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**Re: Comments by the Society for Conservation Biology’s North America Section Regarding the Economic Analysis of the Revised Critical Habitat for the Northern Spotted Owl.**

On behalf of the Society for Conservation Biology and its North America Section (SCB),<sup>1</sup> we offer the following comments on the **economic analysis** of the proposal to revise the critical habitat of the Northern Spotted Owl (*Strix occidentalis caurina*) under the Endangered Species Act (ESA).<sup>2</sup> The U.S. Fish and Wildlife Service has proposed to designate 13.9 million acres across three States as critical habitat for the Northern Spotted Owl (NSO). Under the ESA, no Federal agency action may destroy or adversely modify the critical habitat of a threatened or endangered species. Our comments here complement our comments on the biological and legal aspects of the critical habitat proposal.<sup>3</sup>

Over forty years ago, Congress passed the National Environmental Policy Act, which instructed all agencies to “identify and develop methods and procedures...which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision-making along with economic and technical considerations.”<sup>4</sup> Despite the rapid advances in ecological economics, and economics generally, to quantify environmental benefits and values, the U.S. Fish and Wildlife Service (FWS) has yet to develop methodologies for even general approximations of environmental benefits, including ecosystem services, when it makes decisions directly affecting the biodiversity and natural capital of the United States. We have concerns that by conducting economic analyses that do not attempt to quantify environmental benefits and ecosystem services, the FWS is not employing the best available economic science regarding the benefits that endangered species and their critical habitat provide. By failing to apply the best available economic science, FWS undervalues the economic benefits of critical

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<sup>1</sup> SCB is an international professional organization whose mission is to advance the science and practice of conserving the Earth’s biological diversity, support dissemination of conservation science, and increase application of science to management and policy. The Society’s 5,000 members include resource managers, educators, students, government and private conservation workers in over 140 countries.

<sup>2</sup> *Revised Critical Habitat for the Northern Spotted Owl*, 77 Fed. Reg. 14,062 (Mar. 8, 2012) (hereafter “REVISED CRITICAL HABITAT”).

<sup>3</sup> SCB’s comments on the critical habitat proposal itself can be found at [www.conbio.org/policy](http://www.conbio.org/policy)

<sup>4</sup> 42 U.S.C. § 4332(B) (2000)

habitat and overestimates the economic costs of designating such habitat, resulting in decisions that ultimately may lead to long-term harm to endangered species, the environment, and society.

We are equally concerned that the FWS, together with the Department of Interior (DOI), continue to follow outdated policy guidance from the White House Office of Management and Budget (OMB) regarding how to perform cost-benefit analyses (CBA). OMB's 2003 policy guidance, known as Circular A-4, provides a minimum set of best practices for conducting CBAs.<sup>5</sup> However, Circular A-4 is not a ceiling for what may be incorporated into a CBA, rather it is merely a floor upon which agencies are free to develop more sophisticated analytical methodologies for conducting such analyses.<sup>6</sup> Because the Endangered Species Act contains a best available science mandate,<sup>7</sup> and because President Obama's Scientific Integrity memorandum states that "science and scientific process must inform and guide decisions of my Administration on a wide range of issues, including...protection of the environment,"<sup>8</sup> the FWS has a duty to ensure that the best economic science is used in every economic analysis that it performs regarding threatened and endangered species. This comment letter addresses the shortcomings of the FWS's draft economic analysis for the revised critical habitat proposal for the NSO, and provides a road map for how FWS and the DOI can improve future economic analyses that are related to decisions impacting biodiversity and natural capital in the United States.

The FWS's proposed revision to the NSO's critical habitat is a particularly complex rulemaking. In the draft proposal, the FWS has identified 14 million acres of potential critical habitat for the NSO. This proposal discusses several alternatives that would lower the total acreage of designated critical habitat for the spotted owl, including one that would reduce the total amount of critical habitat designated in order to "[impose] the least burden on society, and on maintaining flexibility and freedom of choice for the public."<sup>9</sup> Our comments primarily focus on how current analyses undertaken by the FWS fails to value the benefits of ecosystem services, and therefore present an incomplete picture of which approach really imposes the least burden on society over the long term.

Other areas of the proposed revision are also controversial, including (1) a proposal to utilize "active forestry" techniques (including commercial timber harvesting) to manage spotted owl critical habitat, (2) a proposal to control and remove Barred Owl populations in the Pacific Northwest, and (3) a proposal regarding the size and scale of possible forestry (e.g., timber harvesting) activities that will trigger "adverse modification" of spotted owl critical habitat.<sup>10</sup> SCB

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<sup>5</sup> OMB Circular A-4: Regulatory Analysis (2003). Available at: [http://www.whitehouse.gov/omb/circulars\\_a004\\_a-4](http://www.whitehouse.gov/omb/circulars_a004_a-4)

<sup>6</sup> For example, National Center for Environmental Economics within the Environmental Protection Agency's Office of Policy has developed a 200 page Guidelines for Preparing Economic Analyses. Available at: <http://yosemite.epa.gov/ee/epa/eed.nsf/pages/guidelines.html>

<sup>7</sup> 16 U.S.C. § 1533(b). Section 4(b)(2) begins "The Secretary shall designate critical habitat, and make revisions thereto, under subsection (a)(3) 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." It goes on to say that the Secretary *may* exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of critical habitat unless ... that failure to designate... will result in the extinction of the species.

<sup>8</sup> Mar 9, 2009 White House Memorandum for the Heads of Executive Departments and Agencies: Scientific Integrity. Available at: <http://www.whitehouse.gov/sites/default/files/microsites/ostp/scientific-integrity-memo-12172010.pdf>

<sup>9</sup> REVISED CRITICAL HABITAT at 14,068.

<sup>10</sup> *Id.* at 14,071-14,072.

submitted joint comments with The Wildlife Society and the American Ornithologists' Union on June 6<sup>th</sup>, 2012, regarding the FWS's proposal to conduct Barred Owl removal experiments in spotted habitats.<sup>11</sup> SCB, TWS, and AOU also submitted a letter to Secretary Salazar on April 2<sup>nd</sup>, 2012 requesting that the DOI complete an Environmental Impact Statement to assess the impacts and efficacy of "active forestry" in the forests of the Pacific Northwest.<sup>12</sup> A peer review of the science underlying the proposed critical habitat designation is being conducted jointly with The Wildlife Society and the American Ornithologists' Union. To preserve the scientific integrity of the peer review, the names of those scientists participating in the joint peer review by the three scientific societies have not been revealed to the SCB policy office, and their work product has not been coordinated with the policy office.

Section 4(b)(2) of the ESA gives the FWS the discretion, not a duty, to exclude habitat from a final critical habitat designation if it determines that the benefits of exclusion outweigh the benefits of specifying an area as critical habitat.<sup>13</sup> This is because the duty to conserve and recover requires leaving a precautionary margin for error in favor of the species. SCB believes, furthermore, that a full assessment of the ecosystem services that the forest habitats of the Northern Spotted Owl provide would clearly demonstrate the overwhelming benefits that inclusion within the critical habitat would entail over the minimal benefits of excluding that critical habitat. Accordingly, SCB recommends that the FWS not exclude any acreage from the final critical habitat designation for the NSO based on its authority under Section 4(b)(2). The comments offered here focus primarily on the policy issues surrounding the FWS and DOI's failure to use the best available economic science for assessing the costs and benefits of critical habitat pursuant to Section 4(b)(2).

## **I. Introduction to the Endangered Species Act, Critical Habitat, and Traditional Cost-Benefit Analysis.**

### **A. The Purpose and Goals of the Endangered Species Act.**

The Endangered Species Act (ESA) is "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation" and has been successful in preventing hundreds of species from going extinct since its enactment in 1973.<sup>14</sup> As was famously explained by the Supreme Court, the "plain intent of Congress in enacting this statute was to halt and reverse the trend toward species extinction, *whatever the cost*. This is reflected not only in the stated policies of the Act, but in literally every section of the statute."<sup>15</sup> The reason that every effort should be made to prevent the extinction of endangered species can be summed up by the statement made by Congress when it passed the Act: "The value of this genetic heritage is, quite literally, *incalculable*.... They are keys to puzzles which we cannot solve, and may provide answers to questions which we have not yet learned to ask."<sup>16</sup>

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<sup>11</sup> The joint comment letter on barred owls is available at [www.conbio.org/policy](http://www.conbio.org/policy)

<sup>12</sup> The joint letter to Secretary Salazar is available at [www.conbio.org/policy](http://www.conbio.org/policy)

<sup>13</sup> 16 U.S.C. § 1533(b)(2).

<sup>14</sup> *Tennessee Valley Authority v. Hill*, 437 U.S. 153, 180 (1978).

<sup>15</sup> *Id.* at 184 (emphasis added).

<sup>16</sup> H.R. Rep. No. 93-412, at 4 (1973) (emphasis added).

SCB believes that the value of any particular threatened or endangered species cannot and should not be reduced to a monetary valuation. Each species on the planet represents a priceless piece of a larger ecosystem that can never be replaced, and has an intrinsic right, recognized and codified by Congress, to continue to exist. The decision by Congress to have the FWS make listing decisions solely on the basis of the best available science—and to exclude any consideration of economic impacts from this decision—is in part a reflection of this view of the value of endangered species.<sup>17</sup>

However, it is equally important to recognize that the protection of endangered species provides many direct and indirect economic benefits to society as well by helping to preserve key ecosystems and the services that these ecosystems provide. In fact, the stated purpose of the Endangered Species Act is to “provide a means whereby ecosystems upon which endangered species and threatened species depend may be conserved.”<sup>18</sup> As Congress explained:

Clearly it is beyond our capability to acquire all the habitat which is important to those species of plants and animals which are endangered today, without at the same time dismantling our civilization. On the other hand, there are certain areas which are critical which can and should be set aside. It is the intent and purpose of this legislation to see that our ability to do so, at least within this country is maintained.<sup>19</sup>

Protecting threatened and endangered species requires that habitat be managed in a way such that human activities do not jeopardize the survival or recovery of these species. While this does not mean that all human activities are restricted within critical habitat, the designation does make it less likely that such activities will impact the ability of such habitat to provide ecosystem services into the future. Significant benefits derive from the preservation of natural habitats and the services they provide to society. In a 1997 study published in *Nature*, the annual value of all ecosystem services was estimated to be between \$16-54 trillion/year, surpassing the annual global gross domestic product at that time.<sup>20</sup> Since that time, the field of ecological economics has continued to grow and develop, in part to help quantify these ecosystem services such that when policy decisions must be made regarding the management of natural habitats, decision makers can properly assess the full impacts of their actions.

#### B. Critical Habitat Under the Endangered Species Act.

The original 1973 ESA required that all federal agencies, in consultation with the FWS, ensure that any of their actions will not jeopardize the continued existence, or destroy or adversely modify any critical habitat of any species listed as endangered or threatened. However, it was not until the 1978 amendments to the ESA that Congress defined the term “critical habitat” and set forth a process by which the FWS would designate critical habitat for threatened and endangered species. The 1978 amendments resulted in part from the controversy relating to the nearly complete Tellico Dam project, which threatened to destroy the critical habitat of the endangered snail darter, a fish only found in a few rivers in Tennessee. In a series of decisions going all the

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<sup>17</sup> 16 U.S.C. § 1534(b).

<sup>18</sup> 16 U.S.C. § 1531(b)

<sup>19</sup> H.R. Rep. No. 93-412, at 4 (1973).

<sup>20</sup> R. Costanza et al., *The Value of the World's Ecosystem Services and Natural Capital*, 387 *Nature* 253 (1997).

way to the Supreme Court, the Tennessee Valley Authority was prohibited from completing the Tellico Dam, and thus destroying the critical habitat of the snail darter, because the ESA “admits of no exception” when it comes to the possible extinction of a threatened or endangered species.<sup>21</sup> In response, Congress clarified several provisions within the ESA regarding critical habitat.

First, it defined “critical habitat” as those areas in “which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection.”<sup>22</sup> Second, it retained the general prohibition originally found in the 1973 Act by establishing Section 7(a)(2) of the ESA, which reaffirmed the requirement that all agencies of the federal government avoid agency actions that would “jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [critical] habitat.”<sup>23</sup> The Section 7(a)(2) prohibition requires all Federal agencies to consult with the FWS whenever a proposed action might destroy or adversely modify critical habitat, and requires the FWS to recommend Reasonable and Prudent Alternatives to the proposed action that would avoid such harm. Third, Congress added Section 4(b)(2) to the ESA, and set forth the process by which FWS designates critical habitat:

The Secretary shall designate critical habitat, and make revisions thereto...on the basis of the best scientific data available and after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. The Secretary may exclude any area from critical habitat if he determines *that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat*, unless he determines, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the *extinction* of the species concerned.<sup>24</sup>

There are two important points to make about this provision of the ESA. First, the FWS may not exclude any area if such exclusions would result in the extinction of a threatened or endangered species. This reaffirms the overarching goal of the ESA to prevent extinction at whatever the cost. Second, this section of the ESA makes clear that the FWS needs to consider the economic impact of designating any particular area as critical habitat, and that it retains the *discretion* to exclude critical habitat if the benefits of exclusion outweigh the benefits of inclusion of an area as critical habitat. However, it is important to recognize that this language does not constrain in any way *how* the FWS might consider the benefits of designating an area as critical habitat, nor does it establish a duty to exclude on the basis of differences in cost-benefit ratios. In fact, we believe that the phrases “benefits of specifying such area as part of the critical habitat” together with “any other relevant impact” should be interpreted broadly to include the values of those ecosystem services, and the benefits that flow from them, as a result of lands being protected as critical habitat. Nor does this language limit the consideration of critical habitat solely to the conventional economic impacts that have been heretofore considered by FWS. Most critically, nothing in Section 4(b)(2) suggests that the overarching goals of preventing extinction, preserving the ecosystems upon which threatened and endangered species depend, or utilizing the best

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<sup>21</sup> *Tennessee Valley Authority v. Hill*, 437 U.S. 153, 173 (1978).

<sup>22</sup> 16 U.S.C. § 1532(5)(A)(i).

<sup>23</sup> 16 U.S.C. § 1536(a)(2).

<sup>24</sup> 16 U.S.C. § 1533(b)(2) (emphasis added).

available science in decision making regarding endangered species should be compromised to accommodate economic impacts of designating critical habitat.

Thus, SCB believes that *both* considerations of economic impacts and the benefits of designating critical habitat must be based on the best available economic science with respect to decisions regarding biodiversity. Such an approach would be consistent, not only with the ESA's statutory mandates, but also with the March 9, 2009 Executive Order on Scientific Integrity, which states that "science and the scientific process must inform and guide decisions of my Administration on a wide range of issues, including...protection of the environment."<sup>25</sup> We recognize that since 2001 with the 10<sup>th</sup> Circuit decision in *Cattle Growers Association v. U.S. Fish and Wildlife Service*,<sup>26</sup> the FWS has been compelled to conduct much more extensive economic analyses of the impacts of critical habitat than it had prior to 2001. This decision required the FWS to conduct "a full analysis of all of the economic impacts of a critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes."<sup>27</sup> Partly as a result of this decision, FWS has increasingly relied on traditional cost-benefit analysis to meet the mandates of Section 4(b)(2). And, to the extent that the agency has discretion to conduct a formal CBA to meet that mandate and comply with the holding in *Cattle Growers*, we respect that policy choice. However, FWS may *not* ignore peer-reviewed economic research and developments in the fields of ecological economics when it conducts CBAs because the scientific field of ecological economics speaks *directly* to the issue of weighing the costs and benefits of actions that impact biodiversity. Nor may FWS limit the analysis of the benefits flowing from ecosystem services as a result of designating critical habitat, since the ESA requires FWS to expressly consider those benefits. For these reasons, we are concerned by actions taken by the FWS, the DOI, and the White House with respect to the designation of critical habitat for the Northern Spotted Owl because, as will be discussed below, these actions appear to be embracing outdated conceptions of how to evaluate the economic impacts of critical habitat, thus violating the best available science mandate of the ESA and the Scientific Integrity policy of the White House.

C. OMB Guidance on Cost Benefit Analysis, OIRA Guidance on Cumulative Economic Impacts, and White House Memorandum on Spotted Owl Critical Habitat.

In 1993, President Clinton signed Executive Order 12866, Regulatory Planning and Review, which required each agency of the federal government, among other things, to "assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs."<sup>28</sup> To assist agencies in complying with EO 12866, the White House Office of Management and Budget (OMB) developed "best practices" guidelines in 1996 for conducting CBAs. These guidelines, currently called Circular A-4, were revised in 2000 and then again in 2003.<sup>29</sup> To perform a regulatory analysis, a federal agency must (1) explain how the regulatory action required by the rule is linked to the expected

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<sup>25</sup> The White House. *Memorandum for the Heads of Executive Departments and Agencies: Scientific Integrity* (Mar 9, 2009).

<sup>26</sup> 248 F.3d 1277 (10<sup>th</sup> Cir. 2001).

<sup>27</sup> *Id.* at 1285.

<sup>28</sup> Executive Order 12866, Regulatory Planning and Review, Sept. 30, 1993.

<sup>29</sup> OMB Circular A-4 at 2.

benefits, (2) identify a baseline to analyze costs and benefits, and (3) identify the expected undesirable side-effects and ancillary benefits of the proposed regulatory action and the alternatives.<sup>30</sup> Circular A-4 defines the baseline as the “best assessment of the way the world would look absent the proposed action.”<sup>31</sup> Any impacts that are incremental to that baseline are attributable to the proposed regulation and, to meet the standards of EO 12866, must be lower than the benefits of such regulation action.

We focus our comments on Circular A-4 because they guide the cost-benefit analyses that FWS performs regarding critical habitat. In the draft *Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl* (hereafter “Draft EA”) the FWS states that “the U.S. Office of Management and Budget’s (OMB) guidelines for best practices concerning the conduct of economic analysis of Federal regulations direct agencies to measure the costs of a regulatory action against a baseline.”<sup>32</sup> Circular A-4 is referenced dozens of times throughout the Draft EA and serves as the analytical guide for the FWS cost-benefit analysis. Therefore, it is appropriate to first consider whether Circular A-4 is sufficient with respect to CBAs addressing biodiversity policy issues.

As will be discussed in greater detail in Section III, Circular A-4 contains several generic economic assumptions that may have unintended consequences with respect to policy decisions affecting biodiversity and ecosystem services. First, Circular A-4 over-simplifies the baseline upon which a cost-benefit analysis is derived because it gives agencies permission to avoid quantifying benefits such as “ecological gains, improvements in quality of life, and aesthetic beauty” where such benefits are “difficult to quantify.”<sup>33</sup> Second, Circular A-4’s use of a 3% and a 7% discount rate is inconsistent with the proper valuation of ecosystem services.<sup>34</sup>

This first point is especially important because, in general, the FWS concludes that ecosystem benefits of critical habitat fall into the “difficult to quantify” category, and regularly states in its economic analyses of critical habitat, including the 2012 Draft EA for the spotted owl that, “Rather than rely on economic measures, the Service believes that the direct benefits of the proposed rule are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.”<sup>35</sup> While SCB agrees that the benefits of designating critical habitat are mostly biological—by protecting habitat needed to recover threatened and endangered species—there are benefits that can be quantified in a straightforward manner using well-accepted economic techniques that should be incorporated into these economic analyses. To put it simply, the basic CBA conducted by the FWS following the outlines of Circular A-4 is not sufficient to capture the benefits of ecosystem services provided by critical habitat. While these techniques may provide a starting point for such analysis, Circular A-4 is simply too generalized to be used uncritically. SCB believes that the field of ecological economics is now sufficiently robust and that its scientific techniques for analysis must be incorporated into the FWS’s economic analyses.

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<sup>30</sup> OMB Circular A-4 at 2.

<sup>31</sup> OMB Circular A-4 at 15.

<sup>32</sup> Draft *Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl* (hereafter “Draft EA”), prepared by Industrial Economics, Incorporated. May 29, 2012. Available at: <http://www.fws.gov/oregonfwo/Species/Data/NorthernSpottedOwl/Documents/DraftEconAnalysis.5.29.12.3.pdf>

<sup>33</sup> OMB Circular A-4 at 27.

<sup>34</sup> OMB Circular A-4 at 33.

<sup>35</sup> Draft EA at 2-14.

In addition to Circular A-4, the Obama administration has embarked on a process to “improve regulation and regulatory review.”<sup>36</sup> In Executive Order 13563, President Obama stated that “to the extent permitted by law, each agency must, among other things: (1) propose or adopt regulations only upon a reasoned determination that its benefits justify its costs.”<sup>37</sup> This new Executive Order built upon EO 12866 and added new requirements that agencies “identify and consider regulatory approaches that reduce burdens and maintain flexibility and freedom of choice for the public.” As mentioned above, the NSO critical habitat proposal states that additional lands may be excluded from the final critical habitat determination based on the principles contained in EO 13563 if exclusion reduces these burdens or maintains this “freedom of choice.” The language contained in the critical habitat proposal was further strengthened by an unprecedented Presidential Memorandum to the Secretary of the Interior which requires the FWS to “give careful consideration to providing the maximum exclusion from the final revised critical habitat, consistent with applicable law and science.”<sup>38</sup>

## **II. An Ecological Economics Approach for Valuing Ecosystem Services and Existing Efforts to Quantify These Benefits.**

### **A. Global Efforts to Incorporate Ecosystem Services into Decision-making.**

In 2000, the United Nations called for an assessment of the consequences of ecosystem change as it relates to human well-being.<sup>39</sup> This Millennium Ecosystem Assessment (MEA) involved the work of more than 1,360 experts worldwide, and provided the most up-to-date, rigorous, scientific appraisal of the condition and trends in the world’s ecosystems and the services they provide. The MEA defined “ecosystem services” as:

the benefits people obtain from ecosystems. These include *provisioning services* such as food, water, timber, and fiber; *regulating services* that affect climate, floods, disease, wastes, and water quality; *cultural services* that provide recreational, aesthetic, and spiritual benefits; and *supporting services* such as soil formation, photosynthesis, and nutrient cycling. The human species, while buffered against environmental changes by culture and technology, is fundamentally dependent on the flow of ecosystem services.<sup>40</sup>

The MEA found that 15 of the 24 ecosystem services examined are being degraded or used unsustainably, including fresh water; capture fisheries; air and water purification; and the regulation of regional and local climate, natural hazards, and pests. The full costs of the loss and degradation of these ecosystem services are difficult to measure. Human actions are depleting

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<sup>36</sup> Executive Order 13563, Jan. 18 2011. Available at: [http://www.whitehouse.gov/sites/default/files/omb/inforeg/eo12866/eo13563\\_01182011.pdf](http://www.whitehouse.gov/sites/default/files/omb/inforeg/eo12866/eo13563_01182011.pdf)

<sup>37</sup> *Id.*

<sup>38</sup> The White House. Memorandum for the Secretary of Interior. *Proposed Revised Habitat for the Spotted Owl: Minimizing Regulatory Burdens*. Feb. 28, 2012.

<sup>39</sup> Kofi A. Annan, Secretary-General of the United Nations. 2000. ‘*We the Peoples’ The Role of the United Nations in the 21<sup>st</sup> Century*. Available at: <http://www.un.org/millennium/sg/report/full.htm>

<sup>40</sup> Millennium Ecosystem Assessment. 2005. *Ecosystems and Human Well-Being: Synthesis Report* at v. Available at: <http://www.maweb.org/documents/document.356.aspx.pdf>



Earth's natural capital, putting such strain on the environment that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted.

Over the last several years, there has been growing attention worldwide to quantifying ecosystem services and accounting for their value in decision-making. Significantly, in 2007, the G8+5, hosted by the UN Environment Programme, launched The Economics of Ecosystems and Biodiversity (TEEB) Study, which enlisted over 500 experts in science, economics, and policy to assess the economic costs of ecosystem degradation and biodiversity loss and to recommend potential solutions. The result was a compelling economic case for the protection of nature. The numbers are impressive: Halving deforestation rates by 2030 would avoid climate-change related damages estimated at more than \$US 3.7 trillion; unsustainable fishing practices cost global marine fisheries \$US 50 billion each year; and the economic value of insect pollination worldwide is estimated at €153 billion (\$US 240 billion). Despite their magnitude, these hidden costs and benefits are routinely ignored in economic policy-making decisions. This represents a potentially significant market failure that must be addressed. As the TEEB report concludes:

One should not shy away from providing the best available estimates of value for a given context and purpose and seeking ways to internalize that value in decision making. Indeed, the TEEB study calls for assessing and internalizing such values wherever and whenever it is practical and appropriate to do so. A failure to do so is unacceptable: namely, to permit the continued absence of value to seep further into human consciousness and behaviour, as an effective 'zero' price, thus continuing the distortions that drive false trade-offs and the self-destructiveness that has traditionally marked our relationship with nature."<sup>41</sup>

The TEEB Study demonstrates that when governments account for the value of ecosystem services, the results can be good for both people and the environment: For example, instead of building an expensive new water treatment plant, New York City authorities opted instead to restore the polluted Catskill watershed, which had once provided natural water purification services to the city. The city authorities paid landowners in the Catskill Mountains to improve land management and prevent waste and nutrient run-off from reaching water sources. This decision saved the city billions up front, as well as annual savings of the \$300-\$500 million that would have been needed each year to pay the operating costs of the would-be treatment plant.<sup>42</sup>

Meanwhile, the World Bank-led partnership for Wealth Accounting and the Valuation of Ecosystem Services (WAVES), launched in 2010, is looking to include natural capital in countries' national accounts. WAVES is the second effort of World Bank to include natural capital in countries' national accounts. During the mid-late 1990s, the World Bank, in its annual "World Development Indicators," included estimates of a form of "green" national accounting, which it called "Genuine Domestic Savings" among other titles, for most countries in the world. Natural capital includes resources such as timber, minerals, energy, water, agricultural land, and fisheries, and usually includes the ecosystem services made possible by that capital, such as carbon

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<sup>41</sup> TEEB (2010) The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB.

<sup>42</sup> TEEB (2010) The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB.

sequestration, flood protection, and air and water filtration. The inclusion of natural capital in national accounting gives countries a more complete picture of the status of their economies, and allows them to make better-informed economic decisions.<sup>43</sup> WAVES is currently testing the feasibility of environmental accounting in five countries: Botswana, Colombia, Costa Rica, Madagascar, and the Philippines. These efforts have benefited from the UN Statistical Commission's recent adoption of the System for Environmental and Economic Accounts (SEEA), which provides an internationally accepted method for accounting for material natural resources. The SEEA has helped to create more widespread acceptance of environmental accounting.<sup>44</sup>

In 2010, the Conference of the Parties to the Convention on Biological Diversity also included in its ten year strategic plan the reporting by its parties on natural resource capital and services in their reports on national accounts along with GDP. Thus 192 nations are urged to include a form of this in their national accounts and conservation plans.<sup>45</sup>

#### B. Efforts Within Federal Agencies to Incorporate Ecosystem Services into Policy Decision-making.

In the United States, there has also been a growing awareness of the importance of considering the value of ecosystem services in policy decision-making. Most notably, in July 2011, the President's Council of Advisors on Science and Technology submitted a report to the President on *Sustaining Environmental Capital: Protecting Society and the Economy*.<sup>46</sup> The council urges the Obama administration to incorporate ecosystem services into its decision-making. Specifically, the council recommends a Quadrennial Ecosystem Services Trends (QuEST) Assessment, that would provide a comprehensive evaluation of the status of the nation's ecosystems, the services they provide, and predictions about how environmental change will impact these ecosystem services. It also recommends that the Department of Interior, National Oceanic Administration, Environmental Protection Agency, and Department of Agriculture improve their ability to perform valuations of the ecosystem services affected by their decision-making. In addition, the report recommends that the OMB, together with the Council on Environmental Quality and Office of Science and Technology Policy, be charged with ensuring that methodologies for ecosystem services valuation be developed collaboratively across agencies.

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<sup>43</sup> The World Bank. Wealth Accounting and Valuation of Ecosystem Services [online]. <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/0,,contentMDK:23140072~pagePK:148956~piPK:216618~theSitePK:244381,00.html>.

<sup>44</sup> Again, these efforts were preceded by efforts in 1993, with the publication of *Integrated Environmental and Economic Accounting -- Handbook of National Accounting* by the World Bank Department for Economic and Social Information and Political Analysis Statistical Division <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/0,,contentMDK:23140072~pagePK:148956~piPK:216618~theSitePK:244381,00.html>.

<sup>45</sup> The CBP Strategic Plan adopted for the decade following 2010 includes the following: "Use the revised and updated national biodiversity strategies and action plans as effective instruments for the integration of biodiversity targets into national development and poverty reduction policies and strategies, **national accounting**, as appropriate, economic sectors and spatial planning processes, by Government and the private sector at all levels."

<sup>46</sup> President's Council of Advisors on Science and Technology. 2011. *Sustaining Environmental Capital: Protecting Society and the Economy*. Executive Office of the President, Washington, DC.

The report also includes recommendations on how best to fill the data gaps that may inhibit ecosystem services valuation.<sup>47</sup>

Similarly, in 2004, the National Academy of Sciences released a report<sup>48</sup>—supported by the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, and the U.S. Department of Agriculture—recommending that ecosystem services be properly valued in policy decisions:

If policymakers consider trade-offs and benefits and costs when making policy decisions, then quantification of the value of ecosystem services is essential. Failure to include some measure of the value of ecosystem services in benefit-cost calculations will implicitly assign them a value of zero. The committee believes that considering the best available and most reliable information about the benefits of improvements in ecosystem services or the costs of ecosystem degradation will lead to improved environmental decision-making.

Both of these reports were preceded by a 1999 National Academy of Sciences report entitled, *Nature's Numbers: Expanding the National Economic Accounts to Include the Environment*, which evaluated the national environmental accounting initiative undertaken by the U.S. Bureau of Economic Analysis from 1992 to 1994 and recommended extending the U.S. national income and product accounts to include a comprehensive set of market and non-market environmental accounts. The NAS reviewed several different approaches to estimating the monetary benefits of natural resource stewardship on national scales, including valuation of forest stands of various ages and environmental service flows. The report recommended regular periodic accounting in natural resource, environmental and other augmented accounts.<sup>49</sup>

Partially in response to these global and national reports on ecosystem services, several agencies within the Federal government have undertaken new efforts and initiatives to quantify ecosystem services in policy decisions. To date, these efforts have largely been uncoordinated, and have not resulted in fundamental changes in how these agencies incorporate the valuation of ecosystem services in decision-making. However, SCB is encouraged by these efforts and believes that the Department of Interior should begin similar efforts, especially in areas of policy where the conservation of biodiversity is directly implicated. Thus far, the most promising efforts to quantify ecosystem services in decision-making have been occurring within the EPA, NOAA, and the USDA.

The EPA's National Center for Environmental Economics, for example, released its revised *Guidelines for Preparing Economic Analyses* in 2010, setting forth a framework for analyzing the costs and benefits of environmental policies with guidelines from the field of

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<sup>47</sup> President's Council of Advisors on Science and Technology. 2011. *Sustaining Environmental Capital: Protecting Society and the Economy*. Executive Office of the President, Washington, DC.

<sup>48</sup> National Academy of Sciences. *Valuing Ecosystem Services: Toward Better Environmental Decision-Making* (The National Academy Press, Washington, DC, 2004)

<sup>49</sup> W. D. Nordhaus and E.C. Kokkelenberg, editors, 1999. *Nature's Numbers: Expanding the National Economic Accounts to Include the Environment*, National Academy Press, Washington, DC,

ecological economics.<sup>50</sup> The EPA also created the Ecosystem Services Research Program (ESRP) in 2005 to study ecosystem services and to develop the methods needed by policymakers to understand the tradeoffs implicit in different policy decisions. To start, researchers are focusing on five regions: the Willamette Basin in Oregon, Tampa Bay, the coastal Carolinas, the Midwest, and the Southwest.<sup>51</sup> The ESRP is particularly interested in the intersection between different ecosystem services and in quantifying how different services interact and respond to environmental change. The goal is to develop complex models that can define management strategies for entire ecosystems, not just individual resources. The Willamette Basin chapter, for example, has developed a modeling tool called Envision that supports decision making by comparing alternative future scenarios and analyzing the implicit tradeoffs. (One application of Envision examined the effects of alternative population-growth and land-use scenarios on the ecosystem services of the entire Willamette River Basin between 2010 and 2060.)<sup>52</sup>

To help protect and restore the Chesapeake Bay and its watershed, NOAA is exploring the use of an ecosystem services-valuation modeling tool called Marine InVest to support the development of environmental markets for nutrient and sediment trading, carbon capture, conservation easements, and oyster reef filtration.<sup>53</sup> Meanwhile, the Office of Environmental Markets at the USDA is working to bring experts, stakeholders, and government agencies together to develop markets for ecosystem services. The Office was created to support the implementation of Section 2709 of the Farm Bill, which requires that the Secretary of Agriculture "establish technical guidelines that measure the environmental services benefits from conservation and land management activities."<sup>54</sup>

Though these efforts have been largely uncoordinated so far, they should be standardized to the greatest extent possible so that FWS properly monetizes ecosystem services when designating critical habitat.

### **III. Circular A-4 Fails to Properly Value Ecosystem Services and As a Result, the Economic Analysis of Revised Spotted Owl Critical Habitat Fails to Properly Value the Ecosystem Services and Associated Benefits of Designation.**

As demonstrated above, our understanding of the ecosystem services that provide benefits to society has grown substantially over the last 20 years. Today, both within the United States and internationally, many sophisticated initiatives are quantifying ecosystem services and the value of nature so as to better inform decision-making. Unfortunately, efforts to incorporate and quantify ecosystem services in regulatory decision-making have not permeated the Office of Management and Budget's guidance to agencies regarding cost-benefit analysis. To the extent that the FWS and DOI are required to conduct CBAs, SCB believes that these analyses must, at a minimum, make an attempt to quantify ecosystem services in order to be more consistent with the ESA stated

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<sup>50</sup> National Center for Environmental Economics. Guidelines for Preparing Economic Analyses [online]. <http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html>.

<sup>51</sup> Bolte, J. et al. In Oregon, the EPA Calculates Nature's Worth Now and in the Future. 2011. *Solutions* 2(6), 35-41. [www.thesolutionsjournal.com/node/1019](http://www.thesolutionsjournal.com/node/1019).

<sup>52</sup> Bolte, J. et al. In Oregon, the EPA Calculates Nature's Worth Now and in the Future. 2011. *Solutions* 2(6), 35-41. [www.thesolutionsjournal.com/node/1019](http://www.thesolutionsjournal.com/node/1019).

<sup>53</sup> NOAA. Habitat: What's It Worth? [online]. [www.habitat.noaa.gov/about/habitat/ecosystemservices.html](http://www.habitat.noaa.gov/about/habitat/ecosystemservices.html).

<sup>54</sup> USDA. USDA Office of Environmental Markets [online]. [www.fs.fed.us/ecosystemservices/OEM/index.shtml](http://www.fs.fed.us/ecosystemservices/OEM/index.shtml).

policy goal—to protect the ecosystems on which threatened and endangered species depend. SCB offers the following recommendations regarding the OMB’s approach to cost-benefit analysis, and regulatory decision-making in general, and explains how the current approach fails to properly value critical habitat of the NSO.

#### A. OMB Cost Benefit Analysis Critique.

SCB has identified two initial conceptual problems with Circular A-4 as it applies to decisions regarding the conservation and management of biodiversity. First, Circular A-4 misidentifies the baseline upon which a cost-benefit analysis is derived. Second, Circular A-4’s use of discounting is inconsistent with the valuation of ecosystem services.

##### 1. Properly Defining the Baseline and Incremental Impacts.

Circular A-4 states that a regulatory cost-benefit analysis should include “(1) a statement of the need for the proposed action, (2) an examination of alternative approaches, and (3) an evaluation of the benefits and costs—quantitative and qualitative—of the proposed action and the main alternatives identified.”<sup>55</sup> In order to develop a statement of need and to examine possible alternative regulatory approaches to addressing a particular policy problem, Circular A-4 first requires the agencies to develop a baseline, which it defines as “the best assessment of the way the world would look absent the proposed action.”<sup>56</sup> As the Circular explains, the baseline is a forecast of the future effect of current government programs and policies. The benefits and costs of a particular regulatory action, and possible alternatives, should then be evaluated against this baseline. By evaluating the regulatory change in light of the baseline, the incremental effects of a regulation, and any costs and benefits that might derive from the proposed regulatory change can then be evaluated. The Draft EA expressly follows this approach by defining the baseline as “the world without critical habitat” for the NSO, which it further explains as “the existing state of regulation, prior to the designation of critical habitat, which provides protection to the species under the Act, as well as under other Federal, State and local laws and guidelines.”<sup>57</sup>

SCB believes that, at its most basic level, Circular A-4 is fundamentally flawed because it excludes the existing flow of ecosystem services from the baseline. As discussed above, each day the natural environment provides a flow of ecosystem services that benefit humans. SCB believes that these ecosystem services should be part of the description of the baseline because they are part of the world as it currently exists. While these services are “free” in the sense that they do not require some sort of direct payment prior to their being disbursed, these services are not empty of value. Unfortunately, as noted by the NAS and TEEB reports, if no attempt is made to value those ecosystem services, then the result is that these services have an implicit value of zero.

In the context of the NSO, the 14 million acres proposed by FWS to be designated as critical habitat are currently providing ecosystem services on a local and global scale. These forests habitats provide value in the form of water purification, air purification, soil retention,

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<sup>55</sup> OMB Circular A-4 at 2.

<sup>56</sup> OMB Circular A-4 at 15.

<sup>57</sup> Draft EA at ES-7.

flood prevention, carbon sequestration, wildlife habitat, recreation, and aesthetic benefits to people.<sup>58</sup> In addition, they provide provisioning services such as food (in the form of wild game, fish, plants, and mushrooms), water, and timber. Under Circular A-4, none of these ecosystem services are incorporated into the baseline, which, in the context of the NSO, is defined only as the “existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat.”

If the value of ecosystem services were incorporated into the baseline, the baseline would look very different. For example, in 2011 Earth Economics published a report entitled *Nature’s Value in the Skykomish Watershed: A Rapid Ecosystem Service Valuation*.<sup>59</sup> This report examined the ecosystem services produced throughout the Skykomish watershed in Washington State. The results of this report were compelling. The Skykomish watershed provides between \$245 million and \$3.3 billion in benefits to the regional economy *each year*. To derive this figure, Earth Economics attempted to come up with a dollar range for each acre of land within the watershed divided into nine broad categories: agricultural lands, forests, grasslands, lakes/rivers, pasture, riparian buffer, shrub/scrub, urban green space, and wetland.<sup>60</sup> High and low per acre values were calculated by compiling applicable peer-review literature on the value of each of these land categories. For example, the value of services provided by an acre of forests was between \$371 and \$5552 per year. An acre of shrub/scrub produces ecosystem services valued between \$81 and \$2710 per year, and an acre of riparian buffer produces between \$166 and \$28,788 per year.<sup>61</sup> Using Geographic Information Systems (GIS) data, Earth Economics was then able to determine approximately how many acres of each land category were present within the watershed, and to arrive at a range of annual benefits contributed to the regional economy each year.<sup>62</sup>

This report is notable for two reasons. First, the report is an attempt at a *rapid* valuation of ecosystem services. Per acre valuations of ecosystem services are extrapolated from the current universe of existing peer-reviewed literature, not through original research.<sup>63</sup> The report acknowledges that a wide range of values for each land category exists and does not attempt to discard values that are either too high or too low, and recognizes that this approach is imperfect.<sup>64</sup> However, even coming up with an imperfect range of values for an area of habitat is still preferable to not making a credible attempt, which as the TEEB and NAS reports note results in a default valuation of zero. SCB recognizes that FWS must complete its economic assessments of critical habitat within the set statutory time frame, thus an approach that works within the time constraints of the overall process should be encouraged. Second, this report evaluates an area of land that, in part, overlaps with the proposed critical habitat for the NSO. The results of this report therefore should be considered by the FWS when it moves forward with a final critical habitat designation.

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<sup>58</sup> R. Costanza et al., *The Value of the World’s Ecosystem Services and Natural Capital*, 387 *Nature* 253 (1997).

<sup>59</sup> Earth Economics. 2011. *Nature’s Value in the Skykomish Watershed: A Rapid Ecosystem Service Valuation*. Available at: <http://www.eartheconomics.org/FileLibrary/file/Reports/Puget%20Sound%20and%20Watersheds/Natures%20Value%20in%20the%20Skykomish%20Watershed%20rESV.pdf>

<sup>60</sup> *Id.* at 17.

<sup>61</sup> *Id.* at 23.

<sup>62</sup> *Id.* at 16-17.

<sup>63</sup> *Id.* at 18.

<sup>64</sup> *Id.* at 40.

The Earth Economics report determined that, based on the peer review literature, an acre of forest produces between \$371 and \$5552 per acre per year in ecosystem benefits to the regional economy.<sup>65</sup> A breakdown of these values follows:

<b>ECOSYSTEM SERVICE</b>	<b>LOW VALUE (\$/ACRE/YEAR)</b>	<b>LOW VALUE (\$/ACRE/YEAR)</b>
Aesthetic & Recreational	0.18	2158.01
Biological Control	2.38	9.98
Disturbance Regulation	1.33	5.14
Food Provisioning	33.29	40.23
Gas & Climate Regulation	10.57	342.71
Genetic Resources	10.65	10.65
Habitat Refugium	1.05	543.42
Nutrient Cycling	74.28	240.37
Pollination	59.00	413.50
Raw Materials	1.34	422.76
Science and Education	36.42	62.92
Soil Erosion Control	63.92	143.50
Soil Formation	5.95	6.66
Waste Treatment	51.80	182.24
Water Regulation	10.35	585.56
Water Supply	9.00	385.00
<b>Total</b>	<b>371.51</b>	<b>5552.67</b>

Assuming that the overwhelming majority of proposed NSO’s critical habitat is forest, with the remaining areas being form of shrub land, or riparian areas, it seems quite possible that the FWS could do a similar rapid analysis of the ecosystem services found in the proposed critical habitat area. If FWS further simplified its analysis and assumed that all proposed critical habitat were forest, and then took the low estimate of \$370 per acre per year in ecosystem services, then the entire 14 million acre critical habitat area would produce approximately \$5.19 *billion* in ecosystem services per year for the regional economies in the three affected States.

SCB recognizes that this represents a back-of-the-envelope estimation, and likely substantially oversimplifies and overvalues the ecosystem services provided across this range of habitats proposed for designation. And, indeed there are many significant limitations in the accuracy of ecosystem service valuations that must be addressed. However, it is *critical* to recognize that attempting to value ecosystem services is essential to improving policy decisions relating to biodiversity. The National Academy of Sciences has recommended that agencies follow this general approach to ecosystem service valuation, as does the President’s Council of Advisors on Science and Technology in their report on *Sustaining Environmental Capital: Protecting Society and the Economy*.<sup>66</sup> Even if the actual value of the ecosystem services provided by the NSO’s critical habitat is only a fraction of this \$5 billion estimate, it nonetheless demonstrates the power of attempting to quantify these ecosystem services, which FWS under its current analytical approach values at *zero*. Thus, SCB proposes a vastly different conceptual

<sup>65</sup> *Id.* at 20.

<sup>66</sup> *Supra* note 45.

framework for defining the baseline in any CBA relating to critical habitat. While the baseline can still take account of “the existing state of regulation” FWS must also account for the flow of ecosystem services provided to society.

If the baseline is properly defined, then the next stage required by OMB Circular A-4, identifying incremental benefits and impacts, would change as well. Under Circular A-4, once the baseline is defined, the agency must assess the “impacts that are incremental to that baseline.”<sup>67</sup> Under the current one-sided approach in critical habitat CBAs, this usually is limited to an accounting of (1) the increased costs that the FWS is likely to incur conducting additional Section 7 consultations for the proposed designated habitat and (2) an accounting of lost and deferred economic activities that would occur if no critical habitat were designated (namely timber harvests). The almost inevitable result is that the costs of designating critical habitat appear disproportionately greater than the benefits of designation.<sup>68</sup> The Draft EA estimates that under its “high impact” (i.e. worst case) scenario, critical habitat designation would result in lost timber harvests amounting to \$6.5 million per year.<sup>69</sup> Where ecosystem service values are given a price of zero, a \$6 million loss could be viewed as significant. When a \$6 million loss is compared to billions of dollars in ecosystem services from these habitats, these same projected losses become insignificant.

As an alternative approach to identifying incremental impacts and benefits of critical habitat, SCB recommends that these anticipated effects be analyzed in the context of whether they degrade, preserve or augment existing flows of ecosystem services. Under this approach, once ecosystem service flows are identified, the FWS could predict (1) the amount of development that would be stopped or mitigated by critical habitat designation, and (2) for degraded lands, the amount of restoration that will occur as a result of a critical habitat designation. Thus, FWS could approximate (compared to an acre of intact habitat) the increment of ecosystem degradation that would be prevented or avoided by designation, as well as the increment of ecosystem restoration that would be facilitated by the designation.

For example, certain types of timber extraction can have significant negative impacts on ecosystem services. Even-age clear-cutting, and the road construction required to access these timber stands, results in soil erosion, flooding, loss of wildlife habitat, and other impacts that degrade ecosystem services.<sup>70</sup> While these practices may result in short term revenues in the form of timber extraction, that revenue would likely not compensate for the lost ecosystem services *if those services were valued properly*. An acre of clear-cut forest is likely to not have as much capacity for flood control, soil retention, and water purification as an acre of intact forest. Using our example of \$370 per acre per year of ecosystem services, FWS could predict that this particular acre of early regenerating forest is providing only a fraction of the soil erosion control (\$63), water regulation (\$10), or water supply (\$9) that is contained within the \$370 per acre value of intact habitat. Thus, designation of critical habitat could provide the incremental benefit of up

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<sup>67</sup> Draft EA at 2-2.

<sup>68</sup> Amy Sinden. 2004. The Economics of Endangered Species: *Why Less is More in the Economic Analysis of Critical Habitat Designation*. Harvard Environmental Law Review 28:129.

<sup>69</sup> Draft EA at 4-31.

<sup>70</sup> R. Keenan and J.P. Kimmis. 1993. *The Ecological Effects of Clear-Cutting*. Environmental Reviews 1(2):121-144; F.J. Swanson and C.T. Dyrness, 1975 The Impact of Clear-Cutting and Road Construction on Soil Erosion by Landslides in the Western Cascade Range, Oregon, Geology 3:393-396;



to \$82 in additional services for that acre because it would lead to the conditions needed to restore that forest over a period that is likely to be greater than most forest harvesting cycles.

Conversely, an acre of intact habitat could lose the capacity to generate up to \$82 in ecosystem services if it were excluded from a critical habitat designation, making it available for timber harvesting. Thus, the inclusion as critical habitat would reduce the risk that these ecosystem services were either degraded or lost altogether. There are other types of timber management that may result in far fewer ecosystem impacts, including selective harvests that are designed to mimic natural processes. These forestry practices, if scientifically validated, may be useful in restoring degraded forests, thereby bringing in revenues and improving flows of ecosystem services.<sup>71</sup> A critical habitat designation would make it more likely that these best-management practices will be fully implemented. And, to the FWS's credit, the Draft EA does identify several benefits that could arise as a result of critical habitat designation if restoration forestry practices are implemented, including the reduced threat of wildfires, drought, and insect damage, improved water quality, reduced sedimentation, and even improved aesthetics that in turn increase recreation opportunities.<sup>72</sup> However, the Draft EA makes no effort to quantify the potential monetary value of these ancillary benefits. Thus, the *only* dollar figures that are produced from the Draft EA relate to timber harvests within areas of designated critical habitat.

It is encouraging that the Draft EA recognizes this distinction, concluding that if Federal agencies implement ecological forestry practices it may be possible to increase timber harvests while simultaneously restoring degraded forests and increasing ecosystem services.<sup>73</sup> However, the quantification of these potential benefits again *only* focuses on the value of timber harvested. Whether or not ecological forestry actually meets its stated goals, the decision as to whether or not to proceed with such a management strategy is still distorted by the fact that all other ecosystem services in the Pacific Northwest forests that might be affected are still effectively valued at zero by the FWS. Thus, any analysis of the potential incremental costs or benefits that derive from timber harvests are disproportionately considered by FWS compared to all other relevant concerns.

## 2. Discounting Ecosystem Services

Circular A-4 instructs agencies to utilize discounting when considering future impacts and benefits of a regulatory action.<sup>74</sup> Circular A-4's underlying rationale for this is that since benefits

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<sup>71</sup> SCB, together with The Wildlife Society and the American Ornithologists Union sent a letter to the Department of Interior on April 2, 2012, noting that there is not yet sufficient scientific support to justify ecological forestry or "active management" at the commercial scale throughout the habitat of the NSO. We requested an independent EIS to evaluate active forestry management impacts on spotted owls, just as FWS has done with respect to its new efforts to evaluate barred owl control techniques. This EIS should identify a range of experimental forestry techniques, appropriate scientific methodologies to assess those techniques, and scientific process for evaluating impacts on spotted owls. At the end of a scientifically appropriate period of time, and after a full scientific peer-review of the data collected, the FWS and DOI would be able to make a fully informed decision regarding short- and long-term management of critical habitat. However, where ecological forestry is scientifically evaluated and validated as an approach that benefits forests and NSO, SCB would support its application, as it would augment and restore ecosystem services in those forests. The joint letter can be found at [www.conbio.org/policy](http://www.conbio.org/policy)

<sup>72</sup> Draft EA at 8-1.

<sup>73</sup> Draft EA at 4-28.

<sup>74</sup> OMB Circular A-4 at 31.

and costs do not always take place at the same time, it is “incorrect simply to add all of the expected net benefits or costs without taking account of when they actually occur.”<sup>75</sup> According to Circular A-4, postponed benefits have a cost because “people generally prefer present to future consumption.”<sup>76</sup> With the basic assumption that society values what we have today more than possible future rewards, a discount rate (subtracting a certain percentage of a resource’s value each year) is used to determine and measure a resource’s future value.

Discount rates are used in calculating the total value of existing resources. So, for instance, in figuring out how much a forest, or a wetland, is worth, a decision-maker would have to account both for its present value (the benefits it will deliver *this* year), and its value over time (the value it will deliver in all subsequent years). The discount rate is crucial to calculating its value over time. OMB requires agencies to use and compare a 7% and a 3% discount rate when considering future benefits and costs. There is considerable disagreement, however, about what the correct discount rate is and about the best method for applying discount rates. The Congressional Budget Office, for example, recommends a discount rate of 2%.

When applying discount rates to ecosystem services, the most straightforward approach is to assume a constant flow of services into the indefinite future and apply a constant discount rate.<sup>77</sup> However, given the fundamental uncertainty involved in applying discount rates, an alternative approach is to have the discount rate decline over time.<sup>78</sup> Ecologists and policy analysts disagree about which strategy to use, and whether to use the same strategy for different assets. For instance, Kula and Evans<sup>79</sup> argue that it is inappropriate to apply the same discount rates to manmade and natural capital, because the latter is limited and finite. Accordingly, economic and social costs should be considered separately from environmental costs and benefits. Kula and Evans modeled this approach for an afforestation project in Northern Ireland. When timber values and carbon sequestration benefits were both discounted at the standard British Treasury rate of 3.5%, the project was not economically viable. However, when timber benefits were discounted at 3.5%, but the carbon sequestration (the environmental benefit) was discounted at 1.5%, the project became profitable.<sup>80</sup>

Where benefits or impacts extend beyond the current generation of people to future generations, special ethical issues arise regarding whether to consider those benefits. Future generations have no voice in decisions made in present, therefore it may not be appropriate to discount benefits that might accrue to them. The possible extinction of a species is a particularly relevant issue to consider for intergenerational discounting. Even as early as 1973, Congress was

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<sup>75</sup> OMB Circular A-4 at 31.

<sup>76</sup> OMB Circular A-4 at 32.

<sup>77</sup> Costanza, R. et al. *Planning Approaches for Water Resources Development in the Lower Mekong Basin* (July 2011).

<sup>78</sup> Weitzman, M. L. 1998. *Why the far-distant future should be discounted at its lowest possible rate*. *Journal of Environmental Economics and Management* 36:201–208; Newell, R. G., and W. A. Pizer. 2003. *Discounting the distant future: how much do uncertain rates increase valuations?* *Journal of Environmental Economics and Management* 46:52–71; and Newell, R. G. and W. A. Pizer. 2004. *Uncertain discount rates in climate policy analysis*. *Energy Policy* 32:519–529.

<sup>79</sup> Kula, E., and Evans, D. 2011. Dual discounting in cost-benefit analysis for environmental impacts. *Environmental Impact Assessment Review* 31, 180–186.

<sup>80</sup> Carbon sequestration benefits were discounted at a lower rate because 2% of the Treasury’s 3.5% stems from economic growth. The authors argue that it is illogical to discount the project’s environmental benefits by the economic growth rate, which itself can be counted as an environmental harm.

keenly aware that the loss of a species represented an incalculable loss to future generations. Circular A-4 does acknowledge the difficulty in setting a intergenerational discount rate, and recommends that, if a decision has intergenerational effects, that agencies “might consider a further sensitivity analysis using a lower but positive discount rate.” However, not all economists believe that a positive discount rate is appropriate. Newell and Pizer (2003) argue for a 4% discount rate, declining to roughly 0% after 300 years.<sup>81</sup> Meanwhile, Sir Nicholas Stern, the author of the Stern Review, has suggested that using a high discount rate (as is common in economic modeling) to evaluate the effects of climate change assumes that the lives of people 20 to 50 years from now do not have the same value as our own, and that intergenerational fairness requires a low or zero discount rate.<sup>82</sup>

The Draft EA follows the OMB Guidance and employs the required 7% and 3% discount rates to assess the incremental costs and benefits of designating critical habitat over a twenty year period.<sup>83</sup> This approach is problematic for several reasons, the first being that a twenty-year time frame may seem appropriate for gauging “impacts” on regional economies, but is virtually meaningless for gauging benefits to a forest system that takes hundreds, if not thousands, of years to create old-growth forest conditions. Degraded ecosystems continue to provide ecosystem services, albeit at a much lower rate than relatively intact ecosystems. Thus, the benefits of additional protections in the form of augmented ecosystem services might not be fully realized in a twenty year period. Indeed these ecosystem services might be of their greatest value decades or even centuries from now.<sup>84</sup> But, a traditional discounting rate, by definition, reduces the value of these services over time in an artificial way. Thus, there is no analysis at all of the possible benefits that might arise beyond the 20 year horizon, even though nature operates on much longer time horizons. Nor does the Draft EA even address potential intergenerational benefits that might accrue to future generations from the designation critical habitat for the NSO.

To the extent that natural growth and recovery of the forest and its ecosystems services is expected to occur or be enhanced within critical habitat, then the value, both economic and biological, should increase, rather than decrease. For example, old growth and late successional temperate rainforests such as the ones in question sequester more carbon each year than almost any other ecosystem or biome.<sup>85</sup>

Therefore, SCB recommends that the FWS consider additional discount rates besides 7% and 3%, including a 1% and a 0% discount rate to assess ecosystem services benefits in order to best understand the range of possible effects from a particular agency action. This strategy has been used before to analyze other resource management issues,<sup>86</sup> and is recommended by the

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<sup>81</sup> Newell, R. G., and W. A. Pizer. 2003. *Discounting the distant future: how much do uncertain rates increase valuations?* Journal of Environmental Economics and Management 46:52–71.

<sup>82</sup> Kula, E., and Evans, D. 2011. Dual discounting in cost-benefit analysis for environmental impacts. *Environmental Impact Assessment Review* 31, 180–186.

<sup>83</sup> Draft EA at 4-35

<sup>84</sup> For the Northern Spotted Owl itself, twenty years is not a particularly long time either. The owl was listed in 1990, only twenty two years ago, and had some critical habitat designated 20 years ago.

<sup>85</sup> See DellaSala et al. 2010. *Temperate and Boreal Rainforests of the World*, Island Press.

<sup>86</sup> Costanza, R. et al. *Planning Approaches for Water Resources Development in the Lower Mekong Basin* (July 2011). The Costanza report analyzed development of water resources in the Lower Mekong Basin with a 10%, 3%, and 1% discount rates to yield substantially different results.

National Academy of Sciences report *Valuing Ecosystem Services*: “Because even small differences in a discount rate for a long-term environmental restoration project can result in order-of-magnitude differences in the present value of net benefits, in such cases the analyst should present figures on the sensitivity of the results to alternative choices for discount rates.”<sup>87</sup> With a fuller understanding of how discounting affects potential future value, and by considering 0% or near 0% discount rates in its analysis to reflect the full value of the habitat, FWS can make better, more informed management decisions regarding critical habitat.

B. The Presidential Memorandum on the Spotted Owl Is Not Consistent with the Endangered Species Act.

As stated above in Section I, concurrently with the publication of the draft critical habitat proposal, the White House released an unprecedented Presidential Memorandum to the Secretary of the Interior which ordered the FWS to “give careful consideration to providing the maximum exclusion from the final revised critical habitat, consistent with applicable law and science.”<sup>88</sup> The Memorandum directed the FWS to “avoid unnecessary costs and burdens” by, among other things, taking the following actions: (1) “consider excluding private lands and State lands from the final revised critical habitat, consistent with applicable law and science;” (2) “carefully consider all public comments on the relevant science and economics, including those comments that suggest potential methods for minimizing regulatory burdens;” (3) “give careful consideration to providing the maximum exclusion from the final revised critical habitat;” and (4) “to the extent permitted by law, adopt the least burdensome means...of promoting compliance with the ESA.”<sup>89</sup> Most critically, the Memorandum states: “habitat typically is best protected when landowners are working cooperatively to promote forest health, and the recognition—as discussed in the proposed rule—that *the benefits of excluding private lands and State lands may be greater than the benefits of including those areas in critical habitat.*”<sup>90</sup>

It is beyond the scope of these comments to discuss the validity of the statement that “habitat is best protected when landowners are working cooperatively.” However, we note in passing that the scientific literature suggests voluntary conservation efforts are most effective where there are meaningful mandatory restrictions on private behavior if voluntary efforts to conserve a resource fail.<sup>91</sup> If mandatory restrictions are not sufficiently “burdensome,” then there will be few incentives for private individuals to take proactive, voluntary measures to avoid those mandatory restrictions. The likelihood that a private entity will undertake voluntary conservation efforts under the Endangered Species Act depends upon the “availability of assurances regarding future regulation, as well as on the background threat of regulation and the cost advantage of

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<sup>87</sup> National Academy of Sciences. *Valuing Ecosystem Services: Toward Better Environmental Decision-Making* (The National Academies Press, Washington, DC, 2004)

<sup>88</sup> The White House. Memorandum for the Secretary of Interior. *Proposed Revised Habitat for the Spotted Owl: Minimizing Regulatory Burdens*. Feb. 28, 2012.

<sup>89</sup> Presidential Memorandum -- Proposed Revised Habitat for the Spotted Owl: Minimizing Regulatory Burdens, 77 Fed. Reg. 12,985, Feb. 28, 2012.

<sup>90</sup> *Id.*

<sup>91</sup> See generally, K. Segerson, T.J. Miceli, *Voluntary environmental agreements: good or bad news for environmental protection?*, J. Environ. Econ. Manage. 36 (1998) 109–130.

voluntary agreements.”<sup>92</sup> Without *both* the “threat” of mandatory conservation requirements through regulation, *and* regulatory assurances that there are advantages to taking voluntary conservation actions early, voluntary conservation efforts will likely be inefficient.<sup>93</sup>

However, SCB is concerned with the statement in the Memorandum that “*the benefits of excluding private lands and State lands may be greater than the benefits of including those areas in critical habitat.*” As explained above, without even attempting to quantify ecosystem services, the benefits that these services provide is given an effective price of zero. Therefore, while there may be a perception that the purported benefits of exclusion outweigh the benefits of inclusion as regards critical habitat, the validity of such statements cannot be assessed in a meaningful manner. As the FWS notes in the NSO critical habitat proposal, “the designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area...Such designation does not require implementation of restoration, recovery, or enhancement measures by non-Federal landowners.”<sup>94</sup> Only in those situations where a landowner requests Federal funding, a Federal permit, or other Federal approval for a proposed action is the Section 7(a)(2) prohibition on the destruction or adverse modification of critical habitat triggered.<sup>95</sup>

The NSO critical habitat proposal contains 1.26 million acres of private land and 670,000 acres of State lands, almost two million acres in total.<sup>96</sup> It is true that many activities on State and private lands will never trigger a Section 7 consultation. However, some activities will inevitably require some type of federal permit, which would trigger such consultations. For example, when a federal court vacated the 730,000 acre critical habitat designation for the endangered cactus ferruginous pygmy-owl,<sup>97</sup> the U.S. Army Corps of Engineers and the Environmental Protection Agency responded by terminating Section 7 consultations with FWS on several major development projects within the former critical habitat area without mitigation. Before the court’s ruling, FWS had typically required developers seeking to build in the owl’s critical habitat to set aside eighty percent of their property as open space or to purchase four acres of owl habitat for every acre developed.<sup>98</sup> After the designation was vacated, this requirement no longer applied. In reality, there are considerable data and evidence that the designation of critical habitat can make a very real difference for listed species. A report analyzing FWS data on population trends of threatened and endangered species submitted to Congress by FWS found that species with critical habitat are nearly twice as likely to have an improving population trend than species without critical habitat.<sup>99</sup> Therefore, excluding 15% of proposed critical habitat based on vague concerns about economic benefits could have significant conservation implications for the NSO.

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<sup>92</sup> C. Langpap, J. Wu, *Voluntary Conservation of Endangered Species: When Does no Regulatory Assurance Mean no Conservation?* *Journal of Environmental Economics and Management* 47 (2004) 435–457.

<sup>93</sup> *Id.*

<sup>94</sup> REVISED CRITICAL HABITAT at 14,081.

<sup>95</sup> *Id.*

<sup>96</sup> *Id.* at 14,068.

<sup>97</sup> *Nat’l Ass’n of Home Builders v. Norton*, 2001 WL 1876349 at \*2 (D.Ariz. Sept. 21, 2001).

<sup>98</sup> Amy Sinden. 2004. *The Economics of Endangered Species: Why Less is More in the Economic Analysis of Critical Habitat Designation*. *Harvard Environmental Law Review* 28:129.

<sup>99</sup> See Martin Taylor et al. 2005. *The Effectiveness of the Endangered Species Act: A Quantitative Analysis* *BioScience* 55(4):360-367.

Because there are clear benefits from designating critical habitat on both public and private lands, SCB is concerned by the overly-general pronouncements both within the critical habitat proposal and the Presidential Memorandum that there may be significant benefits from excluding private lands from the final critical habitat designations.<sup>100</sup> Neither the FWS nor the White House has made *any attempt* to explain the factual basis for their statements. They have not provided supporting literature or even a logical argument to support their assertions. SCB has at least tried to provide an argument that both the direct benefits and the ancillary benefits of designation confer significant values that can be partially quantified. And, with this quantification, it becomes clear that the benefits outweigh the minimal impacts and relatively low costs that might arise from the designation of critical habitat. Additionally, FWS has not explained what actual *harm* comes from designating critical habitat on private lands. Since FWS has correctly concluded that “critical habitat designations do not provide additional regulatory protections for a species on non-Federal lands,” it is difficult to imagine how there could be substantial benefits arising from excluding private lands from designation.

SCB is certainly aware that Congress gave the FWS the discretion to exclude specific areas from a final critical habitat designation if it “determines *that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat*, unless...the failure to designate such area as critical habitat will result in the extinction of the species concerned.”<sup>101</sup> The ability to exclude particular areas of critical habitat may, in certain cases, be appropriate if there are substantial economic or other impacts that would result from the designation of a particular parcel of critical habitat. However, these exclusions should be exceedingly rare. As a factual matter, under the FWS’s own regulations, a parcel of critical habitat can be destroyed outright by an agency action so long as it does not appreciably diminish a species’ survival and recovery.<sup>102</sup> Thus, the inclusion of a particular parcel of land as critical habitat does not forestall all development; it merely requires the agency to comply with certain Reasonable and Prudent Alternatives regarding its activity to ensure that the species survival is not put in jeopardy. SCB believes that FWS’s regulations on critical habitat are not legally valid, as they confuse and conflate the two different protective standards that Congress provided; actions that through an explication of the impacts upon a species over time are shown to be likely to jeopardize its recovery, and the much more direct question of whether a federal action will degrade habitat already designated as critical. Therefore, SCB has petitioned the FWS to change those regulations. However, even under a modern, science based regulatory scheme regulating critical habitat, exclusions would still be exceedingly rare because there are very few projects that are of such paramount importance that they need to be exempted in the first instance. For example, if the Forest Service had discovered the richest rare earth mine in the United States in a ten acre parcel of the NSO’s critical habitat, and this deposit was worth billions of dollars, and was vital to the national strategic defense of the United States, it would be easy to understand why those ten acres might be exempted. But, the Draft EA does not point to any particular area in the three State region where it expects disproportionate impacts to be severe, or even moderate. Instead, what the Presidential memorandum appears to recommend to the FWS is that there be a blanket exclusion of *all* State lands and *all* private lands based on undefined “benefits” of exclusion. If this

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<sup>100</sup> REVISED CRITICAL HABITAT at 14,068; *see also* Presidential Memorandum -- Proposed Revised Habitat for the Spotted Owl: Minimizing Regulatory Burdens, 77 Fed. Reg. 12,985, Feb. 28, 2012.

<sup>101</sup> 16 U.S.C. § 1533(b)(2) (emphasis added).

<sup>102</sup> 50 C.F.R. § 402.02.

recommendation were to be implemented, nearly two million acres of habitat that contains the physical and biological features essential to the survival and recovery of the species would be excluded. SCB fails to see what “benefit” such exclusion would provide given the potential degradation in ecosystem services and the underlying biological capital that might occur without the safeguard of critical habitat designation. In fact, the FWS admits with regard to land use management, “**effects were mostly considered to be limited to none**” if critical habitat were designated on private and State lands.<sup>103</sup> There are simply no data or evidence indicating that an exclusion is warranted based on any economic concerns.

#### **IV. A Roadmap for Evaluating the Ecosystem Benefits that Result from Critical Habitat Designations**

Because it appears unlikely that FWS will abandon the practice of formal CBAs with respect to critical habitat designations, given OMB’s directives, SCB believes that it is necessary for the FWS to refine its overall analytical approach in these CBAs to fully account for the value of ecosystem services, especially in the definition of the baseline.

As a straightforward approach to improving the CBAs that the FWS conducts with critical habitat, SCB recommends the following approach. First, FWS should classify critical habitat into basic land-cover categories, similar to the U.S. Geological Survey’s NLCD 92 Land Cover Class Definitions<sup>104</sup> (similarly to the approach taken by Earth Economics). Second, the FWS should analyze a subset of the ecosystem services defined by the Millennium Ecosystem Assessment, and through a search of the peer review literature and other relevant sources, qualitatively describe which ecosystem services are provided by critical habitat as categorized into general land cover classes. In particular, SCB believes that FWS could consider the following:

- *Provisioning services*: water, timber, and fiber
- *Regulating services*: carbon sequestration, flood control, pollination, water quality;
- *Cultural services*: recreational opportunities
- *Supporting services* such as soil formation, photosynthesis, and nutrient cycling.

Third, once the FWS has qualitatively described which ecosystem services are provided by the particular land classes represented by the proposed critical habitat, it should then attempt to refine, and potentially quantify a range of the monetary values of the ecosystem services critical habitat provides on a per acre basis to the extent feasible. There are several tools available for evaluating and quantifying the value of ecosystem services.<sup>105</sup> Some of these tools take more time, and cost more to apply than others, and they vary in the depth and quality of the information they provide. However, as an aside, SCB notes that the current contractor that FWS regularly uses for economic analyses of critical habitat, Industrial Economics, Inc., advertises on its website that it is working on methods to value ecosystem services, and has contributed to the development of

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<sup>103</sup> FWS 2012. Draft Environmental Assessment, Designation of Critical Habitat for the Northern Spotted Owl at 147.

<sup>104</sup> USGS NLCD 92 Land Cover Class Definitions. <http://landcover.usgs.gov/classes.php/>

<sup>105</sup> Bagstad *et al.*, In Press, *Ecosystem services valuation to support decision making on public lands: A case study for the San Pedro River, Arizona*. USGS Scientific Investigations Report, USGS: Reston, VA.

ecosystem service valuation models, including the InVEST tool we discuss immediately below.<sup>106</sup> **Thus, there does not appear to be a lack of capacity with FWS’s chosen contractor to do such analyses, but rather simply the lack of direction from FWS to Industrial Economics, Inc. to value ecosystem services in critical habitat economic analysis.**

SCB believes that there are three readily available models that could be quickly employed to assess ecosystem service valuations: (1) the Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST) model, (2) the Ecosystem Services Review (ESR) method, and (3) the Wildlife Habitat Benefits Estimation Toolkit. All three are well-documented, work globally, and are ready for immediate, widespread use.<sup>107</sup> While these tools and their estimates of ecosystem services may still be imperfect, the NAS emphatically states that this should not be a rationalization for ignoring their application: “Use of the (imperfect) information about these values is preferable to not incorporating any information about ecosystem values into decision-making...since the latter effectively assigns a value of zero to all ecosystem services.”<sup>108</sup>

The Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST) model, developed by The Natural Capital Project, maps and measures tradeoffs between different ecosystem services and allows users to estimate how the location, amount, and value of ecosystem services are likely to change over time. Values are recorded in either biophysical units (e.g., tons of carbon sequestered) or economic values.<sup>109</sup> InVEST models are spatially explicit and can address questions at the local, regional, and global scales. InVEST currently includes models that measure the value, for example, of carbon sequestration, crop pollination, managed timber production, reservoir hydropower production, wave energy, coastal vulnerability, aquaculture, and aesthetic quality. Future versions of InVEST are expected to include models for flood mitigation, agricultural production, irrigation, commercial and recreational fisheries, and carbon storage, to name a few. InVEST is a well-established tool, with beta versions available since summer 2008. It runs on standard GIS software and has potential for widespread use. Using InVEST is relatively time intensive given the data inputs required, but this could change with the creation of a centralized data archive.<sup>110</sup>

The Ecosystem Services Review, or ESR, was developed by the World Resources Institute, in collaboration with the Meridian Institute and the World Business Council for Sustainable Development. The tool was designed to enable companies to visualize the connection between environmental health and their own bottom lines. The ESR uses a spreadsheet (available at [www.wri.org/publication/corporate-ecosystem-services-review](http://www.wri.org/publication/corporate-ecosystem-services-review)) to help companies identify their dependencies, risks, and opportunities related to ecosystem services. The tool is free, well-

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<sup>106</sup> Industrial Economics, Inc. *Ecosystem Services Valuation*, <http://www.indecon.com/ieconweb/EconomicsEcoServices.aspx?empid=24&titleid=2&specialtyid=41> (last visited July 1, 2012).

<sup>107</sup> *Id.*

<sup>108</sup> National Academy of Sciences. *Valuing Ecosystem Services: Toward Better Environmental Decision-Making* (The National Academies Press, Washington, DC, 2004)

<sup>109</sup> Natural Capital Project. InVEST: Integrated Valuation of Environmental Services and Tradeoffs [online]. <http://www.naturalcapitalproject.org/InVEST.html>

<sup>110</sup> Bagstad *et al.*, In Press, *Ecosystem services valuation to support decision making on public lands: A case study for the San Pedro River, Arizona*. USGS Scientific Investigations Report, USGS: Reston, VA.



documented, and easy to use.<sup>111</sup> Its results, however, are strictly qualitative: It does not facilitate quantification, spatially explicit mapping, or valuation of ecosystem services, so it might best be paired with a more quantitative and spatial tool, such as InVEST. Since 2008, an estimated 300 companies have used ESR.<sup>112</sup>

The Wildlife Habitat Benefits Estimation Toolkit, developed by the Defenders of Wildlife and Colorado State University, is a set of spreadsheets that incorporate transfer functions (i.e., a means of translating values from one study site to another) for ecosystem services related to recreation, property premiums, and willingness to pay for threatened and endangered species recovery.<sup>113</sup> Specifically, the toolkit includes models that estimate residential property value premiums associated with open space; net economic benefits of recreation activities such as fishing, hunting, and bird watching; and the value of ecosystem services provided by terrestrial and aquatic landscapes.<sup>114</sup> Users select a spreadsheet based on the type of ecosystem service they are evaluating and enter the relevant parameters, such as species or habitat type. Once the spreadsheet has calculated economic value, users can select different management scenarios to evaluate their impacts. The toolkit offers a well-documented, user-friendly approach that is ready for immediate, widespread use.<sup>115</sup>

Furthermore, an emerging tool that uses dynamic modeling to better understand ecosystem management is the Multiscale Integrated Model of Ecosystem Services (MIMES), which employs an integrated set of models to reflect flows of natural, built, and social capital. This approach considers a number of ecosystem services simultaneously and shows how they respond to environmental changes at a range of spatial and temporal scales. MIMES is especially useful for helping users understand the economic tradeoffs in different land use decisions.<sup>116</sup> As noted earlier, a system for data sharing (especially for spatial data) could make the use of ecosystem service valuation tools much more efficient and straightforward. There have been past attempts at such a database—such as the NSF’s Ecosystem Services Database—but they have struggled due, in large part, to a lack of funding and maintenance.<sup>117</sup> This could change with proper support from federal agencies. And with centralized sources for data, it would be much easier for federal agencies to run complex ecosystem services models on a regular basis.

Using any of the models and tools listed above could provide a way forward for FWS to derive an estimate of the value of the ecosystem services provided by proposed critical habitat. Such a valuation could and most likely should be expressed as a range of values on a per acre

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<sup>111</sup> *Id.*

<sup>112</sup> World Resources Institute. The Corporate Ecosystem Services Review: Guidelines for Identifying Business Risks & Opportunities Arising from Ecosystem Change [online]. [www.wri.org/publication/corporate-ecosystem-services-review](http://www.wri.org/publication/corporate-ecosystem-services-review).

<sup>113</sup> Bagstad *et al.*, In Press, *Ecosystem services valuation to support decision making on public lands: A case study for the San Pedro River, Arizona*. USGS Scientific Investigations Report, USGS: Reston, VA.

<sup>114</sup> National Council for Science and the Environment. *Wildlife Habitat Benefits Estimation Toolkit* [online]. <http://ncseonline.org/programs/science-solutions/whprp/toolkit>.

<sup>115</sup> Bagstad *et al.*, In Press, *Ecosystem services valuation to support decision making on public lands: A case study for the San Pedro River, Arizona*. USGS Scientific Investigations Report, USGS: Reston, VA.

<sup>116</sup> Altman *et al.* *Ecosystem service tradeoffs and their consequences in a dynamical, spatially explicit modeled system: A case study for the Massachusetts Ocean*.

<sup>117</sup> Curtice *et al.* 2012. *Why Ecosystem-Based Management May Fail without Changes to Tool Development and Financing*. *BioScience* 62(5), 508-515.

basis that such habitat provides in terms of ecosystem services. Once this is done, the FWS will be able to characterize the baseline more robustly, when it moves forward with the next steps of the OMB guided cost-benefit analysis. Incremental impacts and benefits can then be fully characterized as either augmenting, restoring, or degrading ecosystem services, rather than being limited to the monetary impacts of lost resource extraction activities only. Finally, FWS should use a 1% and a 0% discount rate when balancing the long-term benefits of designating critical habitat compared to potential short term impacts. These basic steps will significantly improve the analytical approach used by FWS when it conducts cost-benefit analyses.

## CONCLUSION

SCB is well aware that quantifying the value of ecosystem services of critical habitat, and doing so in the statutory time frame allowed, requires multiple layers of assumptions, simplifications, and uncertainties. However, these assumptions and simplifications are really no different than the assumptions made in traditional cost-benefit analyses on critical habitat about future resource extraction and development activities and the impacts that they will have on the economy, notwithstanding the complexities of a globally integrated economy. To the extent that FWS must conduct an economic analysis through the lens of the OMB's cost-benefit rubric, SCB urges FWS to augment its analysis with an accounting of the value of ecosystem services, and to carry out the other recommendations listed above.

SCB remains **unconvinced**, however, that cost-benefit analyses must be conducted in the first instance for several reasons. First, as the Supreme Court has noted, "Congress uses specific language when intending that an agency engage in cost-benefit analysis."<sup>118</sup> The ESA provides FWS with the *discretion* to "consider the economic impact, *and any other relevant impact*, of specifying any particular area as critical habitat." Had Congress wanted FWS to require a formal economic analysis of the incremental economic impacts of critical habitat, it certainly could have required that. Instead of requiring FWS to not designate critical habitat when economic costs outweighed benefits, Congress directed the FWS to designate habitat after *taking into consideration the economic impact, the national security impact and any other relevant impact*. The Congress provided discretion only as to which scientific methods to use for weighing economic and any other impacts.<sup>119</sup> A simple, qualitative balancing approach, without resort to complex economic calculations, may very well be preferable to a formal economic analysis. It would certainly cost less than the current practice of contracting out these economic analyses, some of which can cost hundreds of thousands of dollars to complete.<sup>120</sup> Spending money to complete these formal economic analyses detracts from the FWS's ability to do the substantive work of designating critical habitat for threatened and endangered species. With a current backlog of over 500 species that still have no critical habitat this is not an idle concern.<sup>121</sup> Delays in

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<sup>118</sup> *American Textile Mfrs. Institute, Inc. v. Donovan*, 452 U.S. 490, 511 (1981).

<sup>119</sup> Amy Sinden. 2004. The Economics of Endangered Species: *Why Less is More in the Economic Analysis of Critical Habitat Designation*. Harvard Environmental Law Review 28:129.

<sup>120</sup> *Id.* See also, Critical Habitat Clarifications, 64 Fed. Reg. 31,871 (June 14, 1999) ("Economic analysis done for critical habitat designation can be expensive. In the past, total costs for such analyses for critical habitat designations have cost as much as \$500,000.").

<sup>121</sup> As of April 2011, critical habitat has only been designated for 604 of the 1,372 (44%) species listed in the United States. USFWS 2011, Critical Habitat Fact Sheet. [http://www.fws.gov/endangered/esa-library/pdf/critical\\_habitat.pdf](http://www.fws.gov/endangered/esa-library/pdf/critical_habitat.pdf)

designating critical habitat delay species' recovery, which in turn results in additional biological costs to the species and economic "costs" to society.

Congress was aware that the passage of the Endangered Species Act, like the passage of *all* of federal environmental protection statutes, could lead to short term costs to the U.S. economy. But these laws were all passed knowing that the benefits vastly outweighed these costs, even where our society lacked a means of quantifying those benefits with dollar figures. There have been a few species that have been saved by the ESA that there are now thriving with commercial hunts of the once threatened American alligator being a prime example. However, for the overwhelming majority of endangered species, once they recover, they will never be hunted (except by nature photographers), and many of these species may never directly contribute to the United States economy. But that fact is not significant because *all* species, including endangered species, have intrinsic value that cannot and should not be seen as limited to the amount that can be quantified. In an ideal world, the exercise of valuing ecosystem services would not be needed either, because our society would have learned to use its resources sustainably, rather than having already cut down 90% of the nation's old growth forests.

Unfortunately, this is not an ideal world, and the FWS must make decisions about critical habitat. To the extent that FWS must conduct these formal economic analyses (SCB does not believe they are required in this particular form), FWS should make some effort to quantify the benefits of ecosystem services. Without this, all FWS is able to do is to express costs monetarily and benefits biologically. This "apples to oranges" comparison does not benefit threatened and endangered species because it tips the scales away from protection of these species, contrary to the purpose of the ESA. SCB therefore recommends that, having considered the economic impacts of designating critical habitat, that the FWS not exclude any proposed critical habitat, pursuant to that discretion in Section 4(b)(2), from the final rulemaking.

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