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MEMORANDUM | FEBRUARY 7, 2016

TO U.S. Fish and Wildlife Service (Service)

FROM Industrial Economics, Incorporated (IEc)

SUBJECT Draft Screening Analysis of the Likely Economic Impacts of Critical Habitat Designation for the Sonoyta Mud Turtle

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On September 21, 2016, the Service published a proposal to list the Sonoyta mud turtle (*Kinosternon sonoriense longifemorale*; hereafter the "mud turtle") as endangered.[1] The Service intends to publish a proposed rule to designate critical habitat for the mud turtle. As part of the rulemaking process, the Service must consider the economic impacts, including costs and benefits, of the proposed rule in the context of three separate requirements:[2]

- **Executive Order (EO) 12866 *Regulatory Planning and Review***, which directs Agencies to assess the costs and benefits of the regulatory action;[3]
- **Section 4(b)(2) of the Endangered Species Act (the Act)**, which requires the Secretary of the Interior to consider economic impacts prior to designating critical habitat; and
- **Regulatory Flexibility Act (RFA)**, which requires Federal agencies to prepare and make available for public comment an initial regulatory flexibility analysis that describes the effect of a proposed rule on small entities. No initial regulatory flexibility analysis is required if the head of the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities.[4,5]

This memorandum provides information for the Service on the likely costs and benefits of the proposed critical habitat designation in order to determine whether the rule meets the threshold for an economically significant rule.[6] This memorandum also discusses the geographic areas or specific activities that could experience the greatest impacts,

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[1] 81 FR 64829.

[2] Additional laws and executive orders require the consideration of the distribution of impacts on vulnerable subpopulations, such as state or local governments. These requirements for distributional analysis are beyond the scope of this memorandum.

[3] Executive Order (EO) 12866 *Regulatory Planning and Review*, September 20, 1993. As affirmed by *Executive Order 13563: Improving Regulation and Regulatory Review*. January 18, 2011.

[4] 5 U.S.C. § 601 et seq.

[5] For a discussion of the Service's findings regarding the RFA and other relevant statutes, please refer to the preamble to the proposed rule published in the Federal Register.

[6] For the definition of "economically significant rule," please refer to section 3(f)(1) of EO 12866.

measured in terms of changes in social welfare, to inform the Secretary's decision under section 4(b)(2).[7]

FINDINGS OF THE SCREENING ANALYSIS

Critical habitat designation for the mud turtle is unlikely to generate costs exceeding $100 million in a single year. Therefore, the rule is unlikely to meet the threshold for an economically significant rule, with regard to costs, under E.O. 12866. Data limitations prevent the quantification of economic benefits.

Section 7 Costs

The economic costs of implementing the rule via section 7 of the Act will most likely be limited to additional administrative efforts to consider adverse modification. This finding is based on the following factors:

- All proposed critical habitat falls on National Park Service (NPS) lands, within the Organ Pipe Cactus National Monument (OPCNM).
- The NPS anticipates that limited activities will occur in the 12.3 proposed acres of occupied habitat over a 20 year timeframe.[1] Where projects are anticipated, project modifications requested to avoid adverse modification are anticipated to be the same as those that would be needed to avoid jeopardy of the species because the primary threats to the species are also habitat-related (i.e., reduction or destabilization of the hydrological system that supports Quitobaquito spring).

The NPS anticipates one or two consultations over the next five to ten years related to vegetation, water, or mud turtle management at Quitobaquito Pond; border infrastructure and enforcement projects; or management plans. New consultations are not expected to result solely from the designation of critical habitat because the species is present in the unit. Because effects to the species itself are so inextricably connected to the physical and biological features of critical habitat, the Service does not anticipate that the critical habitat designation would result in any additional conservation measures. As such, incremental costs are expected to be limited to the additional administrative costs of addressing adverse modification in consultations that would have already been anticipated to occur for the mud turtle. These incremental costs are not expected to exceed $8,500 (2017 dollars) in any given year.

Other Costs

The designation of critical habitat is not expected to trigger additional requirements under state or local regulations nor is the designation expected to have perceptional effects on markets.

Section 7 and Other Benefits

Additional section 7 efforts to conserve the mud turtle are not predicted to result from the designation of critical habitat. Thus, the designation is unlikely to measurably increase the probability that the species will be conserved, and benefits are unlikely to exceed $100 million in a given year.

Geographic Distribution of Costs

We expect all costs related to habitat designation to be limited to the occupied Quitobaquito unit in Organ Pipe Cactus National Monument in southern Arizona. The remaining occupied habitat is in Mexico, and as such cannot be designated as critical habitat.

[1] We apply a study period of 20 years for purposes of this analysis. We believe projecting economic activity beyond 20 years is highly speculative. OMB notes that "for most agencies, a standard time period of analysis is 10 to 20 years…" (U.S. Office of Management and Budget, "Regulatory Impact Analysis: Frequently Asked Questions (FAQs)." 2011).

[7] The discipline of welfare economics focuses on maximizing societal well-being (see Just et. al. 2004. The Welfare Economics of Public Policy: A Practical Approach to Project and Policy Evaluation. Edward Elgar Publishing, Cheltenham and Northampton). It measures costs and benefits in terms of the opportunity costs of employing resources for the conservation of the species and individual willingness to pay to conserve those species. Opportunity cost is the value of the benefit that could have been provided by devoting the resources to their best alternative uses. Opportunity costs differ from the measurement of accounting costs (e.g., actual expenses). Welfare economics is recognized by the U.S. Office of Management and Budget (OMB) as the appropriate tool for valuing the costs and benefits of proposed regulatory actions (OMB, "Circular A-4." September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4).

To prepare this assessment, we rely on: (1) the Service's geographic information systems (GIS) data layers for the draft proposed rule; (2) the Service's incremental effects memorandum; and (3) the results of the Service's outreach efforts to other Federal agencies and potentially affected Tribes concerning the likely effects of critical habitat.

SECTION 1. BACKGROUND

The mud turtle is an aquatic turtle endemic to the Rio Sonoyta watershed in southwestern Arizona and northwestern Sonora, Mexico. Mud turtles occur in arid areas that commonly experience drought and extreme heat and need perennial sources of water with aquatic vegetation and riparian areas with moist soil to survive and complete life history functions. Generally, mud turtles are found in natural and artificial ponds and stream channels.

Specifically, the species has been known to occur at Quitobaquito Springs in Organ Pipe Cactus National Monument (OPCNM) in southern Arizona, and along the Rio Sonoyta and Quitovac Spring in Sonora, Mexico. In the United States, the entirety of the mud turtle's habitat is owned by the National Park Service (NPS) within the OPCNM. The Service is proposing to designate this area as critical habitat.[8] Exhibit 1 presents a map of the proposed critical habitat unit for the mud turtle, as well as the overlap with designated critical habitat for the desert pupfish. The proposed Quitobaquito unit consists of 12.3 acres of occupied habitat within the OPCNM managed by the NPS.

The physical and biological features essential to the conservation of the species are the consistent presence of surface water and associated aquatic habitat, adequate invertebrate prey, riparian habitat with nesting and estivation sites, and the absence of non-native predators and competitors. The Service believes that factors affecting the continued survival of the species are drought, groundwater depletion and surface water diversion caused by agricultural activity in the Rio Sonoyta Valley, and water demand in the nearby border towns of Sonoyta (located in Sonora, Mexico) and Lukeville (located in Pima County, Arizona). The Service believes that drought and groundwater pumping, exacerbated by climate change, are the activities causing population level impacts to the Quitobaquito Springs population in the United States. Various efforts are currently being undertaken to promote the conservation of the mud turtle and other species dependent on the aquatic and riparian habitats of the Quitobaquito Spring, including development of a conservation agreement by the Quitobaquito Rio Sonoyta Work Group.[9]

The NPS anticipates one or two consultations over the next five to ten years related to vegetation, water, or mud turtle management at Quitobaquito Pond; border infrastructure and enforcement projects; or management plans. A formal consultation, Emergency Actions to Stabilize Quitobaquito Pond, and Related Activities, is currently under reinitiation to address removal of a cottonwood tree, repair a berm, and re-line Quitobaquito pond to stabilize water levels in the pond.[10]

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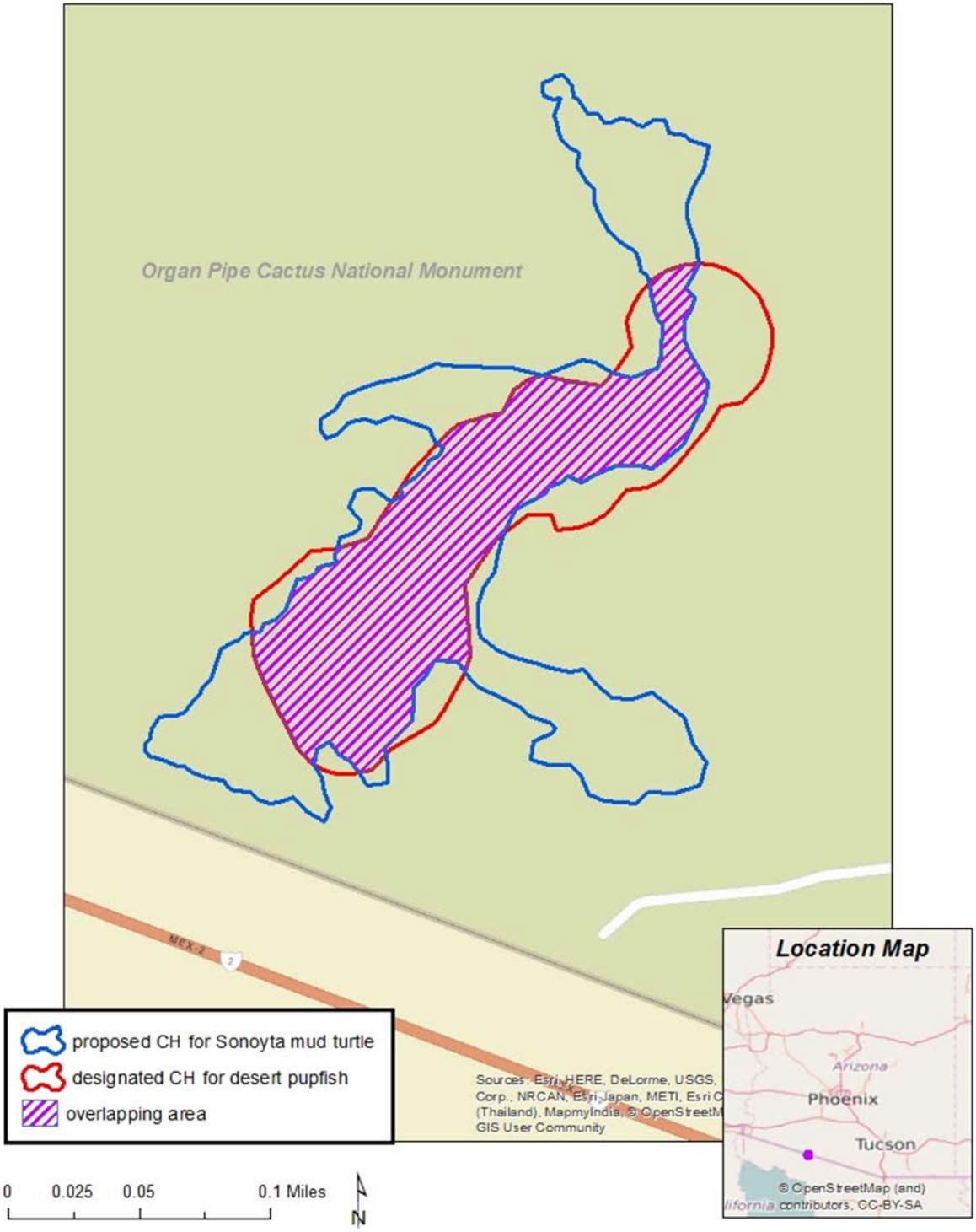
[8] U.S. Fish and Wildlife Service. December 14, 2016. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Sonoyta Mud Turtle (*Kinosternon sonoriense longifemorale*).

[9] *Ibid*.

[10] *Ibid*.

EXHIBIT 1. OVERVIEW MAP OF PROPOSED MUD TURTLE CRITICAL HABITAT



SOURCE: U.S. Fish and Wildlife Service. December 14, 2016. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Sonoyta Mud Turtle (*Kinosternon sonoriense longifemorale*). Figure 3.

SECTION 2. FRAMEWORK

Guidelines issued by the U.S. Office of Management and Budget (OMB) for the economic analysis of regulations direct Federal agencies to measure the costs and benefits of a regulatory action against a baseline (i.e., costs and benefits that are "incremental" to the baseline). OMB defines the baseline as the "best assessment of the way the world would look absent the proposed action."[11] In other words, the baseline includes any existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users affected by the designation of critical habitat. The baseline includes the economic impacts of listing the species under the Act, even if the listing occurs concurrently with critical habitat designation. Impacts that are incremental to the baseline (i.e., occurring over and above existing constraints) are those that are solely attributable to the designation of critical habitat. This screening analysis focuses on the likely incremental effects of the critical habitat designation.

We consider incremental effects of the designation in two key categories: 1) those that may be generated by section 7 of the Act; and 2) other types of impacts outside of the context of section 7:

- **Incremental section 7 impacts:** Activities with a Federal nexus that may affect listed species are subject to section 7 consultation to consider whether actions may jeopardize the existence of the species, even absent critical habitat.[12] As part of these consultations, critical habitat triggers an additional analysis evaluating whether an action will diminish the recovery potential or conservation value of the designated area. Specifically, following the designation, Federal agencies must also consider the potential for activities to result in the destruction or adverse modification of critical habitat. These consultations are the regulatory mechanism through which critical habitat rules are implemented. Any time and effort spent on this additional analysis, as well as the costs and benefits of implementing any recommendations resulting from this review, are economic impacts of the critical habitat designation.
- **Other incremental impacts:** Critical habitat may also trigger additional regulatory changes. For example, the designation may cause other Federal, state, or local permitting or regulatory agencies to expand or change standards or requirements. Regulatory uncertainty generated by critical habitat may also have impacts. For example, landowners or buyers may perceive that the rule will restrict land or water use activities in some way and therefore value the use of the land less than they would have absent critical habitat. This is a perception, or stigma, effect of critical habitat on markets.

SECTION 3. SECTION 7 COSTS OF THE CRITICAL HABITAT RULE

In this section, we discuss the likelihood that the designation of critical habitat will result in incremental costs through the section 7 consultation process. In the baseline, section 7

[11] OMB, "Circular A-4," p. 15. September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4. Circular A-4 provides "guidance to Federal Agencies on the development of regulatory analysis as required under Section 6(a)(3)(c) of Executive Order 12866…", p.1.

[12] A Federal nexus exists for activities authorized, funded, or carried out by a Federal agency.

of the Act requires Federal agencies to consult with the Service to ensure that their actions will not jeopardize the mud turtle. Once critical habitat is designated, section 7 requires Federal agencies to ensure that their actions will not adversely modify critical habitat of the mud turtle. Thus, a key focus of this screening analysis is whether the designation of critical habitat would trigger project modifications to avoid adverse modification that would be above and beyond any modifications triggered by adverse effects to the species themselves.

Incremental costs associated with section 7 consultations for the mud turtle are likely limited to administrative costs. This conclusion is based on two factors:

1. The single proposed critical habitat unit is considered occupied and is located on lands owned and managed by the NPS. Therefore, all activities occurring within the proposed critical habitat will be subject to section 7 requirements regardless of whether critical habitat is designated due to the presence of the species. The Service notes, "[w]e do not envision that there would be any consultations based solely on designated critical habitat." [13]

2. Project modifications requested to avoid adverse modification are anticipated to be the same as those that would be needed to avoid jeopardy of the species because the primary threats to the species are also habitat-related (i.e., degradation of habitat). [14] In addition, conservation measures are already implemented by OPCNM during activities that could potentially affect the Sonoyta mud turtle and its habitat. As noted in the IEM, "[t]hese ongoing land management activities are considered part of the baseline because they will provide some benefits to the Sonoyta mud turtle with or without critical habitat designation…"[15]

Based on the existing baseline protections afforded the mud turtle, we do not forecast any incremental costs associated with project modifications as a result of critical habitat designation. Anticipated section 7 consultations that occur are likely to result in limited additional administrative efforts to consider adverse modification during the consultation process. [16]

MAGNITUDE OF INCREMENTAL COSTS

We provide information on the likely frequency of consultation activity to gauge the magnitude of incremental administrative costs. The Service estimates that approximately one or two consultations will occur every five to ten years due to vegetation, water, or mud turtle management at Quitobaquito Pond; border infrastructure and enforcement projects; or management plans in OPCNM.[17]

Exhibit 2 presents the per-consultation administrative costs used in this analysis. Based on our existing consultation model, which forecasts a typical increase in effort for

[13] U.S. Fish and Wildlife Service. December 14, 2016. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Sonoyta Mud Turtle (*Kinosternon sonoriense longifemorale*). Page 20.

[14] *Ibid*. Page 18.

[15] *Ibid*. Page 15.

[16] Personal communication with the Service on December 8, 2016.

[17] U.S. Fish and Wildlife Service. December 14, 2016. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Sonoyta Mud Turtle (*Kinosternon sonoriense longifemorale*). Page 21.

incremental consultations, we estimate incremental administrative costs of approximately $1,400 for additional Service effort associated with critical habitat for a formal consultation. Total additional administrative costs for addressing adverse modification, including additional Action agency costs (e.g., NPS), as well as the Service's costs, are approximately $4,300 per formal consultation effort.[18]

EXHIBIT 2. INCREMENTAL ADMINISTRATIVE COSTS PER CONSULTATION (2017$)

CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	BIOLOGICAL ASSESSMENT	TOTAL COSTS[1]
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION (OCCUPIED HABITAT)[2]				
Formal	$1,400	$1,600	$1,200	$4,300

Source: IEc analysis of administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2017, and a review of consultation records from several Service field offices across the country conducted in 2002.
Notes:
1. Estimates are rounded to two significant digits and may not sum due to rounding.
2. Estimates reflect average hourly time required by staff.

Assuming that two formal consultations occur in the first year of designation, and every five years thereafter, incremental costs of critical habitat designation for the mud turtle over the next 20 years are expected to be approximately $22,000 (present value assuming a seven percent discount rate, 2017 dollars) or $28,000 (assuming a three percent discount rate, 2017 dollars). [19] The highest costs in a given year are approximately $8,500 (undiscounted) and occur in the first year. Exhibit 3 summarizes estimated incremental costs.

[18] NPS's incremental cost per consultation includes approximately $1,600 for the consultation and $1,200 for incremental effort on the biological assessment.

[19] We use discount rates to calculate the costs of the rule in present value terms. This calculation is intended to address the fact that real costs accruing in different time periods are unlikely to be weighted equally for two, interrelated reasons: (1) individual time preferences (people generally prefer to receive benefits as soon as possible and defer costs), and (2) opportunity costs (resources received today can be invested to yield a positive return while resources expended are no longer available for investment). Analysts account for the effects of timing by discounting future impacts to the "base year" of the analysis, commonly the first year in which the regulation is implemented. In accordance with OMB guidance (U.S. Office of Management and Budget, Circular A-4, September 17, 2003), we calculate the present value of the annual costs using real discount rates of three and seven percent. For this cost analysis, we use a base year of 2017. Finally, we believe projecting economic activity beyond 20 years is highly speculative. OMB notes that "for most agencies, a standard time period of analysis is 10 to 20 years…" (U.S. Office of Management and Budget, "Regulatory Impact Analysis: Frequently Asked Questions (FAQs)," 2011).

EXHIBIT 3. SUMMARY OF INCREMENTAL COSTS

UNIT	VALUE	THREE PERCENT DISCOUNT RATE	SEVEN PERCENT DISCOUNT RATE
Quitobaquito Unit	Present Value over 20 years	$28,000	$22,000
	Annualized over 20 years	$1,900	$2,100
Note: Costs are rounded to two significant digits.			

SECTION 4. OTHER COSTS OF THE CRITICAL HABITAT RULE

This section discusses the potential for incremental costs to occur outside of the section 7 consultation process. These types of costs include triggering additional requirements or project modifications under state laws or regulations, and perception effects on markets. These types of impacts may occur even when activities do not have a Federal nexus for consultation.

ADDITIONAL STATE REGULATION

Incremental costs may occur outside of the section 7 consultation process if the designation of critical habitat triggers additional requirements or project modifications under state or local laws, regulations, or management strategies. These types of costs typically occur if the designation increases awareness of the presence of the species or the need for protection of its habitat. Such costs may occur even when activities do not have a Federal nexus for consultation. In this case, the proposed critical habitat is located entirely on federally managed lands. The Service is not aware of any relevant state or local regulations that would be triggered by the designation of critical habitat for the mud turtles.[20]

POSSIBLE IMPACTS OF PUBLIC PERCEPTION

Comments received regarding proposed designations of critical habitat in various locations throughout the United States indicate that the public perceives critical habitat designation as possibly resulting in incremental changes to private property values, above and beyond those associated with specific forecast project modifications under section 7 of the Act.[21] These commenters believe that, all else being equal, a property that is inhabited by a threatened or endangered species, or that lies within a critical habitat designation, will have a lower market value than an identical property that is not inhabited by the species or that lies outside of critical habitat. This lower value results from the perception that critical habitat will preclude, limit, or slow development, or somehow alter the highest and best use of the property.

[20] U.S. Fish and Wildlife Service. December 14, 2016. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Sonoyta Mud Turtle (*Kinosternon sonoriense longifemorale*).

[21] See, for example, public comments on the possible impact of designating private lands as critical habitat for the Northern spotted owl (as summarized in Industrial Economics, Incorporated. Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl: Final Report. Prepared for the U.S. Fish and Wildlife Service. November 20, 2012. (p.5-21) and the cactus ferruginous pygmy owl (as summarized in Industrial Economics, Incorporated. Economic Analysis of Critical Habitat Designation for the Cactus Ferruginous Pygmy-Owl. Prepared for the U.S. Fish and Wildlife Service. June 1999. p.44)).

Public attitudes about the limits and costs that the Act may impose can cause real economic effects to the owners of property, regardless of whether such limits are actually imposed. Over time, as public awareness grows of the regulatory burden placed on designated lands, particularly where no Federal nexus compelling a section 7 consultation exists, the effect of critical habitat designation on properties may subside.

As mud turtle critical habitat is located entirely on NPS lands, we do not anticipate incremental costs arising from public perception of the designation.

SECTION 5. GEOGRAPHIC DISTRIBUTION OF SECTION 7 AND OTHER COSTS

We expect all costs related to habitat designation to be limited to the occupied Quitobaquito unit in OPCNM in southern Arizona. The remaining occupied habitat is in Mexico, and as such cannot be designated as critical habitat.

SECTION 6. SECTION 7 AND OTHER ECONOMIC BENEFITS

The primary intended benefit of critical habitat is to support the conservation of threatened and endangered species, such as the Sonoyta mud turtle. In order to quantify and monetize direct benefits of the designation, information would be needed to determine (1) the incremental change in the probability of mud turtle conservation expected to result from the critical habitat designation, and (2) the public's willingness to pay for such beneficial changes.

As described in this memorandum, additional project modifications to avoid adverse modification of critical habitat for the mud turtle are not anticipated. Thus, the designation is unlikely to measurably increase the probability that the species will be conserved, and benefits are unlikely to exceed $100 million in a given year.

SECTION 7. SUMMARY

The incremental costs of the proposed critical habitat designation for Sonoyta mud turtle are likely to be limited to additional administrative effort to consider adverse modification in consultations. This finding is based on two factors:

1. All activities with a Federal nexus occurring within the proposed critical habitat area will be subject to section 7 consultation requirements regardless of critical habitat designation due to the presence of listed species; and,
2. Project modifications requested to avoid adverse modification are likely to be the same as those needed to avoid jeopardy of the mud turtle or other listed species.

The incremental administrative burden resulting from the designation of critical habitat for the mud turtle is not anticipated to reach $100 million in any given year based on the anticipated annual number of consultations and associated consultation costs, which are not expected to exceed $8,500 (undiscounted) in any given year. The designation is unlikely to trigger additional requirements under state or local regulations and is not expected to have perceptional effects. Because the designation is not expected to result in incremental conservation efforts for the species, the designation is unlikely to measurably increase the probability that the species will be conserved, and benefits are also unlikely to exceed $100 million in a given year.