

MEMORANDUM | February 5, 2014

TO U.S. Fish and Wildlife Service (Service)
FROM Industrial Economics, Incorporated (IEc)
SUBJECT Supplemental Information on Perceptual Effects – Critical Habitat Designation for the Salt Creek Tiger Beetle

This memorandum provides supplemental data supporting the conclusion that the designation of critical habitat for the Salt Creek tiger beetle (*Cicindela nevadica lincolniana*, hereafter referred to as the “beetle”) is unlikely to result in costs equal to or exceeding \$100 million in a single year. Specifically, it provides an estimate of the value of grazing activities supported by privately-owned lands within proposed critical habitat. Public perception regarding the possible imposition of restrictions on the use of these lands for grazing activities may affect their value. This estimate suggests that the aggregate present value of grazing activities on these lands is less than \$100 million.

SECTION 1. BACKGROUND

Concurrent with this effort, we prepared a separate memorandum for the Service estimating the likely section 7 costs of the proposed critical habitat designation for the beetle. As discussed in that memorandum, we conclude that forecast costs under section 7 of the Endangered Species Act (the Act) are likely to be limited to administrative costs of consultation; project modifications for highway projects; and possible grazing restrictions due to participation in conservation partnership between the Service and agencies or conservation organization landowners, such as the Nebraska Game & Parks Commission.

Comments received regarding prior critical habitat designations in various locations throughout the United States indicate that the public perceives critical habitat 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.¹ 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 alter the highest and best use of the property (e.g., grazing). 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 section 7

¹ See, for example, public comments on the possible cost of designating private lands as critical habitat for the Northern spotted owl (as summarized in Industrial Economics, Incorporated. 2012. *Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl: Final Report*. Prepared for the U.S. Fish and Wildlife Service. p. 5-21) and the cactus ferruginous pygmy owl (as summarized in Industrial Economics, Incorporated. 1999. *Economic Analysis of Critical Habitat Designation for the Cactus Ferruginous Pygmy-Owl*. Prepared for the U.S. Fish and Wildlife Service. p. 44).

consultations exists, the effect of critical habitat designation on properties may subside. Ideally, to estimate the amount by which land values may be diminished and the duration of this effect, we would conduct a retrospective study of existing critical habitat designations. We would use statistical analysis of land sales transactions to compare the value of similar parcels located within and outside of critical habitat. However, such primary research, which requires substantial collection and generation of new data, is beyond the scope of this effort. Furthermore, while some research has been conducted on the effect of the Act on perception and land use decisions, the results of these studies are not transferrable to this situation.

Specifically, several published studies provide evidence that public perception can result in material effects, even absent participation in a section 7 consultation. For example:

- List et al. (2006) examined the effect of the publication of the proposed critical habitat boundaries for the cactus ferruginous pygmy owl near Tucson, Arizona. The authors found that vacant land parcels included in the proposal were developed on average about one year earlier than similar, non-critical habitat parcels. The authors suggest this preemptive behavior was a response to the proposal based on the perception that the final designation could impede landowners' ability to develop these parcels. They acknowledge that the landowner would have developed the land in any case, suggesting that "such a shift can, however, carry a considerable economic cost, and in some circumstances the landowner might not have opted to destroy the habitat had he observed how land prices actually evolved." List et al. also compare land prices within and outside proposed critical habitat and found that "undeveloped land fell in value by about 22% if it was within the critical habitat boundaries."
- Lueck and Michael (2003) found that landowners in North Carolina preemptively prevent the establishment of old-growth pine stands by harvesting more frequently to ensure that endangered red-cockaded woodpeckers (RCWs) do not inhabit their land. The authors found that increasing proximity to known woodpecker locations results in a 6.8 percent increase in the probability that the plot will be harvested and decreases the age at which the forest is harvested by several years. The authors interpret the latter finding as suggesting that not all landowners make small adjustments (a few years) to harvest age. Rather, they believe a small number of owners make large adjustments in optimal harvest age (e.g., assuming 10 percent of landowners switch from a 70- to 40-year rotation would be consistent with a 3-year decrease in the average harvest age). The reduction from a less than optimal stand rotation schedule presumably imposes costs on the landowners in terms of a lower net present value of the harvest.
- Zabel and Paterson (2006) conducted an analysis of building permits issued by California municipalities with and without critical habitat. They found that critical habitat had a statistically significant causal effect on the issuance of permits for single-family houses during the period spanning 1990 through 2002. The largest portion of the effect was attributable simply to whether critical habitat was present in the municipality. The reduction in housing permits also varied in

relation to the size of the designation, but this effect was a much smaller portion of the overall effect. These results suggest that critical habitat “acts as a signal that all development in the municipality will be more costly.” The authors did not find evidence of preemptive behavior.

Collectively, these studies suggest that concerns about possible project delays or the imposition of land use restrictions can lead to changes in the use, and therefore value, of designated parcels and in the overall amount of economic activity undertaken in the designation. Whether the results of these studies are predictive of the effect of designating critical habitat for other species depends on whether the factors contributing to the effects measured in these cases also apply to new designations. Furthermore, this limited number of studies is unlikely to encompass the full range of possible perception-related effects.

Characteristics of a designation that might influence the magnitude of the effect caused by public perception include: (1) whether adequate substitute sites are available for the same activities; (2) whether the community has experience with section 7 requirements; (3) whether the actual effect of future section 7 consultations could be economically significant; (4) the level of baseline demand for the land uses of concern; and (5) the time required to undertake permitting activities under baseline conditions. Furthermore, the length of time over which the effect persists, and the rate at which it diminishes, will be influenced by these factors.

For example, for critical habitat designations in areas with large amounts of alternative suitable land for grazing, the effect on designated property may be more significant and longer lasting. In this situation, it may be relatively easy for farmers and ranchers to purchase lands outside of critical habitat, rather than inside, thus reducing the presumed value of the critical habitat lands for grazing activities. If a designated area has no reasonable substitute, farmers and ranchers, or prospective buyers, are more likely to work with the Service to develop project modifications that allow them to make use of the critical habitat as originally planned. In both cases, such effects would only occur if demand for the productive use of those lands exists in the baseline.

In another example, if a community has experience with the Act, farmers and ranchers may be more sophisticated in their understanding of the true implications of the designation. Under such conditions, adverse effects based on perception alone may be minimized or shorter-lived. In addition, understanding of the degree to which future section 7 consultations could delay or affect land use may influence the amount of preemptive action taken by landowners. If critical habitat for a given species is likely to require relatively onerous restrictions in order to avoid adverse modification (e.g., if the remaining habitat is relatively small and the species is near extinction), the public may express more concern over possible restrictions than in a situation where those restrictions are likely to be more moderate.

In summary, these studies, in conjunction with prior public comments on previous designations, suggest that costs may result from public perception of how critical habitat regulations will be implemented. However, given the differences between the situations analyzed in these studies and the proposed designation for the beetle, we do not attempt

to apply the findings of these studies in this analysis. Instead, to evaluate the magnitude of perception-related costs, we conduct a bounding analysis, described in greater detail in the remainder of this memorandum.

SECTION 2. ANALYSIS

In the case of proposed critical habitat for the beetle, the habitat is located in areas where development pressure is low and where land use activities are limited by the saline wetland nature of the lands. Thus, the value of private lands within the proposed designation is likely to be driven by their possible use for grazing. Despite the fact that a section 7 nexus is unlikely for grazing activities conducted on private lands, the ranching community may perceive that the designation of certain parcels as critical habitat will limit future grazing activities in those areas.

To evaluate the possible magnitude of such costs, we conduct a bounding analysis. Our analysis estimates the market value of privately owned grazing lands within the proposed designation. Public perception may diminish land values by some percent of these total values. While data limitations prevent us from estimating the size of this percent reduction or its attenuation rate, any perceptual effects on a property cannot reduce the value of the property by more than its total market value.

Assuming the entire value of the parcel is lost will likely overstate costs because properties may have alternative uses that the public would not construe as “lost” (e.g., land that is currently used for grazing could be used for recreational or conservation purposes). In addition, these properties may experience perception-related effects as a result of the presence of the listed beetle and/or the state-listed saltwort, thus reducing the incremental portion of the cost attributable to critical habitat for the beetle.

Therefore, we emphasize that the property values reported in this memorandum should not be construed as a best estimate of the likely cost of the proposed designation; rather, they represent an upper bound on possible impacts, assuming:

- All land not known to be supporting other land uses will be used for grazing activities;
- This grazing land will all be subject to perceptual effects; and
- The perceptual effects will result in a complete loss of the value of the land (100 percent of the land value will be lost).

The remainder of this section provides our detailed calculations. To estimate this upper bound, we first identify the number and location of acres within proposed critical habitat that could be reasonably subject to perceptual effects. Then, we estimate the current market value of these acres using state-level pastureland valuation data from the U.S. Department of Agriculture. Additional detail describing these steps is provided below.

STEP 1: IDENTIFY PRIVATE GRAZING LAND POSSIBLY SUBJECT TO PERCEPTIONAL EFFECTS

Data limitations preclude us from definitively identifying the extent of current and future grazing on private lands. Instead, we begin by assuming that all private lands within the designation may be grazed. We then eliminate privately owned lands that are currently held in conservation easements as part of the NRCS Wetland Reserve Program, as information describing this program indicates that permissible land uses on conservation easements include undeveloped recreational uses.² Although the 2008 Farm Bill authorized a pilot program to allow limited grazing on Wetland Reserve Program easements, GIS data indicate that all easements within the proposed designation were acquired prior to 2008, and thus, would not have been included in the pilot program.³ As a result, we assume that easements within the proposed designation are not grazed.

Of the 1,110 acres designated for critical habitat, 564 acres are privately owned. The exclusion of conservation easements reduces the number of private acres possibly supporting grazing to 519, as shown in Exhibit 1. For the purposes of this bounding analysis, we assume all 519 acres support grazing and may experience perceptual effects following the designation of critical habitat.

STEP 2: ESTIMATE VALUE OF PRIVATE GRAZING LAND POSSIBLY SUBJECT TO PERCEPTIONAL EFFECTS

To calculate the value of these lands, we obtained data from the U.S. Department of Agriculture's 2013 report on agricultural land values.⁴ According to this report, the average value of pastureland in Nebraska is \$700 per acre. Given that the entirety of the proposed designation is located within wetlands and riparian areas, which are generally less desirable for grazing, this statewide average is likely a conservative estimate of land value.⁵

We then multiply this per-acre land value by the number of acres of private grazing land within each unit. This calculation generates an upper-bound estimate of the total value of grazing land in the proposed designation that could experience perceptual effects. The results of this analysis are shown in Exhibit 1. The upper-bound estimate of possible perceptual effects is \$360,000.

² U.S. Department of Agriculture, Natural Resources Conservation Service. Wetlands Reserve Program. Accessed at: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/wetlands/> on January 3, 2014.

³ "Nebraska tests grazing option in new wetland applications." North Platte Bulletin. August 7, 2009. Accessed at: <http://www.northplattebulletin.com/index.asp?show=news&action=readStory&storyID=17046&pageID=29> on January 3, 2014.

⁴ U.S. Department of Agriculture, National Agricultural Statistics Service. 2013. *Land Values: 2013 Summary*.

⁵ Communication with the Nebraska Game & Parks Commission indicated that grazing lands within wetlands and flood-prone areas may be less desirable to farmers and ranchers, due to the risk of flooding and difficulty of accessing the area. Lesiak, Chuck. Biologist, Nebraska Game & Parks Commission. Personal communication on December 17, 2013.

EXHIBIT 1. TOTAL VALUE OF GRAZING LAND POSSIBLY SUBJECT TO PERCEPTIONAL EFFECTS (2013\$)

UNIT	TOTAL ACRES	PRIVATE ACRES	ACRES POSSIBLY SUBJECT TO PERCEPTIONAL EFFECTS	GRAZING LAND VALUE PER ACRE	VALUE OF LANDS POSSIBLY SUBJECT TO PERCEPTIONAL EFFECTS	DESCRIPTION OF EXCLUDED ACRES
Little Salt Creek	284	144	128	\$700	\$90,000	Excluded 16 acres in existing conservation easements.
Rock Creek	526	374	345	\$700	\$240,000	Excluded 29 acres in existing conservation easements.
Oak Creek	208	0	0	\$700	\$0	No private land in this unit.
Haines Branch	92	46	46	\$700	\$32,000	No acres were excluded.
Total	1,110	564	519	\$700	\$360,000	

Note: Values may not sum to totals due to rounding.

Sources: GIS data indicating the extent of proposed critical habitat,⁶ existing wetland management easements,⁷ and parcel ownership.⁸ The grazing land value per acre is taken from the USDA National Agricultural Statistics Service report on 2013 Agricultural Land Values.⁹

SECTION 3. CONCLUSION

The number and value of acres that could be subject to perceptual effects as a result of the designation of critical habitat is subject to significant uncertainty. Land ownership data suggest that the designation intersects approximately 519 acres of privately owned lands that may be used for grazing. If public perception causes farmers and ranchers, or potential buyers, to assume grazing is precluded or limited in these areas, these acres could be affected. Due to existing data limitations regarding the probability, timing, and magnitude of such effects, we are unable to estimate the magnitude of perception-related costs resulting from this designation. However, the cost cannot exceed the total value of grazing activities that could be supported by these privately-owned lands. Based on the analysis presented in this memorandum, the value of grazing activities is unlikely to exceed \$100 million.

⁶ U.S. Fish and Wildlife Service. 2013. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Salt Creek Tiger Beetle; Draft Proposed Rule. June 4.

⁷ Lower Platte South Natural Resources District. 2013. *Wetland Management Easements*. Received via email from Shaula Ross, GIS Specialist, Lower Platte South Natural Resources District on December 9, 2013.

⁸ Lancaster County Assessor/Register of Deeds Office. *Ownership Parcels*. Received via email from Shaula Ross, GIS Specialist, Lower Platte South Natural Resources District on March 6, 2013.

⁹ U.S. Department of Agriculture, National Agricultural Statistics Service. 2013. *Land Values: 2013 Summary*.

SECTION 4. REFERENCES

- Hansen, Kirk. Biologist, Nebraska Game & Parks Commission. Personal communication on December 19, 2013.
- Industrial Economics, Incorporated. Memorandum to the U.S. Fish and Wildlife Service on “Screening Analysis of the Likely Economic Impacts of Critical Habitat Designation for the Salt Creek Tiger Beetle.” February 5, 2014.
- Krout, Marvin. Director, Lincoln-Lancaster County Planning Department. Personal communication on December 10, 2013.
- Lancaster County Assessor/Register of Deeds Office. *Ownership Parcels*. Received via email from Shaula Ross, GIS Specialist, Lower Platte South Natural Resources District on March 6, 2013.
- Lesiak, Chuck. Biologist, Nebraska Game & Parks Commission. Personal communication on December 17, 2013.
- Lower Platte South Natural Resources District. 2013. *Wetland Management Easements*. Received via email from Shaula Ross, GIS Specialist, Lower Platte South Natural Resources District on December 9, 2013.
- Marinovich, Melissa. Highway environmental biologist, Nebraska Department of Roads. Personal communication on January 6, 2014.
- “Nebraska tests grazing option in new wetland applications.” North Platte Bulletin. August 7, 2009. Accessed at: <http://www.northplattebulletin.com/index.asp?show=news&action=readStory&storyID=17046&pageID=29> on January 3, 2014.
- U.S. Department of Agriculture, Natural Resources Conservation Service. Wetlands Reserve Program. Accessed at: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/wetlands/> on January 3, 2014.
- U.S. Fish and Wildlife Service. Biologist, Nebraska Field Office. Personal communication on December 19, 2013.
- U.S. Fish and Wildlife Service. 2013. *Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Salt Creek Tiger Beetle; Draft Proposed Rule*. June 4.
- U.S. Department of Agriculture, National Agricultural Statistics Service. 2013. *Land Values: 2013 Summary*.