habitat areas. Paradoxically, if the government considers all of these values as conservation benefits, it would sometimes also have to count those same values as regulation costs because private landowners would be deprived of other intended uses of the property.¹⁵¹ But this paradox is avoided if only the benefit of additional conservation from critical-habitat designation for the endangered species is considered.¹⁵²

Measuring the benefits of an old-growth ecosystem in the Pacific Northwest is not a simple accounting task because most of these benefits are not traded on markets with prices.¹⁵³ Sometimes economists can estimate how those ecosystem services are used in production of goods and services in the market.¹⁵⁴

149. See Gascon et al., *supra* note 141, at 433–34.

150. See NATURAL CAPITAL: THEORY AND PRACTICE OF MAPPING ECOSYSTEM SERVICES 213 (Gretchen C. Daily et al. eds., 2012) [hereinafter NATURAL CAPITAL].

151. See Richard A. Epstein, *Babbitt v. Sweet Home Chapters of Oregon: The Law and Economics of Habitat Preservation*, 5 SUP. CT. ECON. REV. 1, 19–20 (1997) (explaining how the protection of endangered species and critical habitat under the ESA could preempt local zoning authority by limiting control over private and public development projects).

152. See *Seiber v. United States*, 364 F.3d 1356 (Fed. Cir. 2004) (rejecting a takings claim against FWS's rejection of petitioner's incidental take permit pursuant to FWS's designation of 40 out of petitioner's 200 acres of land as critical habitat).

153. See Gascon et al., *supra* note 141, at 431.

154. See NATURAL CAPITAL, *supra* note 150, at 44.

This can allow for backing out valuations that are based on market prices.¹⁵⁵ So for something like water filtration, economists might look at clean water as an input of industries that rely on water, such as agriculture, manufacturing, and recreation.¹⁵⁶ One of the ways to value something like water filtration is to look at what it would cost to filter it with human technology.¹⁵⁷ Ecosystem services can also be valued with stated-preference studies, much like the benefits of species existence.¹⁵⁸ Economists have used such studies to estimate the values of carbon sequestration, water filtration, and a range of other services. For example, Professor Edward Barbier has estimated and critiqued valuations of ecosystem services for coastal wetlands determined using stated-preference studies.¹⁵⁹

By accurately measuring the costs and benefits of critical habitat, the FWS and NMFS can focus conservation efforts on proposed actions that achieve high net benefits to society. This suggestion is more than a pipe dream because existing estimates of the values of species and ecosystem services can be used to improve the accuracy of economic analysis in the short term. In the long term, additional studies can provide more data points to allow for accurate quantification of costs and benefits for additional species and situations.

V. EXAMPLE: CRITICAL HABITAT FOR LOGGERHEAD TURTLES

This Part provides an example of how to implement the proposed benefit measures by examining the recent economic analysis for the Northwest Atlantic population segment of loggerhead turtles. As discussed below, the NMFS estimates the benefits of designating critical habitat along almost one third of the Atlantic coast of the United States to be approximately zero. I use existing estimates of the benefits of protecting the turtle and the value of ecosystem services provided by the critical habitat to calculate a more accurate estimate of the benefits that flow from

155. *Id.*

156. *Id.*

157. *Id.*

158. *See id.*

159. *See* Edward B. Barbier, *Valuing Ecosystem Services for Coastal Wetland Protection and Restoration*, 2 *RESOURCES* 213 (2013).

critical habitat designation. I estimate benefits of critical habitat designation for the North Atlantic population segment of loggerhead turtles to be at least \$106 million per year.

A. Current FWS Economic Analysis

Critical habitat consists of “specific areas” that are “essential to the conservation of the species.”¹⁶⁰ In the case of the loggerhead turtle, critical habitat includes the scenic coastal islands described above and the species of those islands that are connected to loggerhead turtles through the complex web of life.¹⁶¹ Loggerhead turtles also rely on the shallow waters and bays scattered along much of the Atlantic and Gulf coasts of the United States, so these marine ecosystems are proposed for designation as critical habitat by the NMFS.¹⁶² Also included in NMFS’s proposal for critical-habitat designation are the mid-ocean plateaus near which loggerhead turtles find much of their food.¹⁶³ In total, about half of the coastal zone of the Southeast is proposed critical habitat for loggerhead turtles under either FWS or NMFS control.¹⁶⁴ Therefore, much area and many important ecosystems are critical habitat for loggerhead turtles. However, since the incremental approach only looks at the costs and benefits of protections above a baseline of protections for listed species, the estimated benefits of loggerhead turtle critical habitat are negligible.¹⁶⁵

The FWS estimates the costs of critical habitat by looking at the expected administrative burdens of protecting critical habitat.¹⁶⁶ For the loggerhead turtle, this amounts to about

160. 16 U.S.C. § 1532(5)(A) (2018).

161. See *LOGGERHEAD ECON. ANALYSIS*, *supra* note 1, at 1-6.

162. See *id.* at ES-6 to 7.

163. See *id.* at ES-6.

164. See *id.* at 1-12 to 13. For species like the loggerhead turtle that pass through both marine and coastal environments during their life cycles, the FWS and NMFS coordinate their regulation in ways that are in the best interests of the species. See JOHN COPELAND NAGLE, J.B. RUHL & KALYANA ROBBINS, *THE LAW OF BIODIVERSITY AND ECOSYSTEM MANAGEMENT* 141-42 (2013); see also MOU Between the EPA, FWS, and NMFS Regarding Enhanced Coordination Under the Clean Water Act and the ESA, 66 Fed. Reg. 11,202, 11,208 (Feb. 22, 2001).

165. See discussion of the incremental approach *supra* p. 316-20.

166. See *LOGGERHEAD ECON. ANALYSIS*, *supra* note 1, at ES-7.

\$110,000 per year.¹⁶⁷ Benefits are estimated to be unclear but negligible because there is considerable overlap between protections of listed species and critical habitat.¹⁶⁸ Hypothetical benefits are mentioned and described qualitatively but are not quantified.¹⁶⁹

B. More Accurate Economic Analysis of Loggerhead Turtle Critical Habitat

As discussed in Part IV, there are advantages to measuring costs and benefits of proposed regulations using methods that accurately reflect how society values the expected changes due to the regulation. A more accurate estimate of the benefits of critical habitat for the loggerhead turtle adds the values of better outcomes for loggerhead turtle to values of other ecosystem services that are preserved or improved by the critical habitat designation.

There are two existing studies of willingness-to-pay for conservation of loggerhead turtles. Wallmo and Lew use a stated preference choice experiment on a national representative sample to estimate a household willingness to pay of \$48.75 (in 2018 dollars) per year to have loggerhead turtles recover to the point of not needing endangered or threatened status.¹⁷⁰ Aggregated over roughly 117 million households in the United States,¹⁷¹ this leads to a total annual benefit of nearly \$5.7 billion. Since the North Atlantic population segment has 41.8% of the world's loggerhead turtles,¹⁷² the benefit of saving the relevant population segment of loggerheads is \$2.4 billion per year.

Whitehead uses a contingent valuation model that accounts for uncertainty in recovery status of loggerhead turtles, finding that the median North Carolina household is willing to make a

167. *Id.*

168. *See id.* at ES-10.

169. *See id.*

170. Kristy Wallmo & Daniel K. Lew, *Public Willingness to Pay for Recovering and Downlisting Threatened and Endangered Marine Species*, 26 CONSERVATION BIOLOGY 830, 836 tbl.3 (2012) (expressing values in 2011 dollars).

171. U.S. CENSUS BUREAU, UNITED STATES QUICKFACTS (2017), <https://perma.cc/3Y9Z-A8Y7>.

172. *Caretta caretta (Loggerhead Turtle)*, IUCN RED LIST, at tbl.2 (2017), <https://perma.cc/3QXY-2CYR>.

one-time payment of \$59.62 to reduce the probability of extinction to zero for the next twenty-five years for loggerhead turtles.¹⁷³ Assuming this response can be extrapolated to the other states that include loggerhead critical habitat, this leads to an estimated willingness to pay for loggerhead turtles of \$1.14 billion, or \$45.6 million per year.¹⁷⁴ Taken together, the studies indicate a substantial range of willingness-to-pay estimates for loggerhead turtles from \$45.6 million per year to \$1.8 billion per year. To address concerns that stated preference studies may tend to overestimate willingness-to-pay,¹⁷⁵ I use the lower estimate in the range.

As discussed in Part IV, the benefits of critical habitat designation should not be limited to the listed species but should also include benefits of ecosystem services of the critical habitat. Economists, often teamed with ecologists, have estimated valuations of ecosystem services for wetlands using stated-preference studies.¹⁷⁶ Costanza et al. estimate that the ecosystem service of reducing storm surge provides an annual benefit of approximately \$9,671 per hectare of coastal wetland.¹⁷⁷ With approximately 282,426 hectares of coastal wetlands in the states covered by the loggerhead analysis,¹⁷⁸ this amounts to \$2.7 billion in annual benefits. Sandy intertidal beaches provide the ecosystem service of stabilizing sediment,¹⁷⁹ which Huang et al. estimated to be worth around \$5.45 annually per household per mile of shore.¹⁸⁰ The loggerhead analysis covers 1,300 miles of

173. John C. Whitehead, *Ex Ante Willingness to Pay with Supply and Demand Uncertainty: Implications for Valuing a Sea Turtle Protection Programme*, 24 APPLIED ECON. 981, 984 (1992) (estimating willingness to pay as \$33.22 in 1992 dollars, converted to 2018 dollars using the Consumer Price Index).

174. \$59.62 per household × 19.1 million housing units in North Carolina, South Carolina, Georgia, Florida, and Alabama. U.S. CENSUS BUREAU, *supra* note 171.

175. See NOAA Panel Report, *supra* note 130, at 4603–04.

176. See Barbier, *supra* note 159.

177. Robert Costanza et al, *The Value of Coastal Wetlands for Hurricane Protection*, 37 AMBIO 241, 245 (2008) (Table 3 estimate of mean value of \$8,236 per hectare in 2008 dollars converted to 2018 dollars using the Consumer Price Index).

178. *Id.* (using wetland area of the average storm swath for Alabama, Florida, Georgia, South Carolina, and North Carolina from Table 3).

179. W.J. MITSCH & J.G. GOSSELINK, WETLANDS AND COASTS 166 (3d ed. 2000).

180. Ju-Chin Huang, P. Joan Poor & Min Qiang Zhao, *Economic Valuation of Beach Erosion Control*, 22 MARINE RESOURCE ECON. 221, 235 (2007) (listing

beaches and 19.1 million households, resulting in \$135 million in annual benefits.

But not all of these turtles, beaches, and wetlands would be destroyed without critical habitat designation, so we must determine how much would have been protected in a no-action alternative. As discussed in Part II, the increment of protections of critical habitat has to be measured against the baseline of what would have been protected in a no-action alternative.¹⁸¹ The Zabel and Paterson results discussed in Part IV suggest that critical habitat designation can lead to a 37% drop in construction activity.¹⁸² Although this estimate is looking at the cost side of critical habitat designation, there is a close link between the opportunity costs of foregone development and the benefits of preserving an area as critical habitat. Namely, foregone development is likely to result in more natural environments and vice versa. Using this as a rough proxy of the impact of critical habitat on conservation behavior and discounting by a factor of ten because not all development will result in complete destruction of coastal amenities, I estimate that 3.7% of the values discussed above would be protected because of critical habitat designation. This results in a preliminary estimate of the benefits of critical habitat designation for loggerhead turtles in the Southeast of \$106 million per year.¹⁸³

As studies provide valuations of additional services like shoreline recreation, the estimates of benefits can include those quantified ecosystem services as well. For now, the benefit measures can be thought of as lower bounds on the measures of benefits that flow from critical habitat. The estimate of \$106 million per year of critical habitat for the North Atlantic population segment of loggerhead turtle more accurately reflects

their preferred estimate for economic benefit per mile per household as \$4.45 in 2007 dollars, converted to 2018 dollars using the Consumer Price Index).

181. *See supra* Part II.D.

182. *See* Zabel & Paterson, *supra* note 117, at 68.

183. This was calculated by summing the conservative estimated benefit of saving loggerhead turtles (\$45.6 million per year), the estimated benefit of reduced storm surge (\$2.7 billion per year), and the estimated benefit of shore stabilization (\$135 million per year), and then multiplying that sum by the estimated protection factor afforded by critical-habitat designation (0.037).

social preferences for turtles and benefits of coastal areas than the FWS estimate of approximately zero benefit for this designation.

VI. CONCLUSION

This Part concludes with a discussion of how accurate economic analysis of critical habitat designation can help improve the discourse about the ESA by focusing the discussion on the tradeoffs that are at the heart of the Act.

As discussed above, the FWS and NMFS should engage in more accurate economic analysis when designating critical habitat under the ESA—it is a better fit with the language of the statute and can help lead to more effective regulations. Following these suggestions would put the FWS and NMFS more in line with White House guidance and practices of other agencies that implement environmental laws. FWS and NMFS have made policy choices to 1) only consider incremental effects of critical habitat; and 2) value only the benefits that come from the listed species themselves. I argue that the agencies should reverse course on these two policies and promulgate a new rule that establishes a methodology of economic analysis that fulfills Congress's call to consider economic factors when designating critical habitat.¹⁸⁴ Benefits should be measured by looking at the value of listed species and the value of ecosystem services protected through critical habitat designation.

As seen with the example of the economic analysis of the loggerhead turtle, the tools for more accurate economic analysis are within reach. Current practices of the FWS and NMFS do not accurately capture the real costs and broad benefits that reflect social feelings about the tradeoff between conservation and development. Additionally, economic analysis can be a tool that allows the FWS and NMFS to keep conserving beautiful places but remove the worst of the burdens on landowners. By focusing first on regulations that provide large net benefits, the agencies can avoid some of the extreme results that prompt pushback to the ESA.

Climate change is likely to increase the stakes of endangered species regulation by straining both ecological and economic

184. *See* 16 U.S.C. § 1533(b)(2) (2018).

systems. With this additional stress, it will be crucial for the FWS and NMFS to be able to point to how their proposed regulations are benefiting society. Although some find it distasteful to try to put a price on nature, failing to do so often means that only opponents of conservation have numbers to wave in front of Congressional committees and the press. If the agencies that implement the ESA engage in accurate cost-benefit analysis, all sides of the argument can have more information to use when making decisions about how to best balance the conservation of resources against other social goals. Agency actions can be more transparent by clearly laying out proposed actions, alternatives, and estimated costs and benefits.

All of these factors can help improve the discourse about the ESA by shifting from arguments about owls versus jobs to meaningful discussions about how to use ecosystems that are critical to improving outcomes for species and provide valuable products and services to people. Both the turtles and tourists on the beach can better enjoy the beautiful landscapes of Cape Hatteras—and hundreds of other places in the United States—with the help of accurate economic analysis that promotes effective protection of critical habitats.