

MEMORANDUM | December 17, 2013

TO U.S. Fish and Wildlife Service (Service)
FROM Industrial Economics, Incorporated (IEc)
SUBJECT Supplemental Information on Land Values – Critical Habitat Designation for the *Ivesia webberi*

This memorandum provides supplemental data supporting the conclusion that the designation of critical habitat for the *Ivesia webberi* is unlikely to result in costs equal to or exceeding \$100 million in a single year.¹ Specifically, it provides an estimate of the market value of land located within proposed critical habitat that may be subject to development pressure in the foreseeable future. Public perception regarding the possible imposition of restrictions on the use of these parcels may affect their value. This estimate suggests that the aggregate value of these acres is less than \$100 million.

1.0 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 *Ivesia webberi*. 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 the administrative effort associated with the consultation process. The Service is unable to predict situations where it would request additional modifications to projects as a result of the designation; however, it believes such circumstances are unlikely.

Comments received regarding prior critical habitat designations in various locations throughout the United States indicate that the public perceives critical habitat as potentially resulting in incremental changes to private property values, above and beyond those associated with specific forecast project modifications under section 7 of the Act.² 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

¹ For additional detail describing our analysis of the potential for the proposed critical habitat rule to result in costs exceeding \$100 million in a single year, see 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 *Ivesia webberi*." December 17, 2013.

² 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).

somehow alter the highest and best use of the property. 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 consultation 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) find 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 find 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 development 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 communities with multiple alternative development sites that are nearly or equally as good, and where developers can easily switch to an alternative location, the effect on designated property may be more significant and longer lasting. In this situation, it may be relatively easy for developers to select a parcel outside of critical habitat, rather than inside, thus reducing the presumed value of the critical habitat parcel. If a designated site has no reasonable substitute, developers are more likely to work with the Service to develop project modifications that allow them to make use of the critical habitat site as originally planned. In both cases, such effects would only occur if demand for the productive use of those parcels exists in the baseline.

In another example, if a community has experience with the Act, developers 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 comment 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 *Ivesia webberi*, 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.

2.0 ANALYSIS

In this bounding analysis, we estimate per-acre land values for undeveloped, vacant parcels in the vicinity of the proposed designation where the likelihood of development in the foreseeable future is greatest. Public perception of the effect of critical habitat may diminish land values by some percent of these total values. Data limitations prevent us from estimating the size of this percent reduction or its attenuation rate. However, any diminishment in property value cannot exceed the total value of the property.

Assuming the entire value of the parcel is lost would likely overstate costs because many properties may have alternative uses that the public would not construe as “lost” (e.g., land that is currently used for crops or cattle might still be used for those purposes, even if the public believes the sites could not be developed into housing). In addition, these properties may experience baseline perception-related effects as a result of the presence of the listed *Ivesia webberi*, thus reducing the incremental portion of the cost attributable to critical habitat. Therefore, 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.

The remainder of this section provides our detailed calculations. To estimate this upper bound, we first identify the number and location of acres within critical habitat where the likelihood of development in the foreseeable future is greatest. Then, we estimate the current market value of these acres using data on the market value of similar vacant parcels within or near the proposed critical habitat. Additional detail describing these steps is provided in the following sections.

STEP 1 - IDENTIFY THE LOCATION AND NUMBER OF ACRES LIKELY TO BE SUBJECT TO DEVELOPMENT PRESSURE

The Service identified development as a threat in five units and as a likely future economic activity by the U.S. Forest Service (USFS) in two additional units. Of these seven units, one unit falls entirely within lands managed by the USFS (Unit 10) and two units (Units 9 and 16) occur in remote areas based on satellite imagery, where the future pressure for development is likely low. The remaining four units are located close to or within the Reno/Sparks metropolitan area in Washoe County. Washoe County is predicted to grow at an annual growth rate of 1.48 percent through 2030.³ Accordingly, we focus our analysis on the four critical habitat units that are located close to or within the Reno/Sparks metropolitan area (Exhibit 1).

³ Washoe County, Nevada. 2010. Master Plan - Population Element. Department of Community Development. Reno, Nevada. September 9. p. 4 Accessed online December 1, 2013 at: http://www.washoecounty.us/comdev_files/cp/population_element.pdf

EXHIBIT 1. SUMMARY OF PROPOSED *IVESIA WEBERRI* CRITICAL HABITAT UNITS WHERE DEVELOPMENT IS IDENTIFIED AS A THREAT OR LIKELY FUTURE ECONOMIC ACTIVITY

| UNIT NO. | UNIT NAME | TOTAL PRIVATE LANDS | CLOSE TO URBAN CENTER? |
|--------------|---------------------|---------------------|--|
| 9 | Stateline Road 1 | 7 ac | No, remote area based on satellite imagery. |
| 10 | Stateline Road 2 | 0 ac | No, unit falls entirely within USFS lands. |
| 12 | Black Springs | 24 ac | Yes, falls within Reno/Sparks metropolitan area. |
| 13 | Raleigh Heights | 14 ac | |
| 14 | Dutch Louie Flat | 46 ac | |
| 15 | The Pines Powerline | 32 ac | |
| 16 | Dante Mine Road | 4 ac | No, remote area based on satellite imagery. |
| Total | | 127 ac | |

According to the Service, land use within areas proposed as critical habitat include a mixture of rangeland and forest land at the urban interface.⁴ To identify areas of proposed critical habitat that may be subject to development pressure in the foreseeable future, we focus our analysis on the subset of critical habitat units that are located close to or within the Reno/Sparks metropolitan area in Washoe County.⁵ Relevant acres include land that is: (a) privately owned, (b) not protected by a conservation easement, and (c) of a land cover suitable for development (i.e., we exclude land that has been developed, as well as barren rock, wetlands and open water).⁶ Based on these three criteria, we identify approximately 114 acres of private, developable land in two Washoe County census tracts. Exhibit 2 summarizes these acres by census tract and critical habitat unit. This estimate may overstate the number of acres available for development activities because, while we exclude areas that are publicly-owned or permanently conserved, we are not able to account for local zoning or land use restrictions, or geographic features such as slope that may further limit suitability for development.

⁴ U.S. Fish and Wildlife Service. October 31, 2013. Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for *Ivesia webberi*. pp. 22.

⁵ Even if these acres are not likely to be developed in the next 10 to 20 years, they may have other productive uses, such as grazing. The value of these lands for grazing, which is captured in the market prices of these acres, could experience perception-related effects if the public perceives that the designation will somehow restrict grazing activities on these properties.

⁶ Land ownership was determined using GIS data provided by the US Fish and Wildlife Service on November 5, 2013. Land protection status was determined using U.S. Geological Survey, Gap Analysis Program (GAP). November 2012. Protected Areas Database of the United States (PADUS), version 1.1 (CBI Edition). Downloaded from: gapanalysis.usgs.gov/padus/ on November 25, 2012. Land cover was determined using U.S. Geological Survey. National Land Cover Database 2006 (NLCD2006). Downloaded from: www.mrlc.gov/finddata.php on April 30, 2011; Census tracts were determined using U.S. Census Bureau. 2013 TIGER/Line Files. Downloaded from: <http://www.census.gov/geo/maps-data/data/tiger-line.html> on December 11, 2013.

EXHIBIT 2. PRIVATE, VACANT ACRES POSSIBLY SUITABLE FOR DEVELOPMENT ACTIVITY, BY CENSUS TRACT AND CRITICAL HABITAT UNIT

| CENSUS TRACT | AFFECTED CRITICAL HABITAT UNITS | TOTAL DEVELOPABLE LAND | DEVELOPABLE LAND OVERLAPPING PROPOSED CRITICAL HABITAT | PERCENT OF TOTAL DEVELOPABLE LAND PROPOSED AS CRITICAL HABITAT |
|---|---------------------------------|------------------------|--|--|
| 26.19 | Unit 12 & 13 | 3,980 ac | 37 ac | 0.9% |
| 10.14 | Unit 14 & 15 | 1,347 ac | 17 ac | 5.7% |
| Total: | | 5,327 ac | 114 ac | -- |
| Sources: Land ownership was determined using GIS data provided by the US Fish and Wildlife Service on November 5, 2013. Land protection status was determined using U.S. Geological Survey, Gap Analysis Program (GAP). November 2012. Protected Areas Database of the United States (PADUS), version 1.1 (CBI Edition). Downloaded from: gapanalysis.usgs.gov/padus/ on November 25, 2012. Land cover was determined using U.S. Geological Survey. National Land Cover Database 2006 (NLCD2006). Downloaded from: www.mrlc.gov/finddata.php on April 30, 2011; Census tracts were determined using U.S. Census Bureau. 2013 TIGER/Line Files. Downloaded from: http://www.census.gov/geo/maps-data/data/tiger-line.html on December 11, 2013. | | | | |

STEP 2 - CALCULATE THE VALUE OF DEVELOPABLE LAND IN AREAS LIKELY TO DEVELOP IN THE FORESEEABLE FUTURE

To obtain representative values for raw, undeveloped land, we conducted a search of Washoe County’s Property Assessment database, and identified 18 vacant parcels in close proximity to the 114 acres of private, vacant land that overlaps proposed critical habitat.^{7,8} The results of this search suggest raw land values between \$625 to \$5,000 per acre (2013 dollars).⁹ Based on this information, the total value of the 114 acres proposed as critical habitat and available for future development is unlikely to exceed \$100 million. Furthermore, because costs resulting from public perception of the effect of critical habitat designation would likely represent some fraction of this total value, such perceptual effects are unlikely to exceed a threshold of \$100 million in a given year.

3.0 CONCLUSION

The results of this analysis suggest approximately 114 acres of private, vacant land that is available for future development in the Reno/Sparks metropolitan area. If public perception causes the value of critical habitat acres to be diminished, these acres are those most likely to be affected. Due to existing data limitations regarding the probability that such effects will occur, and the likely degree to which property values will be affected, we are unable to estimate the magnitude of perception-related costs resulting from the designation. However, the cost cannot exceed the total value of affected properties. Based on the analysis presented in this memorandum, the value of affected parcels is unlikely to exceed \$100 million.

⁷ The 18 parcels identified in our search of the Washoe County Property Assessment parcel map include a mix of three land codes: vacant - unknown/other (16), vacation - development (1) and vacant - single family (1). We did not identify any vacant commercial properties near the proposed designation.

⁸ According to a representative of the Washoe County Assessor’s Office, taxable land values are equal to the sales prices of recently sold properties with characteristics similar to the subject property. Taxable land values are assessed every year. (Washoe County Assessor’s Office, Real Property Appraisal. Personal communication on December 9, 2013; Washoe County, Nevada. “Real Property Appraisal.” Accessed on December 3, 2013 online at: <http://www.washoecounty.us/assessor/appraisal.htm>.)

⁹ Washoe County, Nevada. “Real Property Assessment Data.” Accessed on December 5, 2013 online at: <http://www.washoecounty.us/assessor/cama/search.php>

4.0 REFERENCES

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