

THE CHALLENGING ROLE OF ECONOMICS IN THE DESIGNATION OF CRITICAL HABITAT¹

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ABSTRACT – This paper provides a brief overview of some of the challenges facing the U.S. Fish and Wildlife Service in incorporating economic information as part of its critical habitat designation process. The Service is required to explicitly consider the economic impacts of a designation before making any final determinations. As the critical habitat designations have become more numerous and in many cases, encompass large amounts of area involving many diverse groups of stakeholders, the framework and scope of the economic analysis has undergone considerable scrutiny. Not only is the analysis meant to aid decision-making, but it is also unique in that it describes the interpretation of the rule and its effects on the general public. The designation of critical habitat for the bull trout *Salvelinus confluentus* provides a good example to highlight some of these issues as it is also one of the few designations that expressly factored economic impacts into its final exclusions.

INTRODUCTION

The Endangered Species Act (Act) requires critical habitat to be designated when a species is afforded protection under the Act at the time it is listed. Critical habitat is defined under the Act to be those areas considered essential for the conservation of the protected species.² While the Act stipulates that the decision-making process to list a species be based on science, the decision-making process for the designation of critical habitat is required to also consider the economic impacts before making any final determinations. This paper will provide an overview of some of the challenges facing the U.S. Fish and Wildlife Service (Service) in incorporating economic information into its critical habitat rulemakings and in doing so, will highlight the case history of the critical habitat designations for the bull trout *Salvelinus confluentus* as it pertains to the continuing evolution of the economic analysis framework.

The Service initially proposed to designate critical habitat for the Columbia and Klamath River distinct population segments of the bull trout in November 2002, after listing the species as threatened under the Act in June 1998. In June 2004, the Service proposed to designate critical habitat for the Jarbidge, Coastal-Puget Sound, and Saint Mary-Belly populations after listing these species as threatened in 1999. In October 2004, the Service published a final critical habitat rule for the Columbia and Klamath populations. This final rule was one of the first to cite economic concerns as a rationale for making certain exclusions. The rationale behind these exclusions did not last long, however. In September 2005, the Service issued a final critical habitat rule for the Jarbidge, Coastal-Puget Sound, and Saint Mary-Belly populations and at that time also revised their final critical habitat determinations for the Columbia and Klamath populations. While many of the areas originally excluded under the original final critical habitat rule remained, the Service no longer cited economic concerns as the explicit rationale for exclusion.

While the Act has permitted decision-makers to exclude areas from critical habitat for economic impacts since it was amended in 1978 (partly in response to the Tellico Dam controversy) in reality this provision has been rarely exercised. Beginning in 2001, however, when the flood of lawsuits began

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² The term “conservation” is defined under the Act to mean the use of all methods and procedures necessary to recover the species and remove it from its protected status under the Act.

demanding the Service to designate critical habitat for listed species, a new Administration came to govern that was particularly interested in understanding who and how these designations would impact landowners. This raised the status of the economic analysis, which in turn raised a number of issues regarding how impacts were to be assessed and presented in a document that was increasingly playing a more direct role in the decision-making process. Among some of the issues that were raised at that time, which are still being discussed today are:

1. The uniformity of proposed essential habitat areas;
2. The spatial extent of an “area” in the economic analysis;
3. The identification and treatment of baseline conservation measures; and
4. How best to express potential economic benefits.

Each issue is discussed in greater detail, below.

THE UNIFORMITY OF ESSENTIAL HABITAT

Critical habitat is to be only those areas considered to be *essential* for the conservation of the species. However, this creates an automatic conflict with the mandate to consider the effects of economic impacts before making any final determinations. If the habitat is truly essential for conserving the species, then it stands to reason that it cannot be excluded from any critical habitat designation for economic reasons or else the goal of conservation could not be attained. Even after a final determination is made, however, it is not uncommon to see permitted land-use modifications suggesting that at least on a marginal scale certain areas of critical habitat may in fact be less essential for conservation than others.

In many cases, including the bull trout, the proposed critical habitat areas are so large that the Service cannot reasonably be expected to ascertain the uniformity of the entire area in terms of its habitat values for both the survival and recovery of the species. Instead, the Service defines a set of habitat characteristics (primary constituent elements) to clarify what landowners need to look for once their land has been officially included within the boundaries of a designation to determine whether or not their land has any of the physical features necessary to make it truly critical habitat for the listed species.

Most designations, including the bull trout, identify multiple habitat features that are considered to be essential for the conservation of the species. For the Columbia and Klamath populations of the bull trout, these features include: (1) space for individual and population growth; (2) food, water, or other nutritional requirements; (3) shelter; (4) breeding, reproduction, and rearing sites; and (5) habitats that are protected from disturbance. Clearly not all of these features will be uniformly present across every single area and clearly some of the areas will have better quality features than other areas. Over time this becomes more evident through the collection of more detailed data.

For example, the Service initially proposed designating 20,980 stream miles (18,449 miles was considered to be occupied) and 591,577 acres of lakes and reservoirs (561,481 acres were considered occupied) for all five populations of the bull trout in their 2002 and 2004 proposed rules. Later, in 2010, the Service changed its proposal for these populations to include 22,679 stream miles (21,718 occupied miles) and 533,426 acres of lakes and reservoirs (517,550 occupied acres). In both instances, the proposals were for areas considered to be essential for the conservation of the bull trout. The 2010 proposed rule explains the discrepancies to be based on better occupancy data and refined information on the importance of certain habitats. While the differences appear to be small in context of the entire amount of area being considered for designation, it illustrates the dynamics associated with defining essential areas. Developing a method to account for informational uncertainties in a quantitative manner combined with an accounting of the relative contribution of particular areas in terms of both current and future contributions for a species survival and recovery could aid the conservation process.

In fact, the Service’s sister agency, the National Marine Fisheries Service (NMFS) formerly recognized the habitat variability in their critical habitat designations for the Pacific *Oncorhynchus spp.* and Atlantic salmon *Salmo salar*. For these two rulemakings, NMFS developed a process to score areas proposed for critical habitat based on such biological criteria as the quantity and quality of the spawning and rearing characteristics of the habitat along with the migratory needs of the species. Habitat areas were given a ranking of either high, medium, or low based on their relative conservation value to the species.

Also, NMFS considered the probability that an area would be subject to a future consultation under the Act. This information was then weighed against the economic impacts associated with consultations under the Act for each area. The final critical habitat designation for the Pacific salmon and steelhead *O. mykiss* contained multiple economic exclusions, which were determined following a two-step process. Under the first step, NMFS identified all areas eligible for exclusion based on a relative scale of economic impact. Next, biological teams were asked to consider whether excluding any of the eligible areas, either alone or in combination with other eligible areas, would significantly impede conservation. Areas identified as high economic impact having low conservation value were excluded from the final designation thus avoiding potentially wasteful conservation measures in relatively unproductive areas.

SPATIAL EXTENT OF AN “AREA”

The second issue that the Service has wrestled with over the years pertains to the spatial extent of the economic analysis. The Act is clear in that before making a final determination about a critical habitat designation, the Service must take into consideration the economic impact of specifying *any particular area* as critical habitat. Areas can be excluded from critical habitat if it is determined that the benefits of exclusion outweigh the benefits of inclusion, unless the exclusion would result in the extinction of the species.

While the Act allows for the exclusion of any particular area if the benefits of exclusion outweigh the benefits of inclusion, the relationship of an area to a critical habitat unit is not defined. In addition, economic data are often only available along socio-political boundary lines, which often do not match up with critical habitat boundaries. Thus, the decision regarding the spatial detail of the economic analysis is frequently a balancing act, which must incorporate such factors as the time given to conduct the analysis, spatial extent of the designation, size of individual critical habitat units, and degree of stakeholder interest.

In general, the more refined an economic analysis becomes, the more time and resources it takes to conduct the study and present the findings in a useful format for decision-making. The benefit of such refinement is that it allows for the exclusion of finely targeted, high impact areas. When an economic analysis is conducted at a coarser scale, high impact economic activities may end up being lumped in with surrounding low impact areas, potentially resulting in inefficient economic exclusions, from a conservation perspective.³

The bull trout critical habitat rules provide a convenient example for illustrating the different methods used to define an area. In the November 2002 proposed critical habitat rule for the Columbia and Klamath distinct population segments, the Service's proposal was broken into 25 distinct critical habitat units based on geographic location. Economic impacts were assessed at the critical habitat unit level. The analysis found that the Willamette River Basin was forecasted to incur the most economic impact both in terms of total impact per unit as well as on a cost-per-river-mile. The analysis also reported that five of the 25 units in total accounted for over 50% of the total impact and that two units alone accounted for 25% of the total impact on a river-mile basis. Interestingly, these two units (Willamette and Malheur) accounted for just over 2% of the proposed river miles of the designation.

Based on these findings, the 2004 final critical habitat rule excluded both the Willamette and Malheur units specifically because of high economic impacts. This was one of the very first explicit economic exclusions in a critical habitat rulemaking. In addition, the final rule also collectively excluded waters impounded behind dams specifically out of concern for the potential economic impacts that were detailed within each unit. As previously mentioned, the rationale for excluding these areas for economic considerations did not last long. On September 26, 2005 the Service revised its 2004 final rule and

³ The first critical habitat rule to explicitly exclude proposed areas for economic impacts was for the four vernal pool crustaceans and eleven vernal pool plants in California and southern Oregon in August 2003. Due to several factors, the economic analysis estimated impacts at a county-wide scale. As a result, the final rule excluded several entire counties based on economic impacts although in reality the distribution of impacts within each county was not uniform across the areas proposed as critical habitat.

dropped any explicit reference to economic impacts as a rationale for excluding any areas without explanation.

During this period, it became apparent that the decision-makers were interested in better understanding economic impacts at a finer scale before making any final determinations. The Service similarly supported such an approach to avoid large scale exclusions where the economic impacts may be concentrated in just a small area within a unit. In response, the economic analysis for the proposed critical habitat rule for the Jarbidge, Coastal-Puget Sound, and St. Mary Belly bull trout was conducted at the fifth-field Hydrologic Unit Code (HUC), as defined by the U.S. Geological Survey. This gave the reader a deeper understanding of where exactly particular areas may incur disproportional or significant impacts beyond a simpler assessment conducted at the larger critical habitat unit scale.

For example, the economic analysis determined that the Lower Green critical habitat subunit was the most impacted within the entire Puget Sound unit. However, the analysis went further and identified the specific watershed within this subunit that incurred the most impact, which was the Lower Green watershed (HUC 1711001303) that accounted for 75% of the total subunit's impact. While the analysis was able to identify high cost area HUCs, which would allow a decision-maker to more finely exclude areas without affecting an entire unit or subunit, no exclusions were made based on economic impacts.

CONSIDERATION OF EXISTING CONSERVATION PROTECTION MEASURES

Typically an economic impact analysis assesses the state of change to society based on the expected difference between a “with” and “without” scenario of the proposed rule under consideration. However, for critical habitat rulemakings, following this standard has produced some confusing results. This is because once a species is protected under the Act, even absent the designation of critical habitat, the species along with its habitat is afforded significant protection. Once listed, federal agencies are required to consult with the Service on any action authorized, funded, or carried out to ensure that such action is not likely to jeopardize the continued existence of the listed species. Only after the designation of critical habitat is the Service compelled to consider the effects of an agency action in terms of whether or not it will also adversely modify critical habitat. The two terms, jeopardy and adverse modification were defined in such a similar manner that over time it became practically difficult to distinguish between actions that could jeopardize the species from those destroying or adversely modifying critical habitat.⁴

The nearly identical definitions fostered the Service's position that the conservation benefits afforded listed species through critical habitat designations were extremely marginal, particularly in areas determined by the Service to be occupied by the species. As a result the Service attributed the majority, if not all of the conservation protection measures to the listing process, which is not subject to any consideration of economic impacts. Consequently, many of the earlier economic analyses for critical habitat designations concluded that there would be no additional economic impacts resulting from such a designation.

However, a key event occurred that had a significant effect on how the economic analysis was conducted. On May 11, 2001, the United States Court of Appeals in the Tenth Circuit decided that the critical habitat economic analyses conducted by the Service were inadequate. Specifically, the Court found that an economic analysis that was focused solely on an assessment of impacts that were uniquely attributable to a critical habitat designation was virtually meaningless because the Service had been treating the protections afforded a species' critical habitat as co-extensive with the protections afforded a species' habitat through the listing process. While the Court explicitly recognized that the root of the problem lay with the similarity of the regulatory definitions, it was only able to instruct the Service to conduct a meaningful economic analysis that, if it must, assessed the impacts associated with the

⁴ The term “destruction or adverse modification” was defined at 50 CFR 402.02 as a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species, while the term “jeopardize” means the continued existence of means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.

avoidance of jeopardizing a species to the extent that such actions would also co-extensively avoid adversely modifying its critical habitat.

This led to a broad expansion of the economic analysis because at the time there was no clear guidance on how to practically distinguish between the two standards during consultation, particularly for occupied habitat. Consequently, both of the bull trout economic analyses reported co-extensive economic impacts associated with the proposed designations. Co-extensive impacts included reasonably foreseeable actions having a federal nexus that may first require consultation with the Service before getting permission to proceed. Both of the analyses also had to wrestle with the fact that already there were significant baseline protection measures that benefited the bull trout and its habitat along with other species. Determining what was attributable to bull trout and what was not was extremely difficult, and the analyses made clear that many of the land and water management practices and standards could be traced to measures designed to emphasize habitat protection for Pacific salmon.

This relates to a second complicating factor. Not only did bull trout habitat overlap in many areas with protected Pacific salmon habitat, NMFS was simultaneously proposing critical habitat for the salmon as well. There was considerable concern, particularly from oversight agencies as well as interested stakeholders, that both analyses could potentially claim as baseline protection those protection measures afforded to the other species as a result of its listing and critical habitat designation. If such a framework were to be followed, both analyses would have failed to properly assess the full economic impact associated with the rulemaking and thus run afoul of other federal rulemaking requirements leading to the certainty of future lawsuits.⁵ Given the backlog of critical habitat designations needed to be promulgated by the Service at this time and the desire to avoid future litigation particularly in regards to the economic analysis, considerable effort was taken to recognize within the analysis the likelihood of any future overlapping conservation measures with the salmon but to also include such impacts as co-extensive with the bull trout to the extent that such measures were also necessary to conserve the bull trout as part of a future project should the salmon not have shared in the bull trout's habitat (e.g. construction of fish ladders).

The Columbia and Klamath economic analysis analyzed each of the 25 units for reasonably foreseeable land use management actions having a federal nexus that may require changes in project management or behavior to avoid adversely modifying bull trout critical habitat even if such measures co-extensively avoided jeopardizing the species. Undertaking this task was even more difficult given that the proposed rule did not specifically identify or discuss the types of special management or habitat protection measures that may be necessary to conserve the species. Instead, the proposed rule focused on describing the features necessary for bull trout survival and recovery. In response, the economics team collected as many bull trout section 7 consultations as it could and went through them to determine the types of actions that triggered section 7 consultations, the special management protection measures described in the consultation, the federal action agency, and if applicable, any non-federal third-party associated with the outcome of the consultation.

The draft economic analysis of the Columbia and Klamath proposed rule concluded that the co-extensive conservation-related impacts associated with the designation of critical habitat impacts to range between \$20 million to \$26 million (U.S.) annually and that federal agencies would incur approximately 70 to 75% of the total costs. It found that most of the forecast project modification costs were dam and reservoir related (42%) with other conservation costs associated with timber harvest (29%), USFS-related water diversions (12%), habitat conservation plans (8%) and placer gold mining and other events (3%). The economic analysis for the Puget Sound, Jarbidge, and St. Mary Belly bull trout found that the total

⁵ There are a number of analytical requirements associated with federal rulemakings that are independent of the Endangered Species Act. Executive Order 12866 requires agencies to formally assess both the economic costs and benefits of their regulations (including cumulative effects) and to consider regulatory alternatives that will minimize the burden to regulated entities. The Regulatory Flexibility Act requires agencies to determine whether or not their regulations will impose a significant impact on a substantial number of small entities and if it does, develop a Regulatory Flexibility Analysis containing regulatory alternatives to minimize the burden on small entities.

co-extensive impact of conservation-related impacts to be \$60.8 million, annually and that the highest economic impact was associated with conservation measures associated with residential and commercial real estate development (\$26.1 million, annualized), which represented about 44% of the total co-extensive impacts. Conservation measures associated with hydroelectric projects was estimated to be only \$5.1 million, annually, or about 8% of the total.

In contrast, the Service recently re-proposed critical habitat for all of the bull trout populations and has modified its definition of baseline conditions. The economic analysis for this proposal attempts to more formerly distinguish between economic impacts directly attributable to a critical habitat designation from those that may occur co-extensively with listing protections. To do this, the Service had to develop an Incremental Effects Memo that detailed to the economists exactly how conservation measures would be applied with and without critical habitat. The memo instructed the economics team to expect no differences in conservation measure outcomes for consultations involving occupied critical habitat but that the administrative process of considering the impacts of a proposed project on critical habitat would add a 33% additional administrative burden to the Service and associated action agencies. The memo stated that only conservation measures associated with areas identified as unoccupied critical habitat were to be attributed to the proposed rule. Accordingly, the draft economic analysis for a rule very similar to the earlier proposals now estimates economic impacts to range between \$5.0 - \$7.1 million per year. Still, the greatest impact is expected to be associated with dam modification projects, such as the installation of fish passages, temperature controls, and flow monitoring and management for the species.

ECONOMIC BENEFITS

For the 2002 proposed rule, a preliminary estimate of the economic benefits was conducted as part of the initial draft report on economic impacts. Economic benefits were broken down into four distinct categories: (1) direct (use) benefits; (2) existence values; (3) indirect benefits (i.e., ecosystem services); and (4) total value. Only direct-use benefits were estimated, while the other types of benefits were described anecdotally.

The draft chapter estimated that the direct benefit associated with a restored bull trout sport fishery to be about \$6 million per year or less in the Columbia Basin and \$100,000 per year or less in the Klamath Basin. These estimates were based on the assumptions that a restored Klamath bull trout fishery would result in an additional 3,000 to 4,000 days per year of bull trout fishing in streams and that a restored Columbia Basin bull trout fishery would result in an increase between 218,000 to 269,000 angler days each year and that the economic surpluses associated with a restored bull trout fishery ranged between \$17 per day for in-state anglers to \$50 per day for out-of-state anglers.

One issue that was raised internally in reviewing this estimate was with the assumption made in the economic analysis that critical habitat would lead to a fully recovered bull trout population that could be freely targeted by sportsmen within 25 years. Although Service biologists certainly supported this goal, at the time they could not necessarily agree that the designation of critical habitat would lead to recovery within the next 25 years. To the extent that a delisting occurs further out in time, the present value of the future stream of economic benefits would be lower than that reported. Also, to the extent that a restored fishery results in fewer additional angler days than forecasted (due to demographic changes in preferences over time, for example), the economic surplus and increased angler day estimates would also be overstated.

The second component of economic benefit, existence value, relates to the concept that certain members of our society place a value on simply knowing that an endangered or threatened species continues to exist in its natural environment and are willing to pay to support this benefit. The analysis surveyed the economics literature for published studies that estimated the existence values for other endangered and threatened fishes. None of these studies related to the bull trout and given the fact that the reported values in the studies varied widely depending on the species, location, and survey method, made the authors reluctant to attempt any type of credible benefit-transfer method.

Another potential economic benefit discussed in the draft was the potential for indirect benefits. Indirect economic benefits could include project modification cost savings for other listed species that

concurrently benefit from bull trout conservation measures, improvements or avoidance of degradation of certain ecosystem services (e.g., drinking water), and benefits to certain types of recreationists through the maintenance of in-stream flows. Many of these benefits potentially overlap one another, making estimation difficult to credibly quantify. In addition, as previously mentioned, NMFS was in the process of promulgating their own set of critical habitat rules for the Pacific salmon, which further complicated the reporting of impacts without double counting.

The chapter also discussed an alternative perspective for assessing the beneficial economic impacts associated with the conservation of the bull trout – total value. Total value in this context refers to the value placed on all possible motivations or uses including direct and indirect use, and existence motives. Total value may be reflected in the resources society chooses to invest in such conservation actions as fish and wildlife mitigation actions under the Northwest Power Act and the decision by the Confederated Salish and Kootenai Tribes to implement its Wetland/Riparian Habitat and Bull Trout Restoration Plan.

CONCLUSIONS AND RECOMMENDATIONS

Below are several suggestions aimed to improve the efficacy of the economic analysis as well as to clarify its role in the decision-making process based on some of the examples discussed.

First, adopting new and clearly distinct regulatory definitions for the terms jeopardy and adverse modification would enable all stakeholders under the critical habitat process to better understand the differences in conservation standards and expectations with and without critical habitat. This will aid conservation by making the consultation process under the Act more efficient as stakeholders could better understand and estimate the type and scale of conservation measures that would likely be imposed for their actions without first having to undergo a formal or informal consultation process. This will also help the Service become even more efficient at streamlining the consultation process as it would hopefully result in a reduction in the time and effort involved in a consultation as project proponents would know ahead of time what would be reasonably expected of them for their proposed actions. Finally, new definitions could also help reduce the seemingly endless rounds of litigation pertaining to the scale and scope of critical habitat designations as it would become increasingly transparent to all parties how the designations proposed by the Service will result in actual conservation to our trust species.

Second, in order for the economic analysis to have any real, practical role in the decision-making process, there should be formal recognition that not all areas proposed for critical habitat are uniform in their habitat qualities. Formally grading or ranking areas based on a selected set of habitat qualities and abundances that are unique to each designation would allow for a better understanding of the relative contribution of proposed areas for a species' survival and recovery. Should the Service be given more time and resources to adopt such a framework, the conservation process could become more efficient and productive as limited conservation resources could be better targeted to the areas that would provide the greatest conservation benefit to our trust species. Obviously, the dividends associated with this framework increase the more refined an area is defined. Developing a habitat ranking scale based on the critical habitat units proposed for the Columbia and Klamath populations of bull trout in their 2002 proposed rule would not have been as conducive for identifying areas that are most cost-effective or least cost-effective for conservation as developing a habitat ranking scale based on individual HUCs. Obviously this takes more up-front time and resources but in the long run could provide a very beneficial roadmap for cost-effective conservation.

Third, caution needs to be exercised in the attempt to measure economic benefits from associated conservation actions. In many cases, in contrast to the bull trout, there are likely no foreseeable direct use benefits. Also, out of the nearly 1,400 species protected under the Act, many are unknown to the general population, raising questions about the plausibility of any meaningful existence values. To advocate for a change in policy that measures economic benefits potentially turns the economic impact analysis into a cost-benefit analysis, which would make it even more difficult to defend any decisions not to exclude areas based on disproportional economic effects. The Act requires only that economic impacts be considered by decision-makers. Economic impacts are commonly defined as the net changes in economic

activity within a regional economy associated with the government action. In contrast, economic benefits refer a different concept – total social welfare – and include both market and nonmarket values. There really is no need to formally assess the net change in total social welfare in order to achieve the desired goals and objectives of the Act if instead the decision-making process focuses on following a cost-effectiveness approach based on economic impacts and how species will physically benefit from land-use management changes.

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