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ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THREE ARIZONA PLANTS

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prepared for:

U.S. Fish and Wildlife Service

4401 N. Fairfax Drive

Arlington, VA 22203

prepared by:

Industrial Economics, Incorporated

2067 Massachusetts Avenue

Cambridge, MA 02140

617/354-0074

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LIST OF ACRONYMS AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
Act	Endangered Species Act
ADA	Arizona Department of Agriculture
ADOT	Arizona Department of Transportation
ASLD	Arizona State Land Department
BLM	Bureau of Land Management
BMGR	Barry M. Goldwater Range
BMPs	Best Management Practices
Cacti	acuña cactus and Fickeisen plains cactus
CBP	Customs and Border Protection
CBP-BP	U.S. Customs and Border Protection Border Patrol
CEQA	California Environmental Quality Act
CSP	Conservation Stewardship Program
DHS	Department of Homeland Security
DOD	Department of Defense
DOI	Department of the Interior
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
HCP	Habitat Conservation Plan
IEc	Industrial Economics, Inc.
INRMP	Integrated Natural Resource Management Plans
Mallow	Gierisch mallow
MFP	Management Framework Plan
MOU	Memorandum of Understanding
NAICS	North American Industry Classification System
NFMA	National Forest Management Act
NPS	National Park Service
OHV	Off-road vehicle
OMB	U.S. Office of Management and Budget

OPCNM	Organ Pipe Cactus National Monument
PCE	Primary constituent elements
PLO	Public Land Order
RCP	Biological Resource Land Use Clearance Policies and Procedures
RFA	Regulatory Flexibility Act
RMPs	Resource Management Plans
ROW	Right-of-way
SBA	Small Business Administration
SBREFA	Small Business Regulatory Enforcement Fairness Act
Service	U.S. Fish and Wildlife Service
TIMR	Tactical Infrastructure Maintenance and Repair Program
TNC	The Nature Conservancy
UMRA	Unfunded Mandates Reform Act of 1995
USDA	Department of Agriculture
USFS	U.S. Forest Service
WHIP	Wildlife Habitat Incentive Program

EXECUTIVE SUMMARY

1. The purpose of this report is to evaluate the potential economic impacts associated with the designation of critical habitat for three Arizona plant species - Gierisch mallow (*Sphaeraclea gierischii*, hereafter "the mallow"), acuña cactus (*Echinomastus erectocentrus* var. *acunensis*), and Fickeisen plains cactus (*Pediocactus peeblesianus* var. *fickeiseniae*) ("the cacti"). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service).

2. The Service proposed to list the cacti and the mallow as endangered and proposed critical habitat for the species on October 3, 2012 and August 17, 2012, respectively.[1,2] The proposed critical habitat for the plants is located across five counties in Arizona and one county in Utah. A total of 53,720 acres of critical habitat is proposed for the acuña cactus across six units and ten subunits, 39,632 acres is proposed for the Fickeisen plains cactus across seven units and 14 subunits, and 12,822 acres is proposed for the mallow across two units. The Service is also considering 9,554 acres for exclusion from critical habitat designation for the Fickeisen plains cactus within three units and five subunits. The areas proposed for critical habitat designation and considered for exclusion are the subject of this economic analysis.

3. This analysis first describes existing plans and regulations that provide protection for the plants and their habitat: for example, land management plans currently prescribe management that protects the plants on certain federally-managed areas within the proposed critical habitat. These are "baseline" protections accorded the plants absent the designation of critical habitat.

4. The discussion of the regulatory baseline provides context for the evaluation of the economic impacts of critical habitat designation, which are the focus of this analysis. These "incremental" economic impacts are those not expected to occur absent the designation of critical habitat for the plants. This information is intended to assist the Secretary of the U.S. Department of the Interior (DOI) in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.[3]

[1] 77 FR 60510-60579.

[2] 77 FR 49894-49919.

[3] 16 U.S.C. §1533(b)(2).

OVERVIEW OF THE PROPOSED CRITICAL HABITAT

5. The acuña cactus is a spherical cactus occurring in valleys and on small knolls and gravel ridges in the Sonoran desertscrub in southern Arizona and Mexico.[4] The Fickeisen plains cactus is a cold-adapted plant endemic to Kaibab limestone on the Colorado Plateau in northern Arizona.[5] Lastly, the Gierisch mallow is a perennial, flowering plant found in warm desertscrub plant communities on gypsum outcrops in northern Arizona and southern Utah.[6] The study area for the analysis includes all areas proposed as critical habitat for the three plant species, as identified in Exhibit ES-1. In general, the study area is located in remote areas away from major population centers and other developed areas.

6. Exhibit ES-2 depicts ownership within the proposed critical habitat areas for the three Arizona plants. The largest share of the area proposed as critical habitat for each of the plants is federally-owned: 55 percent for the acuña cactus, 34 percent for the Fickeisen plains cactus, and 89 percent for the Gierisch mallow. The proposed critical habitat for each of the three plants also contains a significant portion of state-owned land: 27 percent of acuña cactus, 28 percent of Fickeisen plains cactus, and 11 percent of Gierisch mallow. The cacti also contain tribal and privately-owned land. Federal land managers include the Bureau of Land Management (BLM), Forest Service (USFS), Department of Defense (DOD), and National Park Service (NPS). Tribal lands included in the proposed designation occur within the Navajo Nation and the Tohono O'odham Nation. The Service is currently considering excluding Navajo Nation lands from the designation of critical habitat for the cacti.[7] Additionally, lands managed by the DOD on the Barry M. Goldwater Range (BMGR) are being considered for possible exemption, pending amendments to the BMGR's Integrated Natural Resource Management Plans (INRMP).

[4] 2012 Proposed Rule. 77 FR 60510.

[5] 2012 Proposed Rule. 77 FR 60527-60529.

[6] 2012 Proposed Rule. 77 FR 49894.

[7] Personal communication with U.S. Fish and Wildlife Service biologist, January 31, 2013.

EXHIBIT ES-1. OVERVIEW OF THREE ARIZONA PLANTS PROPOSED CRITICAL HABITAT

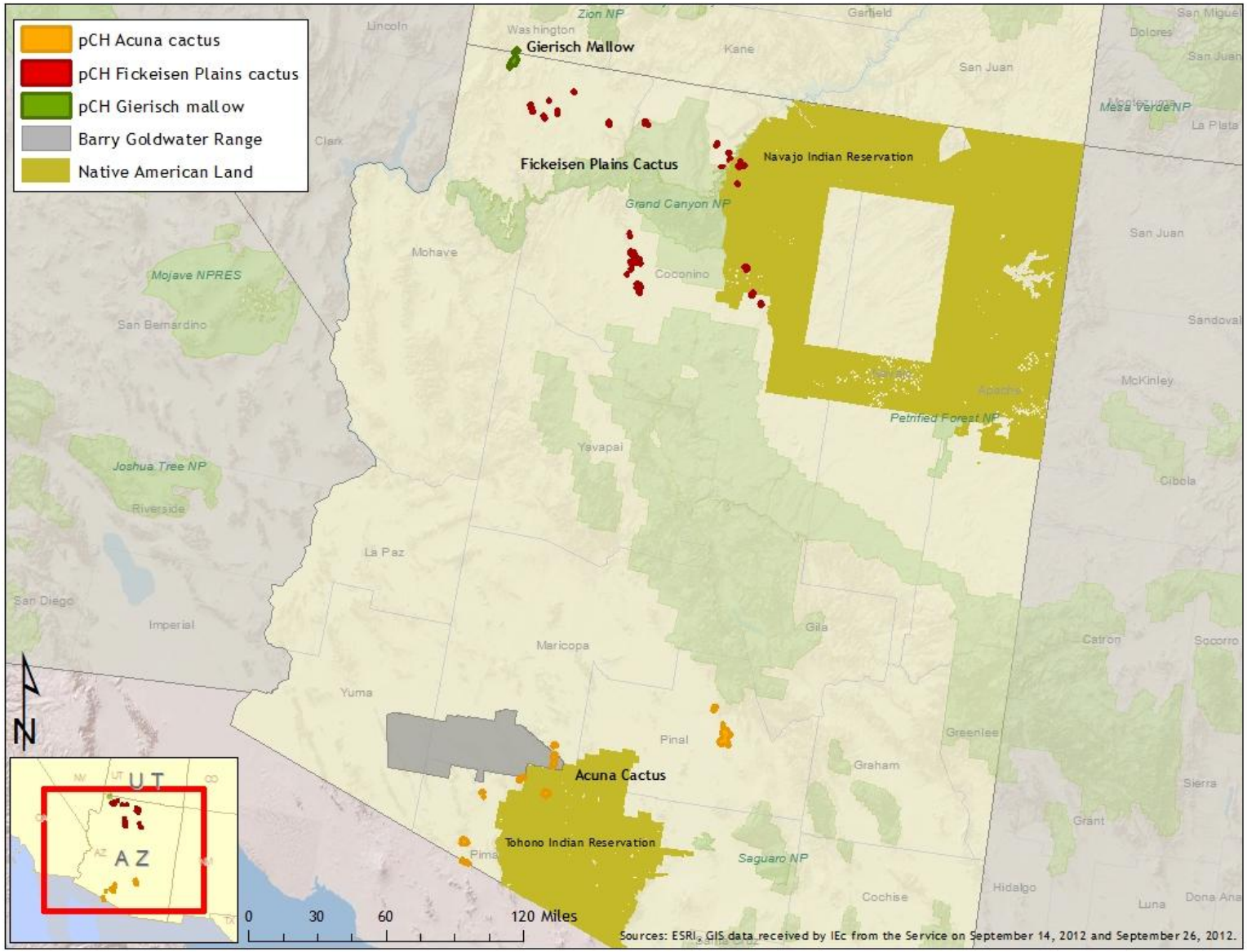
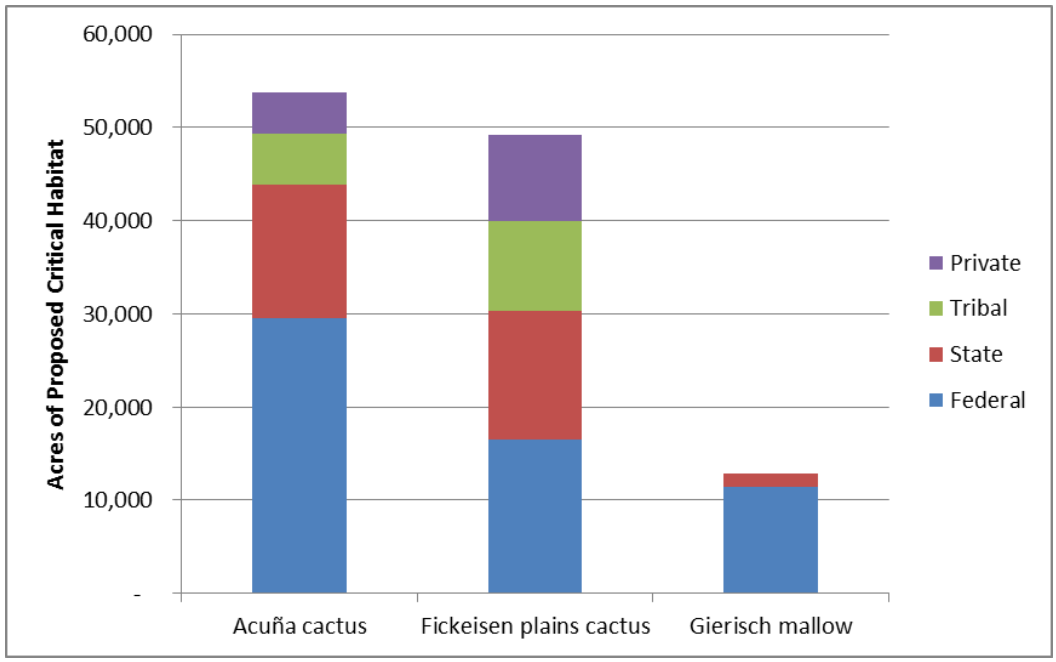


EXHIBIT ES-2. OWNERSHIP WITHIN THREE ARIZONA PLANT PROPOSED CRITICAL HABITAT



7. Review of the Proposed Rules identified the following economic activities as being potentially affected by conservation efforts for the three plants and their habitat. These activities are addressed in Chapters 3 and 4 of the economic analysis.

(1) **U.S. – Mexican border activities:** Customs and Border Protection **(**CBP) and NPS Law Enforcement activity in the area around the border with Mexico may degrade acuña cactus habitat. Off-road vehicle travel associated with border activities may cause vegetation destruction, soil compaction, and direct mortality of the acuña cactus.[8]

(2) **Livestock grazing:** Grazing represents a threat to the cacti and the mallow. Grazing practices can change vegetation composition and abundance, cause soil erosion and compaction, reduce water infiltration rates, and increase runoff. In addition, livestock can step on or knock over individual plants, and in the case of the mallow may eat plants, especially during the flowering season.[9,10]

(3) **Gypsum mining:** Gypsum mining represents a threat to the mallow in Arizona. Mining operations temporarily removes the plant's habitat and any plants growing in the affected area for the duration of the mining activities. Post-mining, the reclaimed soils do not contain the original gypsum compositions with

[8] 77 FR 60519.

[9] 77 FR 60518.

[10] 77 FR 49898.

which the plants are associated and therefore may not be capable of supporting the plants.[11]

(4) **Uranium mining:** Uranium mining represents a potential threat to the Fickeisen plains cactus within the Arizona Strip and Coconino Plateau. Mining may reduce suitable habitat, increase erosion, enable invasion of nonnative pants, and increase the risk of plant mortality.[12]

(5) **Commercial development:** Commercial development associated with tourism on lands within the Navajo Nation is identified as a potential threat to the Fickeisen plains cactus. This type of development may lead to trampling of plants by people and loss of plants and habitat to make way for development.[13]

(6) **Recreational activities:** Unauthorized OHV use and target shooting represent a threat to the mallow in Utah. OHV use associated with recreation, including camping and hunting, also occurs within Fickeisen plains cactus habitat. These activities represent a direct threat to the plants through trampling as well as an indirect threat through soil compaction, loss of soil crusts, erosion, and the promotion and spread of nonnative invasive species.[14,15]

(7) **Road construction and maintenance:** Road construction and maintenance within Fickeisen plains cactus can destroy or modify habitat and lead to increased erosion. Road maintenance on unimproved roads can result in atmospheric dust which may deposit on vegetation. In addition, roads may lead to increased trampling of plants caused by increased human access.[16]

(8) **Species and Habitat Management:** The three plants and their habitat are currently afforded some level of protection under various Federal and Tribal management plans and programs. These plans and programs will be required to explicitly consider impacts on the plants and their habitat.

8. The Proposed Rule also identifies predation by native insects and small mammals, drought, and climate change as threats to the cacti. The Service does not consult specifically on economic activities that may jeopardize the cacti or adversely modify their critical habitat through predation, drought, and climate change. Furthermore, the Service has noted that the underlying causes of climate change are complex global issues that are beyond the scope of the Act.[17] Therefore, this analysis does not specifically address predation, drought, or climate change as threats to the species.

[11] 77 FR 49897-49898.

[12] 77 FR 60539.

[13] 77 FR 60540.

[14] 77 FR 49900.

[15] 77 FR 60540.

[16] *Ibid*.

[17] 73 FR 76251.

KEY FINDINGS

9. Baseline protection for the plants addresses a broad range of habitat threats within a significant portion of the proposed critical habitat area. The majority of the federally-managed lands offer at least some protection from threats. For example, new mining claims are not allowed within a large area surrounding the Fickeisen plains cactus, removing this threat within certain proposed units.[18] State and tribal regulations, such as the Arizona State Land Department (ASLD) protocol for state listed species and the Navajo Nation Management Plan for the Fickeisen plains cactus, provide additional protection.

10. A key factor in the incremental analysis is that in most cases the types of conservation efforts requested by the Service during section 7 consultation regarding the plants are not expected to change with critical habitat designation of occupied habitat due to the fact that the species are closely tied to their habitat and are not mobile.[19,20] In other words, the Service anticipates that, in most instances, the conservation efforts recommended to avoid jeopardy to the species also effectively avoid the destruction or adverse modification of occupied critical habitat. As a result, in most instances critical habitat designation will not change the types of plant conservation efforts recommended by the Service.

11. In some geographic areas, however, potential adverse modification from land use threats may be an issue where jeopardy is not. This is true in the unoccupied proposed subunits for the acuña cactus, Cimarron Mountain and Sand Tank Mountain, and in rare cases within occupied units where a localized project may not adversely affect the plants while adversely modifying critical habitat. However, it is difficult to identify areas within the occupied units where the plants might not be found or affected, therefore this analysis assumes that plants are found throughout the occupied areas and incremental impacts from conservation efforts will be limited to the acuña cactus unoccupied subunits. There are no unoccupied units proposed for the Fickeisen plains cactus and the mallow.

12. This economic analysis takes a two-pronged approach when quantifying the costs associated with the Proposed Rules:

    - For the cacti, the analysis describes the baseline protections accorded the plants absent critical habitat designation and monetized the potential incremental impacts precipitated specifically by the critical habitat designation for the species; and
    - For the mallow, which occurs partially within the jurisdiction of the Tenth Circuit Court, the analysis monetizes both the baseline and incremental impacts.

[18] In April 2012 a Federal judge for the U.S. District Court of Arizona allowed a lawsuit challenging the ban on new mining claims to move forward. If the ban is not upheld in the courts, new uranium mining activity may threaten the cactus. This analysis assumes that the current state of regulation will be upheld.

[19] U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 10, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Acuña Cactus and the Fickeisen Plains Cactus."

[20] U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 14, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Gierisch Mallow."

Summed, these two types of impacts comprise the fully co-extensive impacts of conservation in areas considered for critical habitat designation for the mallow.

13. Exhibit ES-3 summarizes the incremental impacts of critical habitat designation for the cacti. The present value impacts reflect costs incurred over the 20-year time frame of this analysis (2013 through 2032). Overall incremental impacts for the acuña cactus are forecast to be $57,000, an annualized impact of $3,700 (assuming a seven percent discount rate).[21] Incremental impacts for the Fickeisen plains cactus are forecast to be $39,000, an annualized impact of $2,500, in areas proposed for critical habitat designation and $22,000, an annualized impact of $1,400, in areas considered for exclusion.

14. Exhibit ES-4 summarizes the baseline and incremental impacts of conservation efforts for the mallow and its habitat. Total baseline impacts for the mallow are estimated to be $770,000, an annualized impact of $50,000. Total incremental impacts for the mallow are estimated to be $51,000, an annualized impact of $3,300.

[21] All present value impacts presented throughout the text of this analysis apply a seven percent discount rate, unless otherwise indicated.

EXHIBIT ES-3. TOTAL INCREMENTAL IMPACTS FOR THE CACTI (2013 – 2032, 2013$)

	INCREMENTAL IMPACTS	
	3% DISCOUNT RATE	7% DISCOUNT RATE
ACUÑA CACTUS		
Present Value	$60,000	$57,000
Annualized	$3,900	$3,700
FICKEISEN PLAINS CACTUS		
PROPOSED CRITICAL HABITAT		
Present Value	$42,000	$39,000
Annualized	$2,800	$2,500
AREAS CONSIDERED FOR EXCLUSION		
Present Value	$23,000	$22,000
Annualized	$1,500	$1,400

Notes:
1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year (Year 0) of 2013 for present value calculations using costs estimated in 2013 dollars.

EXHIBIT ES-4. TOTAL INCREMENTAL IMPACTS FOR THE MALLOW (2013 – 2032, 2013$)

	BASELINE IMPACTS		INCREMENTAL IMPACTS	
	3% DISCOUNT RATE	7% DISCOUNT RATE	3% DISCOUNT RATE	7% DISCOUNT RATE
Present Value	$820,000	$770,000	$59,000	$51,000
Annualized	$54,000	$50,000	$3,800	$3,300

Notes:
1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year (Year 0) of 2013 for present value calculations using costs estimated in 2013 dollars.

15. Per unit impacts are summarized in Exhibits ES-5 and ES-6 for the cacti and the mallow, respectively. Subunit 4b, Sand Tank Mountain, is expected to experience the greatest incremental impacts for the acuña cactus with a total present value of approximately $24,000. This impact is due to a survey effort expected to be undertaken by the DOD within the Barry M. Goldwater Range (BMGR) in this unoccupied subunit. Unit 4,

Snake Gulch, is expected to experience the greatest incremental impacts of critical habitat designation for the Fickeisen plains cactus in the areas proposed for designation, a total present value of approximately $7,100. These impacts reflect administrative costs of consultation on management plans within Kaibab National Forest. In the areas considered for exclusion for the Fickeisen plains cactus, Unit 7, Little Colorado River Overlook, is expected to experience the greatest incremental impacts, approximately $11,000 over the 20-year time period. These costs reflect Arizona Department of Transportation (ADOT) annual right-of-way (ROW) maintenance on SR 64 and grazing and development activity within the Navajo Nation.

16. Unit 2, Black Knolls, is expected to experience greater baseline impacts than Unit 1 for the mallow (approximately $520,000 over the next 20 years); while Unit 1, Starvation Point, is expected to experience slightly greater incremental impacts (approximately $27,000 over the next 20 years). Impacts in both units are associated with consultations on gypsum mining, livestock grazing, BLM management activities, I-15 road widening, and annual ROW maintenance. Baseline impacts include both the administrative cost of consultation as well as costs associated with conservation efforts undertaken to protect the mallow, while incremental impacts are limited to administrative costs.

17. Incremental impacts associated with specific activities are discussed below. Exhibit ES-7 presents the breakdown of total incremental impacts by species and activity. As shown in the exhibit, conservation efforts within the BMGR account for nearly 40 percent of the incremental impacts associated with the designation of critical habitat for the acuña cactus. The largest source of incremental impacts for the Fickeisen plains cactus in the areas proposed for designation is consultation with the BLM on management plans and grazing. Consultation on activities within the Navajo Nation for development and grazing account for the largest share of the incremental impacts in the areas considered for exclusion. Over half of the incremental impacts for the mallow are associated with two programmatic consultations on grazing activity on BLM-managed lands.

EXHIBIT ES-5. FORECAST INCREMENTAL IMPACTS BY UNIT FOR THE CACTI, 2013-2032 (2013$, DISCOUNTED AT SEVEN PERCENT)

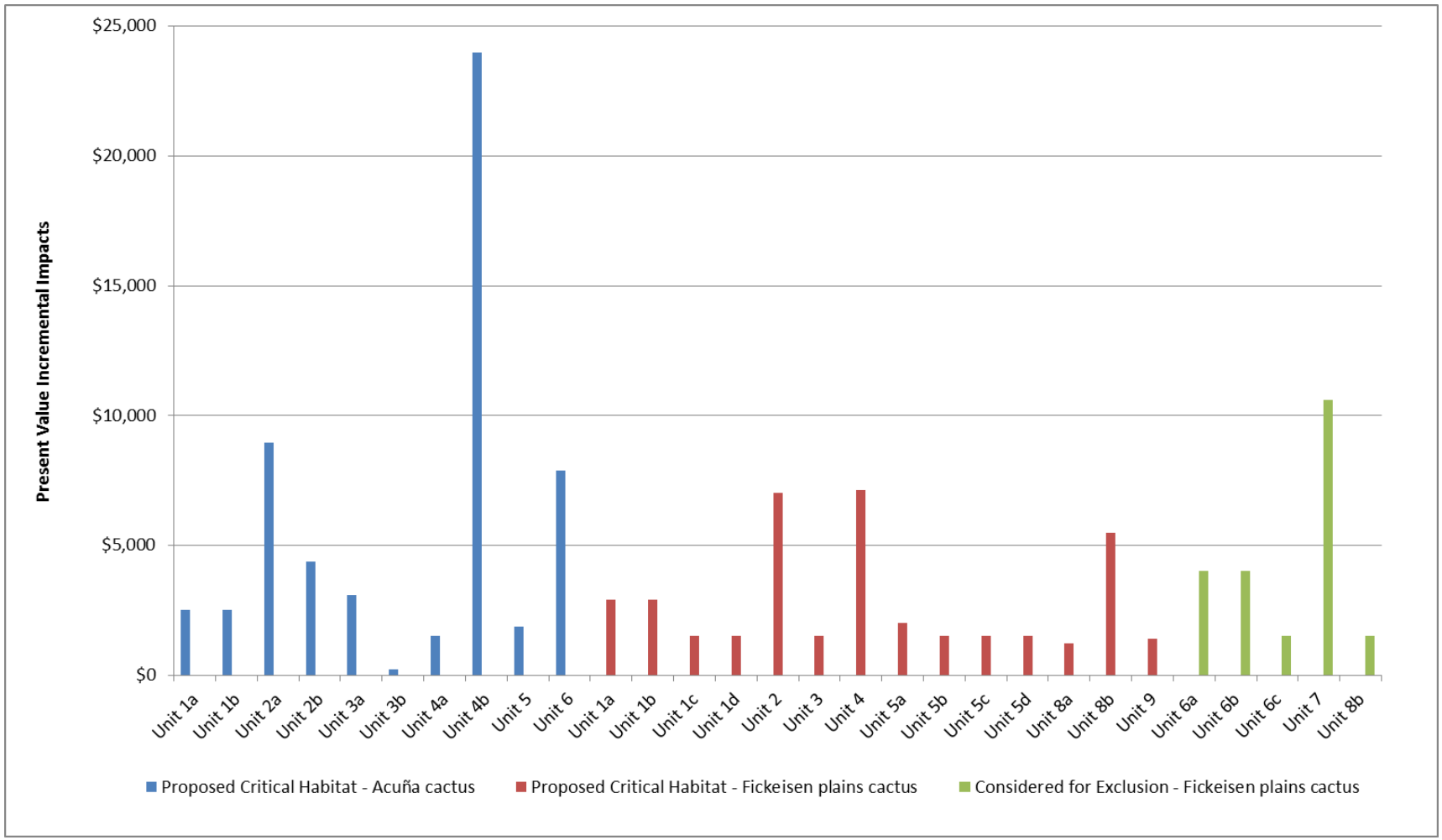


EXHIBIT ES-6. FORECAST IMPACTS BY UNIT FOR THE MALLOW, 2013-2032 (2013$, DISCOUNTED AT SEVEN PERCENT)

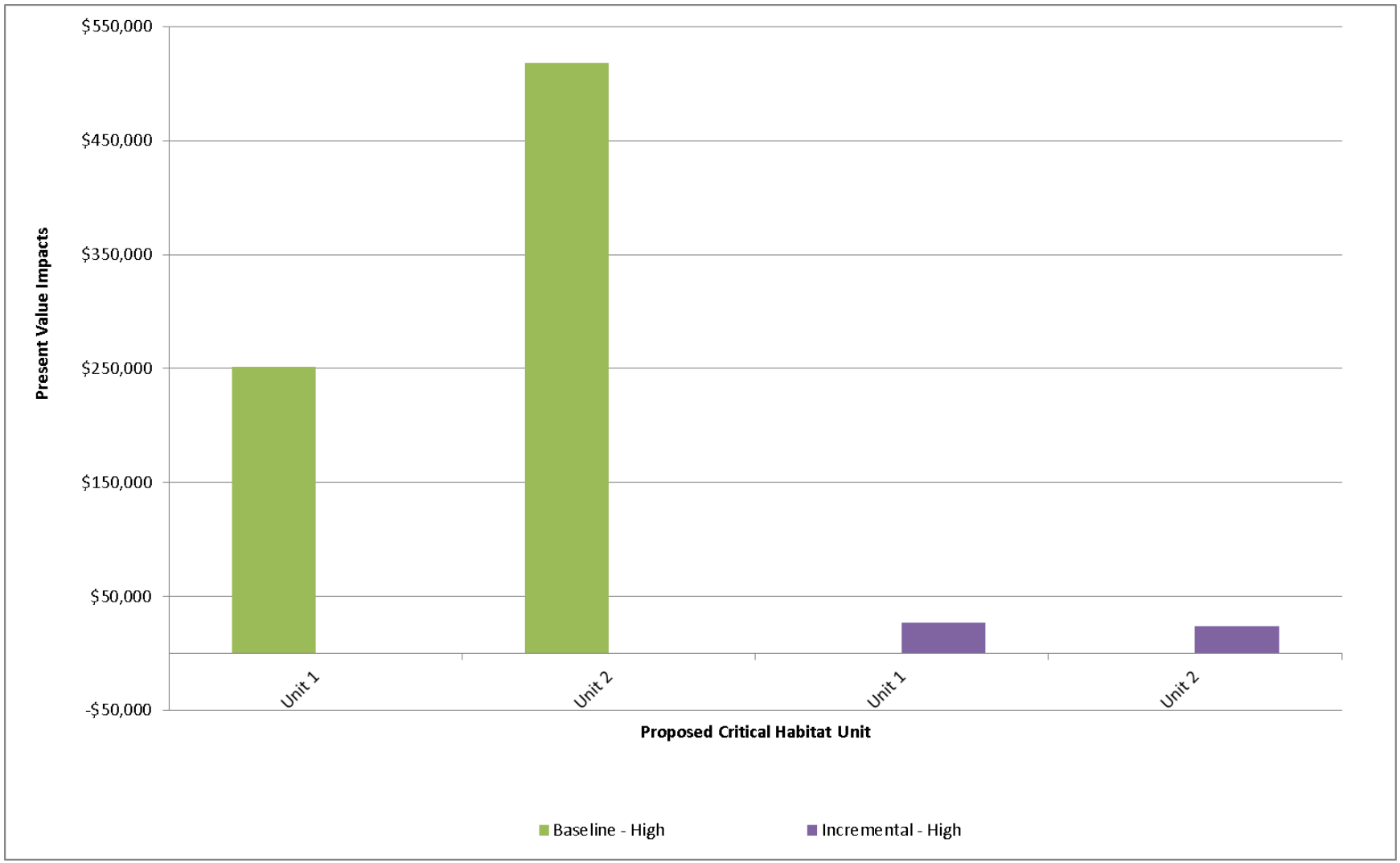
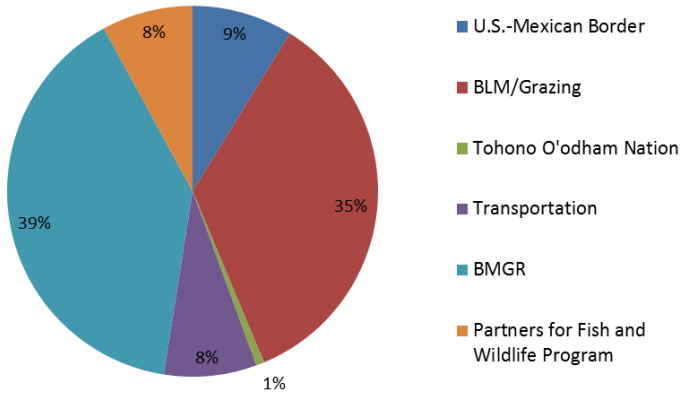
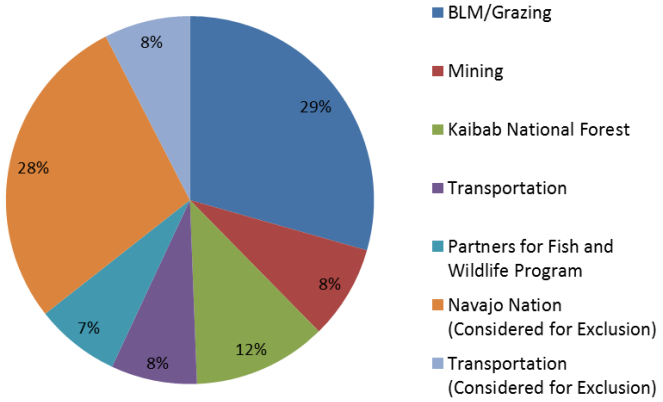


EXHIBIT ES-7. FORECAST PRESENT VALUE INCREMENTAL IMPACTS BY SPECIES AND ACTIVITY, 2013-2032 (2013$, DISCOUNTED AT SEVEN PERCENT)

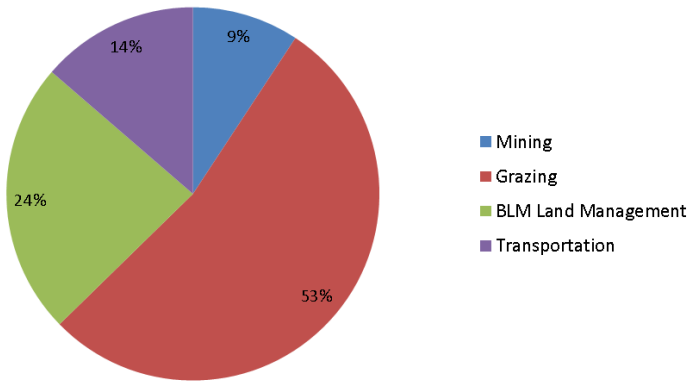
Acuña cactus



Fickeisen plains cactus



Gierisch mallow



Acuña cactus

- U.S.-Mexican Border Activities: Reinitiation of consultation on the Tactical Infrastructure Maintenance and Repair Program
- BLM/Grazing Activities: Reinitiation of consultation on the Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management; reinitiation of consultation on Lower Sonoran Field Office Resource Management Plans; programmatic consultation on grazing activity; and programmatic consultation for NRCS funding.
- Tohono O'odham Nation Activities: Technical assistance for development of a management plan for the cactus, including costs associated with jeopardy analysis for the unoccupied Cimarron Mountain Subunit.
- Transportation Activities: Annual technical assistance on ROW maintenance activities.
- BMGR Activities: Survey efforts within unoccupied Sand Tank Mountain Subunit.
- Partners for Fish and Wildlife Program: Intra-service programmatic consultation regarding conservation projects undertaken as part of this program.

Fickeisen plains cactus

- BLM/Grazing Activities: Reinitiation of consultation on the Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management; reinitiation of consultation on the Arizona Strip District Resource Management Plan; programmatic consultation on grazing activity; and programmatic consultation for NRCS funding.
- Navajo Nation Activities: Consultation on grazing activities, consultation on development of a new tourism facility, consultation on future wind energy development, and programmatic consultation for NRCS funding.
- Uranium Mining Activities: Consultation on EZ Mine.
- Kaibab National Forest Activities: Reinitiation of three consultations on management plans.
- Transportation Activities: Two annual technical assistance efforts on ROW maintenance within SR 64 and I-89.
- Partners for Fish and Wildlife Program: Intra-service programmatic consultation regarding conservation projects undertaken as part of this program.

Gierisch mallow

- Gypsum Mining Activities: Consultation on Black Rock Gypsum Mine expansion and technical assistance on Georgia-Pacific Mine.
- Grazing Activities: Programmatic consultation on grazing activity within BLM-managed lands in Utah and Arizona.

- BLM Land Management Activities: Reinitiation of consultation on the Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management and the Arizona Strip District Resource Management Plan
- Transportation Activities: Annual technical assistance on ROW maintenance within I-15 and informal consultation on I-15 road widening.

KEY UNCERTAINTIES

18. The primary, potentially substantial, source of uncertainty in this analysis is the extent to which the presence of the plants, as opposed to the existence of critical habitat, drives the conservation measures for these species in occupied areas. Localized projects may not constitute jeopardy to the plants while still causing adverse modification of critical habitat. The Service has indicated that it is difficult to state with any certainty whether a plant will be found in a given location and for this reason we make the simplifying assumption that the plants will be found throughout the occupied units. If the plants are not found at a particular project or activity site then this assumption will lead to an underestimate of the incremental impacts associated with the designation.

19. Additional significant sources of uncertainty include:

1. Whether consultations will occur on Tribal, private, and state-managed lands due to the existence of a Federal nexus; and
2. The extent to which the Service recommends conservation measures within the unoccupied Cimarron Mountain Subunit during consultation on the Tohono O'odham management plan for the acuña cactus.

ORGANIZATION OF THIS REPORT

20. This report is organized into five chapters. Chapter 1 provides background on the proposed critical habitat rule. Chapter 2 discusses the framework employed in the analysis. Chapters 3 and 4 present an analysis of the baseline protections currently afforded the cacti and the mallow, respectively, and assess the incremental economic impacts that may result from the Proposed Rules. Chapter 5 provides a brief discussion of potential economic benefits. Finally, four appendices to this report address additional statutory requirements, summarize results at a three percent discount rate and undiscounted impacts, provide information from the Service related to the potential for changes in conservation following critical habitat designation, and provide maps of proposed critical habitat designation for each of the three species.

CHAPTER 1 | INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

21. This chapter provides an overview of the proposed critical habitat for three plants: the Gierisch mallow (*Sphaeraclea gierischii*, hereafter "the mallow"), acuña cactus (*Echinomastus erectocentrus* var. *acunensis*), and Fickeisen plains cactus (*Pediocactus peeblesianus* var. *fickeiseniae*) ("the cacti"). It includes a summary of past Federal actions that relate to the current proposal, a description of the area proposed for designation, and a discussion of threats to the proposed critical habitat. The information contained in this chapter provides a context for the analysis. All official definitions and proposed critical habitat boundaries are provided in the Proposed Rules.[22,23]

1.1.1 PREVIOUS FEDERAL ACTIONS

22. The acuña and Fickeisen plains cacti were initially identified for possible inclusion in the list of endangered and threatened species in 1975 in the Service's Review of Status of Vascular Plants.[24] Both cacti species were identified as candidates for listing on February 21, 1990. On October 3, 2012, the Service proposed to list the cacti as endangered and designate critical habitat for both species.[25] The mallow was added as a candidate for listing on December 10, 2008, as the result of a 2007 petition by WildEarth Guardians seeking listing of 475 species in the southwestern United States. On August 17, 2012, the Service proposed to list the mallow as endangered and designate critical habitat for the species under the Act.[26] This analysis considers the economic effects of designating critical habitat for the cacti and mallow.

1.1.2 PROPOSED CRITICAL HABITAT DESIGNATION

23. The acuña cactus is an approximately 16-inch tall, spherical cactus, occurring in valleys and on small knolls and gravel ridges in the Sonoran desertscrub. The acuña cactus is highly dependent on specific elevation and slope conditions, and pollinator presence.[27] It is found in Maricopa, Pima, and Pinal Counties in southern Arizona, and Sonora, Mexico.

24. The Fickeisen plains cactus is a cold-adapted plant, that retracts into the soil during cold winter and dry summer seasons, as well as during drought, sometimes for as long as three

[22] 77 FR 49894-49919.

[23] 77 FR 60510-60579.

[24] 40 FR 27824 as cited in 77 FR 60513.

[25] 77 FR 60510-60579.

[26] 2012 Proposed Rule 77 FR 49894-49919.

[27] 2012 Proposed Rule. 77 FR 60510.

years. The plants can be difficult to find, even when their location is known. It is a narrow endemic species, restricted to Kaibab limestone on the Colorado Plateau in Coconino and Mohave Counties, Arizona. It occurs most often along canyon rims, flat terraces or benches, or on the toe of well-drained hills, at specific elevation and slope conditions. Fickeisen plains cactus reproduction is not well studied, but is believed to be dependent on cross-pollination by small, native bees.[28]

25. The Gierisch mallow is a perennial, flowering member of the mallow family. It is found in warm desertscrub plant communities, on gypsum outcrops in northern Arizona and southern Utah, specifically in Mohave County, Arizona and Washington County, Utah.[29] Though little is known about the plant, it seems to have a strong association with hillsides and steep slopes. Similarly, little is known about the plant's pollination and germination system, though it is likely to be dependent on bees similar to those that are important to other globemallows.[30]

26. Critical habitat is being proposed for the three plants across five counties in Arizona and one county in Utah. A total of 53,720 acres of critical habitat is proposed for the acuña cactus, 49,186 acres is proposed for the Fickeisen plains cactus, and 12,822 acres is proposed for the mallow. The proposed critical habitat for each species is described in detail below.

Acuña Cactus

27. The Service proposes to designate approximately 53,720 acres in six units and ten subunits located in Maricopa, Pima, and Pinal Counties in Arizona. Within the occupied subunits, critical habitat is defined as the 900-meter pollination area surrounding known plants. However, these areas were truncated in some instances to exclude topographical features where the plant will not grow, such as the Ajo Mine pit. There are two unoccupied subunits included in the proposed designation, totaling approximately 12,867 acres: the Cimarron Mountain Subunit of the Sauceda Mountains Unit, located on the Tohono O'odham Indian Reservation; and the Sand Tank Subunit of the Sand Tank Mountains Unit, located on the Barry M. Goldwater Range, managed by the DOD. Additionally, strands of land between populations in the Box O Wash Unit and an area of land in the Javelina Mountain Subunit adjacent to the existing population are considered to be particularly rich in the primary constituent elements (PCEs), and are therefore included in the proposed designation even though individual plants have not been located in this area. Exhibit 1-1 presents information on land ownership by subunit for the proposed acuña cactus critical habitat.

Fickeisen Plains Cactus

28. The Service proposes to designate approximately 39,632 acres across seven units and 14 subunits within the Colorado Plateau in Mohave and Coconino Counties, Arizona. The

[28] 77 FR 60527-60529.

[29] 77 FR 49894.

[30] *Ibid*.

Service is considering 9,554 acres for exclusion from critical habitat designation within three units and five subunits. Critical habitat for this species is defined as the 1,000-meter pollination area surrounding all existing plants. However, this area was truncated in some instances to exclude topographical features where the plant will not grow, such as steep slopes or canyon walls. All proposed areas are considered to be occupied by the species. The proposed habitat is located on lands managed by the BLM, USFS, and Navajo Nation, as well as state trust and private lands. Exhibit 1-1 presents additional detail on land ownership within the proposed Fickeisen plains cactus critical habitat.

EXHIBIT 1-1. SUMMARY OF LAND OWNERSHIP IN PROPOSED CRITICAL HABITAT FOR ACUÑA AND FICKEISEN PLAINS CACTI

UNIT		SUBUNIT		OWNERSHIP (PERCENT OF TOTAL)				TOTAL (ACRES)
				FEDERAL	STATE	TRIBAL	PRIVATE	
Acuña cactus								
1	Organ Pipe Cactus National Mountain	a	Dripping Spring	100%	0%	0%	0%	3,931
		b	Acuña Valley	100%	0%	0%	0%	5,971
2	Ajo	a	Ajo Townsites	21%	0%	0%	79%	1,035
		b	Little Ajo Mountains	43%	0%	0%	57%	610
3	Sauceda Mountains	a	Coffeepot Mountain	90%	0%	10%	0%	4,044
		b	Cimarron Mountain	0%	0%	100%	0%	5,190
4	Sand Tank Mountains	a	Javelina Mountain	100%	0%	0%	0%	2,251
		b	Sand Tank Mountain	100%	0%	0%	0%	7,677
5	Mineral Mountain			80%	20%	0%	0%	2,697
6	Box O Wash			17%	68%	0%	16%	20,314
TOTAL (PERCENT OF PCH TOTAL)				**55%**	**27%**	**10%**	**8%**	**53,720**
Fickeisen plains cactus								
Proposed Critical Habitat								
1	Hurricane Cliffs	a	Dutchman Draw	100%	0%	0%	<1%	3,774
		b	Salartus Draw	61%	37%	0%	2%	1,789
		c	Temple Trail	100%	0%	0%	0%	1,096
		d	Toquer Tank	100%	0%	0%	0%	865
2	Sunshine Ridge			81%	19%	0%	0%	1,863
3	Clayhole Valley		Clayhole Ridge	82%	18%	0%	0%	1,024
4	Snake Gulch			100%	0%	0%	0%	2,335
5	House Rock Valley	a	Beanhole Well	86%	14%	0%	0%	2,153
		b	North Canyon Wash	100%	0%	0%	0%	1,166
		c	Marble Canyon	100%	0%	0%	0%	528
		d	South Canyon	100%	0%	0%	0%	831
8	Gray Mountain	a	Mays Wash	35%	11%	0%	53%	1,724
		b	Gray Mountain	0%	1%	0%	54%	1,288
9	Cataract Canyon			0%	63%	0%	37%	19,196
							Proposed Critical Habitat Subtotal	*39,632*

UNIT		SUBUNIT		OWNERSHIP (PERCENT OF TOTAL)				TOTAL (ACRES)
				FEDERAL	STATE	TRIBAL	PRIVATE	
Considered for Exclusion								
6	Tiger Wash	a	Tiger Wash 1	0%	0%	100%	0%	940
		b	Tiger Wash 2	0%	0%	100%	0%	3,700
		c	Shinumo Wash	0%	0%	100%	0%	940
7	Little Colorado River Overlook			0%	0%	100%	0%	2,891
8	Gray Mountain	b	Gray Mountain	0%	0%	46%	0%	1,083
							Considered for Exclusion Subtotal	*9,554*
TOTAL (PERCENT OF PCH TOTAL)				**34%**	**28%**	**19%***	**19%**	**49,186**

Notes: Totals may not sum due to rounding.
*Area considered for exclusion.
Sources: U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 10, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Acuña Cactus and the Fickeisen Plains Cactus," pp. 3-4. See Appendix C; 77 FR 60558.

Gierisch Mallow

29. The Service proposes to designate two units of critical habitat for the mallow, totaling 12,822 acres in Mohave County, Arizona, and Washington County, Utah. Critical habitat for this species is defined as the 1,200-meter pollination area surrounding all existing populations. All areas included in the proposed designation are considered occupied, and are entirely state- or Federally- managed lands. Exhibit 1-2 provides information on land ownership within the proposed mallow habitat.

EXHIBIT 1-2. SUMMARY OF LAND OWNERSHIP IN PROPOSED CRITICAL HABITAT FOR GIERISCH MALLOW

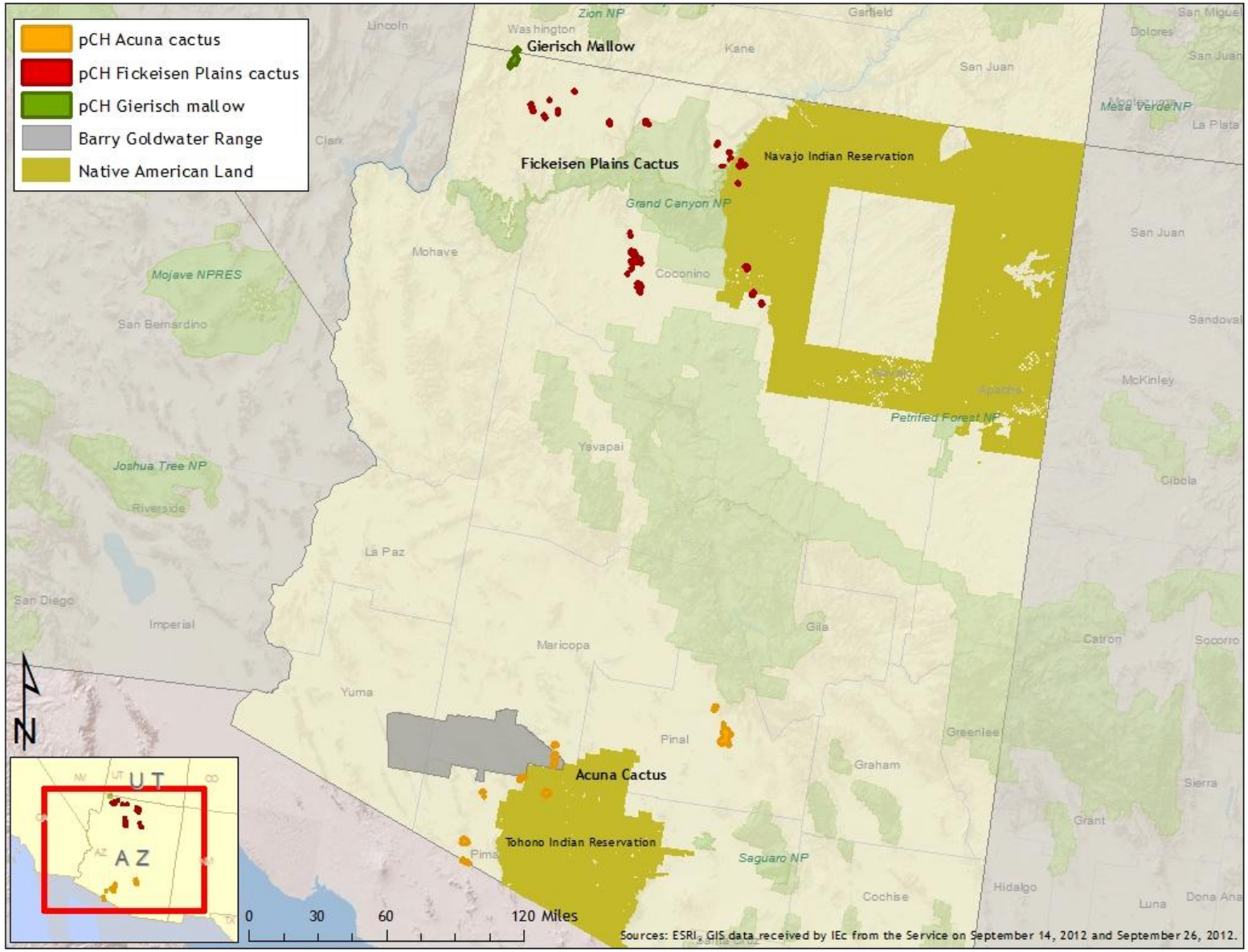
UNIT		OWNERSHIP (PERCENT OF UNIT TOTAL)				TOTAL (ACRES)
		FEDERAL (AZ)	FEDERAL (UT)	STATE (AZ)	STATE (UT)	
1	Starvation Point	0%	76%	18%	6%	3,309
2	Black Knolls	93%	0%	7%	0%	9,513
TOTAL (PERCENT OF PCH TOTAL)		**69%**	**20%**	**10%**	**1%**	**12,822**

Source: GIS data provided by the Service to IEc on September 20, 2012; USGS, National Gap Analysis Program, Protected Areas Database (PAD-US), accessed September 25, 2012 at http://gapanalysis.usgs.gov/padus/.

30. The Service has not identified areas being considered for exclusion from critical habitat under section 4(b)(2) of the Act.[31] The "study area" for the economic analysis comprises all lands proposed as critical habitat. A map displaying an overview of the areas being proposed is provided below in Exhibit 1-3. Additional maps of the units proposed as critical habitat for the plants are included in Appendix D.

[31] 77 FR 60563, 77 FR 49914.

EXHIBIT 1-3. OVERVIEW OF AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION FOR THE THREE ARIZONA PLANTS



1.2 ECONOMIC ACTIVITIES CONSIDERED IN THIS ANALYSIS

31. Review of the Proposed Rules identified the following economic activities as being potentially affected by conservation efforts for the three plants and their habitat. These activities are addressed in Chapters 3 and 4 of the economic analysis.

(1) **U.S. – Mexican border activities:** CBP and NPS Law Enforcement activity in the area around the border with Mexico may degrade acuña cactus habitat. Off-road vehicle travel associated with border activities may cause vegetation destruction, soil compaction, and direct mortality of the acuña cactus.[62]

(2) **Livestock grazing:** Grazing represents a threat to the cacti and the mallow. Grazing practices can change vegetation composition and abundance, cause soil erosion and compaction, reduce water infiltration rates, and increase runoff. In addition, livestock can step on or knock over individual plants, and in the case of the mallow may eat plants, especially during the flowering season.[63,64]

(3) **Gypsum mining:** Gypsum mining represents a threat to the mallow in Arizona. Mining operations temporarily removes the plant's habitat and any plants growing in the affected area for the duration of the mining activities. Post-mining, the reclaimed soils do not contain the original gypsum compositions with which the plants are associated and therefore may not be capable of supporting the plants.[65]

(4) **Uranium mining:** Uranium mining represents a potential threat to the Fickeisen plains cactus within the Arizona Strip and Coconino Plateau. Mining may reduce suitable habitat, increase erosion, enable invasion of nonnative pants, and increase the risk of plant mortality.[66]

(5) **Commercial development:** Commercial development associated with tourism on lands within the Navajo Nation is identified as a specific threat to the Fickeisen plains cactus. This type of development may lead to trampling of plants by people and loss of plants and habitat to make way for development.[67]

(6) **Recreational activities:** Unauthorized OHV use and target shooting represent a threat to the mallow in Utah. OHV use associated with recreation, including camping and hunting, also occurs within Fickeisen plains cactus habitat. These activities represent a direct threat to the plants through trampling as well as an indirect threat through soil compaction, loss of soil crusts, erosion, and the promotion and spread of nonnative invasive species.[68,69]

[62] 77 FR 60519.

[63] 77 FR 60518.

[64] 77 FR 49898.

[65] 77 FR 49897-49898.

[66] 77 FR 60539.

[67] 77 FR 60540.

[68] 77 FR 49900.

[69] 77 FR 60540.

(7) **Road construction and maintenance:** Road construction and maintenance within Fickeisen plains cactus can destroy or modify habitat and lead to increased erosion. Road maintenance on unimproved roads can result in atmospheric dust which may deposit on vegetation. In addition, roads may lead to increased trampling of plants caused by increased human access.[70]

(8) **Species and Habitat Management:** The three plants and their habitat are currently afforded some level of protection under various Federal and Tribal management plans and programs. These plans and programs will be required to explicitly consider impacts on the plants and their habitat.

32. The Proposed Rule also identifies predation by native insects and small mammals, drought, and climate change as threats to the cacti. The Service does not consult specifically on economic activities that may jeopardize the cacti or adversely modify their critical habitat through predation, drought, and climate change. Furthermore, the Service has noted that the underlying causes of climate change are complex global issues that are beyond the scope of the Act.[71] Therefore, this analysis does not specifically address predation, drought, or climate change as threats to the species.

1.3 ORGANIZATION OF THE REPORT

33. The remainder of this report is organized into four additional chapters and four appendices. Chapter 2 discusses the framework employed in the analysis, Chapter 3 presents an analysis of the baseline protections currently afforded the two cacti, and assesses incremental economic impacts that may result from the Proposed Rule. Chapter 4 presents an analysis of baseline protections, and assesses potential future baseline and incremental costs associated with Gierisch mallow proposed critical habitat. Chapter 5 provides a brief discussion of potential benefits of the designation. We estimate the distributional impacts to small entities and the energy industry in Appendix A. A complete list of the remaining chapters and appendices is provided below.

Chapter 2 – Framework for Analysis

Chapter 3 – Potential Baseline and Incremental Economic Impacts for the Acuña and Fickeisen Plains Cacti

Chapter 4 – Potential Baseline and Incremental Economics Impacts for the Gierisch Mallow

Chapter 5 – Potential Economic Benefits

Appendix A – Additional Statutory Requirements

Appendix B – Sensitivity of Results to Discount Rate

Appendix C – Incremental Effects Memoranda

Appendix D – Detailed Maps of Proposed Critical Habitat

[70] *Ibid.*

[71] 73 FR 76251.

CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS

34. The purpose of this analysis is to estimate the economic impact of actions taken to protect the three plants and their habitat. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the three plant species and their habitat within the proposed critical habitat area. This analysis employs "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections otherwise accorded the plants, for example, under the Federal listing and other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for the plants. As described in Section 2.1, this analysis quantifies both baseline and incremental impacts likely to occur after the proposed critical habitat is finalized for the mallow, and for the cacti qualitatively describes the baseline conservation measures and quantifies only the incremental impacts of the critical habitat designation.

35. This information is intended to assist the Secretary of the DOI in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.[43] In addition, this information allows the Service to address the requirements of Executive Orders 12866 as amended by Executive Order (EO) 13563 (the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA)), Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), EO 13132 ("Federalism"), and EO 13211 ("Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use").[44]

36. This chapter describes the framework for this analysis. It first describes case law that led to the selection of the framework applied in this report. Next, we describe in economic terms the general categories of economic effects that are the focus of the impact analysis, including a discussion of both efficiency and distributional effects. We then define the analytic framework used to measure these impacts in the context of critical habitat regulation and the consideration of benefits. We conclude with a presentation of the information sources relied upon in the analysis and notes on the presentation of the results.

[43] 16 U.S.C. §1533(b)(2).

[44] Executive Order 12866, *Regulatory Planning and Review*, September 30, 1993; Executive Order 13563, *Improving Regulation and Regulatory Review*, January 18, 2011; Executive Order 13211, *Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use*, May 18, 2001; 5. U.S.C. §§601 *et seq*; and Pub Law No. 104-121.

2.1 BACKGROUND

37. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the proposed critical habitat area. The U.S. Office of Management and Budget (OMB) has produced guidelines for conducting economic analysis of regulations. These guidelines direct Federal agencies to measure the costs of a regulatory action against a baseline, which it defines as the "best assessment of the way the world would look absent the proposed action."[45] In other words, the baseline includes the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat. Impacts that are incremental to that baseline (i.e., occurring over and above existing constraints) are attributable to the proposed regulation. Significant debate has occurred regarding whether assessing the impacts of the Service's proposed regulations using this baseline approach is appropriate in the context of critical habitat designations.

38. In 2001, the U.S. Tenth Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed critical habitat, regardless of whether those impacts are attributable co-extensively to other causes.[46] Specifically, the court stated,

> "The statutory language is plain in requiring some kind of consideration of economic impact in the CHD [critical habitat designation] phase. Although 50 C.F.R. 402.02 is not at issue here, the regulation's definition of the jeopardy standard as fully encompassing the adverse modification standard renders any purported economic analysis done utilizing the baseline approach virtually meaningless. We are compelled by the canons of statutory interpretation to give some effect to the congressional directive that economic impacts be considered at the time of critical habitat designation…. Because economic analysis done using the FWS's [Fish and Wildlife Service's] baseline model is rendered essentially without meaning by 50 C.F.R. § 402.02, we conclude Congress intended that the FWS conduct a full analysis of all of the economic impacts of a critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes. Thus, we hold the baseline approach to economic analysis is not in accord with the language or intent of the [Endangered Species Act]."[47]

39. Since that decision, however, courts in other cases have held that an incremental analysis of impacts stemming solely from the critical habitat rulemaking is proper.[48] For example,

[45] OMB, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf.

[46] *New Mexico Cattle Growers Assn. v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

[47] *Ibid.*

[48] In explanation of their differing conclusion, later decisions note that in *New Mexico Cattle Growers*, the U.S. Tenth Circuit Court of Appeals relied on a Service regulation that defined "destruction and adverse modification" in the context of section 7 consultation as effectively identical to the standard for "jeopardy." Courts had since found that this definition of

in the March 2006 ruling that the August 2004 critical habitat rule for the Peirson's milk-vetch was arbitrary and capricious, the United States District Court for the Northern District of California stated,

> "The Court is not persuaded by the reasoning of *New Mexico Cattle Growers*, and instead agrees with the reasoning and holding of *Cape Hatteras Access Preservation Alliance v. U.S. Dep't of the Interior,* 344 F. Supp 2d 108 (D.D.C. 2004). That case also involved a challenge to the Service's baseline approach and the court held that the baseline approach was both consistent with the language and purpose of the [Endangered Species Act] and that it was a reasonable method for assessing the actual costs of a particular critical habitat designation *Id* at 130. 'To find the true cost of a designation, the world with the designation must be compared to the world without it.'"[49]

40. More recently, in 2010, the U.S. Ninth Circuit Court of Appeals came to similar conclusions during its review of critical habitat designations for the Mexican spotted owl and 15 vernal pool species.[50] Plaintiffs in both cases requested review by the Supreme Court, which declined to hear the cases in 2011.

41. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis takes a two-pronged approach:

- For the cacti, the analysis qualitatively describes the baseline protections accorded the plants absent critical habitat designation and monetizes the potential incremental impacts precipitated specifically by the critical habitat designation for the species (Chapter 3); and
- For the mallow, which occurs partially within the jurisdiction of the Tenth Circuit Court, the analysis monetizes both the baseline and incremental impacts. Summed, these two types of impacts constitute the co-extensive impacts of conservation in areas considered for critical habitat designation for the mallow.

42. Several Courts of Appeal, including the Ninth Circuit and the Fifth Circuit, have invalidated the Service's regulation defining destruction or adverse modification of critical habitat.[51] At this time the Service is analyzing whether destruction or adverse modification would occur based on the statutory language of the Act itself, which requires the Service to consider whether the agency's action is likely "to result in the

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"adverse modification" was too narrow. For more details, see the discussion of *Gifford Pinchot Task Force v. United States Fish and Wildlife Service* provided later in this section.

[49] *Center for Biological Diversity et al, Plaintiffs, v. United States Bureau of Land Management et al., Defendants and American Sand Association, et al, Defendant Intervenors*. Order re: Cross Motions for Summary Judgment, Case 3:03-cv-02509 Document 174 Filed 03/14/2006, pages 44-45.

[50] Home Builders Association of Northern California v. United States Fish and Wildlife Service, 616 F.3d 983 (9th Cir. 2010), cert. denied, 179 L. Ed 2d 301, 2011 U.S. Lexis 1392, 79 U.S.L.W. 3475 (2011); Arizona Cattle Growers v. Salazar, 606 F. 3d 1160 (9th Cir. 2010), cert. denied, 179 L. Ed. 2d 300, 2011 U.S. LEXIS 1362, 79 U.S.L.W. 3475 (2011).

[51] *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, 378 F.3d 1059 (9th Cir. 2004); *Sierra Club v. U. S. Fish and Wildlife Service*, 245 F.3d 434 (5th Cir. 2001).

destruction or adverse modification of habitat which is determined by the Service to be critical" to the conservation of the species. To perform this analysis, the Service considers how the proposed action is likely to impact the function of the critical habitat unit in question and how the effects relate to the functioning of the entire designation. To assist us in evaluating these likely impacts, the Service developed memoranda characterizing the effects of critical habitat designation over and above those associated with the listing based on their experience consulting on and analyzing the effect of activities on other listed species and their habitat (see Appendix C). A detailed description of the methodology used to define baseline and incremental impacts is provided later in this chapter.

2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

43. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the three plants and their habitat. Economic efficiency effects generally reflect "opportunity costs" associated with the commitment of resources required to accomplish species and habitat conservation. For example, if the set of activities that may take place on a parcel of land is limited as a result of the designation or the presence of the species, and thus the market value of the land is reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly, the costs incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs of three plants conservation efforts.

44. This analysis also addresses the distribution of impacts associated with the designation, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation efforts on small entities and the energy industry. This information may be used by decision-makers to assess whether the effects of species conservation efforts unduly burden a particular group or economic sector. For example, while conservation efforts may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience relatively greater impacts.

2.2.1 EFFICIENCY EFFECTS

45. At the guidance of OMB and in compliance with Executive Order 12866 "Regulatory Planning and Review," Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action. In the context of regulations that protect the three plants, these efficiency effects represent the opportunity cost of resources used or benefits foregone by society as a result of the regulations. Economists generally characterize opportunity costs in terms of changes in producer and consumer surpluses in affected markets.[52]

[52] For additional information on the definition of "surplus" and an explanation of consumer and producer surplus in the context of regulatory analysis, see: Gramlich, Edward M., A Guide to Benefit-Cost Analysis (2nd Ed.), Prospect Heights, Illinois: Waveland Press, Inc., 1990; and U.S. Environmental Protection Agency, Guidelines for Preparing Economic Analyses, EPA 240-R-00-003, September 2000, available at http://yosemite.epa.gov/ee/epa/eed.nsf/ webpages/Guidelines.html.

46. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a Federal land manager may enter into a section 7 consultation with the Service to ensure that a particular activity will not adversely modify critical habitat. The effort required for the consultation is an economic opportunity cost because the landowner or manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When compliance activity is not expected to significantly affect markets -- that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.

47. Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, protection measures that reduce or preclude the development of large areas of land may shift the price and quantity of housing supplied in a region. In this case, changes in economic efficiency (i.e., social welfare) can be measured by considering changes in producer and consumer surplus in the market.

2.2.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

48. Measurements of changes in economic efficiency focus on the net impact of conservation efforts, without consideration of how certain economic sectors or groups of people are affected. Thus, a discussion of efficiency effects alone may miss important distributional considerations. OMB encourages Federal agencies to consider distributional effects separately from efficiency effects.[53] This analysis considers several types of distributional effects, including impacts on small entities; impacts on energy supply, distribution, and use; and regional economic impacts. It is important to note that these are fundamentally different measures of economic impact than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.

Impacts on Small Entities, Governments, and Energy Supply, Distribution, and Use

49. This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the RFA, might be affected by future species conservation efforts.[54] It also assesses the potential for impacts to State, local and Tribal governments and the private sector as required by Title II of UMRA.[55] In addition, in response to Executive Order 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the future impacts of conservation efforts on the energy industry and its customers.[56]

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[53] U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf.

[54] 5 U.S.C. §§601 *et seq*.

[55] 2 U.S.C. 1531 *et seq.*

[56] Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

Regional Economic Effects

50. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation efforts. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by recreators) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreators). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.

51. The use of regional input-output models in an analysis of the impacts of species and habitat conservation efforts can overstate the long-term impacts of a regulatory change. Most importantly, these models provide a static view of the economy of a region. That is, they measure the initial impact of a regulatory change on an economy but do not consider long-term adjustments that the economy will make in response to this change. For example, these models provide estimates of the number of jobs lost as a result of a regulatory change, but do not consider re-employment of these individuals over time or other adaptive responses by impacted businesses. In addition, the flow of goods and services across the regional boundaries defined in the model may change as a result of the regulation, compensating for a potential decrease in economic activity within the region.

52. Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency losses. Thus, these types of distributional effects are reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects, but should be considered as distinct measures of impact.

2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

53. This analysis identifies those economic activities most likely to threaten the three plants and their habitat and, where possible, quantifies the economic impact to avoid or minimize such threats within the boundaries of the study area (the geographic boundaries of the study area are described later in this Chapter). This section provides a description of the methodology used to separately identify baseline impacts and incremental impacts stemming from the proposed designation of critical habitat for the three plants. This evaluation of impacts in a "with critical habitat designation" versus a "without critical habitat designation" framework effectively measures the net change in economic activity associated with the proposed rulemaking.

2.3.1 IDENTIFYING BASELINE IMPACTS

54. The baseline for this analysis is the existing state of regulation, prior to the designation of critical habitat, which provides protection to the species under Act, as well as under other Federal, State and local laws and guidelines. This "without critical habitat designation" scenario also considers a wide range of additional factors beyond the compliance costs of regulations that provide protection to the listed species. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by the Service and other government entities, and trends in other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.

55. Baseline protections include sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections to the extent that they are expected to occur absent the designation of critical habitat for the species. This analysis describes these baseline regulations and quantifies costs associated with these regulations for the mallow. Enforcement actions taken in response to violations of the Act are not included in this analysis.

- Section 7 of Act, absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species. Consultations under the jeopardy standard result in administrative costs, as well as impacts of conservation efforts resulting from consideration of this standard. Baseline administrative costs of section 7 consultation are summarized later in Exhibit 2-2.
- Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the "take" of endangered wildlife, where "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[57] The economic impacts associated with this section manifest themselves in sections 7 and 10. While incidental take permits are not issued for plant species, the Service is obligated to ensure that proposed activities adequately minimize impacts to the species.
- Under section 10(a)(2)(B) of the Act, a non-Federal entity (e.g., a State or private landowner or local government) may develop a Habitat Conservation Plan (HCP) for a listed wildlife species in order to meet the conditions for issuance of an incidental take permit in connection with a land or water use activity or project.[58] The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately avoided or minimized. The development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be precipitated by the designation of critical habitat, or the designation influences stipulated conservation efforts under HCPs. While HCPs are not developed

[57] 16 U.S.C. 1532.

[58] U.S. Fish and Wildlife Service, "Habitat Conservation Plans Under the Endangered Species Act," April 2011, accessed at http://www.fws.gov/endangered/esa-library/pdf/hcp.pdf.

solely for plant species, if listed plants occur in the area subject to the HCP, the Service must consider whether effects from the issuance of a permit may jeopardize the continued existence of the plant species as required by section 7 of the Act. There are currently no HCPs that include the three plants as covered species.

56. The protection of listed species and habitat is not limited to the Act. Other Federal agencies, as well as State and local governments, may also seek to protect the natural resources under their jurisdiction. If compliance with the Clean Water Act or State environmental quality laws, for example, protects habitat for the species, such protective efforts are considered to be baseline protections and costs associated with these efforts are categorized accordingly. Of note, however, is that such efforts may not be considered baseline in the case that they would not have been triggered absent the designation of critical habitat. In these cases, they are considered incremental impacts and are discussed below.

2.3.2 IDENTIFYING INCREMENTAL IMPACTS

57. This analysis quantifies the potential incremental impacts of these rulemakings. The focus of the incremental analysis is to determine the impacts on land uses and activities from the designation of critical habitat that are above and beyond those impacts resulting from existing required or voluntary conservation efforts being undertaken due to other Federal, State, and local regulations or guidelines.

58. When critical habitat is designated, section 7 requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat (in addition to considering whether the actions are likely to jeopardize the continued existence of the species). The added administrative costs of including consideration of critical habitat in section 7 consultations, and the additional impacts of implementing conservation efforts (i.e., reasonable and prudent alternatives) resulting from the protection of critical habitat are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental impacts of the rulemaking.

59. Incremental impacts may be the direct compliance costs associated with additional effort for consultations, reinitiated consultations, new consultations occurring specifically because of the designation, and additional conservation efforts that would not have been requested under the jeopardy standard. Additionally, incremental impacts may include indirect impacts resulting from reaction to the potential designation of critical habitat (e.g., implementing plant conservation in an effort to avoid designation of critical habitat), triggering of additional requirements under State or local laws intended to protect sensitive habitat, and uncertainty and perceptional effects on markets.

60. Exhibit 2-1 depicts the decision analysis regarding whether an impact should be considered incremental. To inform the economic analysis, the Service provided memoranda describing its expected approach to conservation for the cacti and the mallow following critical habitat designation (Appendix C). Specifically, the Service's memoranda provide information on how the Service intends to address potential adverse

effects on critical habitat as distinct from potential adverse effects on the species. Whether an activity is likely to be subject to incremental impacts depends largely on two factors: (1) whether a Federal nexus exists compelling consultation under section 7 of the Act; and (2) whether the project occurs within an unoccupied subunit.

Direct Impacts

61. The direct, incremental impacts of critical habitat designation stem from the consideration of the potential for destruction or adverse modification of critical habitat during section 7 consultations. The two categories of direct, incremental impacts of critical habitat designation are: 1) the administrative costs of conducting section 7 consultation; and 2) implementation of any conservation efforts requested by the Service through section 7 consultation to avoid potential destruction or adverse modification of critical habitat.[59]

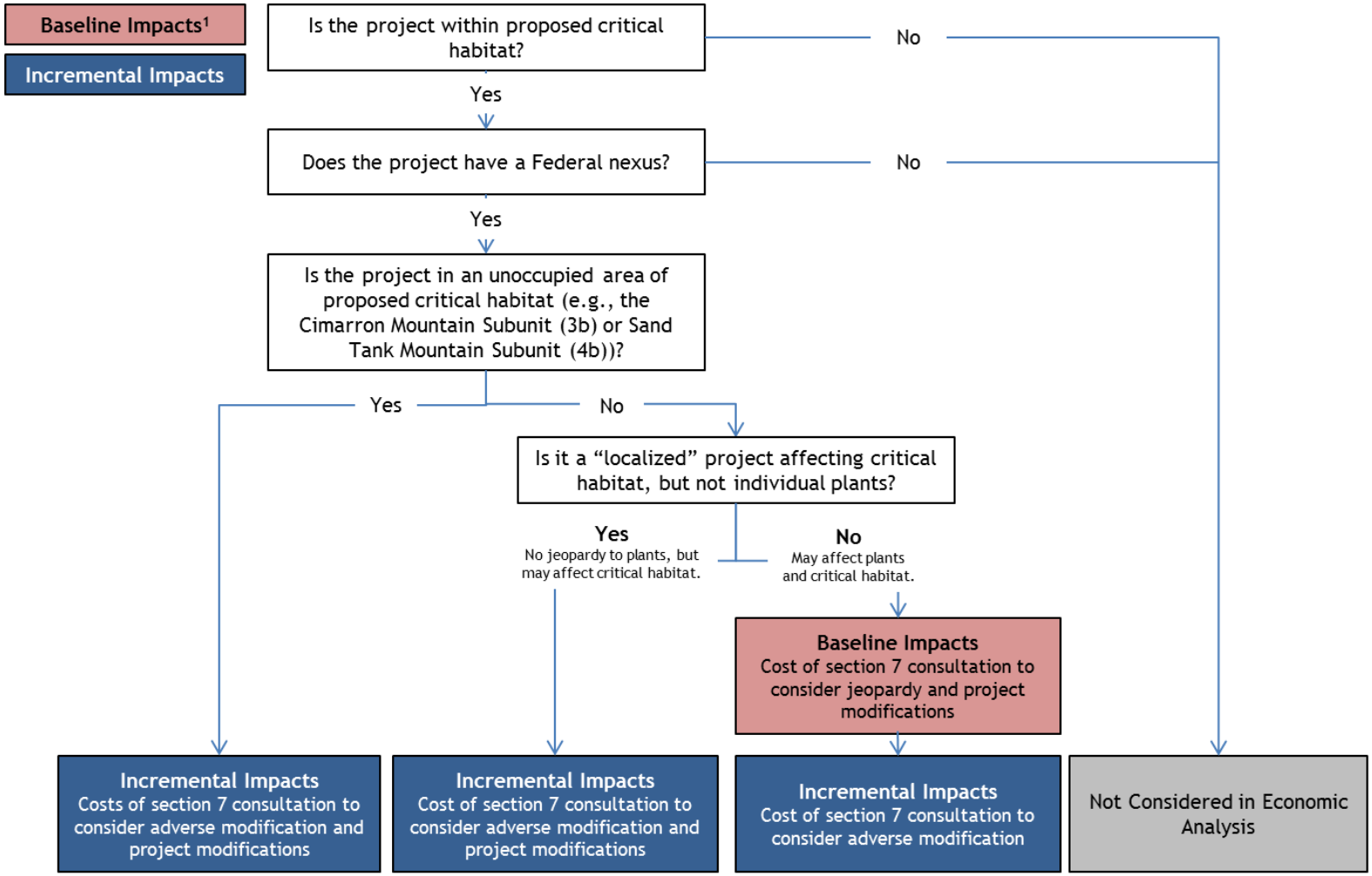
62. Section 7(a)(2) of the Act requires Federal agencies to consult with the Service whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. In some cases, consultations will involve the Service and another Federal agency only, such as the U.S. Army Corps of Engineers. Often, they will also include a third party involved in projects with a permitted entity, such as the recipient of a Clean Water Act section 404 permit.

63. During a consultation, the Service, the Action agency, and the entity applying for Federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or to the proposed critical habitat. Communication between these parties may occur via written letters, e-mail, phone calls, in-person meetings, or any combination of these. The duration and complexity of these interactions depends on a number of variables, including the type of consultation, the species, the activity of concern, and the potential effects to the species and designated critical habitat associated with the proposed activity, the Federal agency, and whether there is a private applicant involved.

64. Section 7 consultations with the Service may be either informal or formal. *Informal consultation*s consist of discussions between the Service, the Action agency, and the applicant concerning an action that may affect a listed species or its designated critical habitat, and are designed to identify and resolve potential concerns at an early stage in the planning process. By contrast, a *formal consultation* is required if the Action agency determines that its proposed action may or will adversely affect the listed species or designated critical habitat in ways that cannot be resolved through informal consultation. The formal consultation process results in the Service's determination in its Biological Opinion of whether the action is likely to jeopardize a species or adversely modify critical habitat, and recommendations to minimize those impacts. Regardless of the type of consultation or proposed project, section 7 consultations can require substantial administrative effort on the part of all participants.

[59] The term conservation efforts is intended to broadly capture efforts that stakeholders may undertake for the species, regardless of whether these efforts are explicitly called for in a section 7 consultation.

EXHIBIT 2-1. FRAMEWORK FOR DETERMINING DIRECT BASELINE AND INCREMENTAL IMPACTS FOR ACUÑA CACTUS, FICKEISEN PLAINS CACTUS, AND GIERISCH MALLOW RESULTING FROM THE IMPLEMENTATION OF SECTION 7 OF THE ACT



1 Baseline impacts will be described qualitatively for the Fickeisen Plains and acuña cacti, and quantified for the Gierisch mallow.
Sources: U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 10, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Acuña Cactus and the Fickeisen Plains Cactus" and U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 14, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Gierisch Mallow." (See Appendix C.) Personal communication with the Service on September 9, 2012.

Administrative Section 7 Consultation Costs

65. Parties involved in section 7 consultations include the Service, a Federal "action agency," and in some cases, a private entity involved in the project or land use activity. The action agency (i.e., the Federal action necessitating the consultation) serves as the liaison with the Service. While consultations are required for activities that involve a Federal action and may affect a species regardless of whether critical habitat is designated, the designation may increase the effort for consultations in the case that the project or activity in question may adversely modify critical habitat. Administrative efforts for consultation may therefore result in both baseline and incremental impacts.

66. In general, where critical habitat is designated concurrently with the listing of the species, two different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:

1. **Additional effort to address adverse modification in a new consultation -** New consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond the listing issues. In this case, only the additional administrative effort required to consider critical habitat is considered an incremental impact of the designation.
2. **Incremental consultation resulting entirely from critical habitat designation -** Critical habitat designation may trigger additional consultations that may not occur absent the designation (e.g., for an activity for which adverse modification may be an issue, while jeopardy is not, or consultations resulting from the new information about the location of species habitat provided by the designation). Such consultations may, for example, be triggered in critical habitat areas that are not occupied by the species. All associated administrative and project modification costs of these consultations are considered incremental impacts of the designation.

67. The administrative costs of these consultations vary depending on the specifics of the project. One way to address this variability is to show a range of possible costs of consultation, as it may not be possible to predict the precise outcome of each future consultation in terms of level of effort. Review of consultation records and discussions with multiple Service field offices resulted in a range of estimated administrative costs of consultation. For simplicity, the average of the range of costs in each category is applied in this analysis (see Exhibit 2-2).

Section 7 Conservation Effort Impacts

68. Section 7 consultation considering critical habitat may also result in additional conservation effort recommendations specifically addressing potential destruction or adverse modification of critical habitat. For future consultations considering jeopardy and adverse modification, the economic impacts of conservation efforts undertaken to avoid adverse modification are considered incremental impacts of critical habitat designation. For consultations that are forecast to occur specifically because of the

designation (incremental consultations), impacts of all associated conservation efforts are assumed to be incremental impacts of the designation.

Identifying Direct Incremental Impacts for the Three Plants

69. In cases where section 7 consultation occurs, the Service states that for each of the cacti species:

> "Occupied critical habitat units and their PCEs reflect the needs of the species and are clearly defined in the proposed rule. Modifications to the PCEs of critical habitat would tend to be closely tied to adverse effects to the species; therefore, activities that would require consultation for critical habitat are primarily the same as activities that currently require consultation for the species [...] Because the acuña cactus and the Fickeisen Plains cactus are closely tied to their habitat and are not mobile, it is more likely that surface disturbances resulting in critical habitat being adversely modified would likely also constitute jeopardy to the species."[59]

The Service makes a similar determination for the mallow for which both proposed units are occupied, and both contain all of the PCEs.[60]

70. The Service's memoranda do not identify instances in which the project modifications recommended to avoid adverse modification would differ from those recommended to avoid jeopardy. Thus, the outcome of a section 7 consultation is unlikely to be affected by the presence of critical habitat, and direct incremental impacts are generally limited to additional administrative costs associated with addressing adverse modification in section 7 consultations. However, two exceptions to this general rule are discussed below.

71. The first exception is within the proposed subunits for the acuña cactus that are unoccupied by the species.[61] Two unoccupied subunits are proposed, the Cimarron Mountain Subunit of the Sauceda Mountain Unit and the Sand Tank Mountain Subunit of the Sand Tank Mountain Unit. The Service states that for project sites within the limits of unoccupied critical habitat, adverse effects to critical habitat may occur where adverse effects to the plants would not otherwise be concluded.[62] Therefore, any conservation measures implemented for the cactus in these areas may be considered incremental impacts of the Proposed Rule to designate critical habitat.

72. The second instance where incremental impacts are likely is in rare cases within occupied units where localized projects may not adversely affect the plants, but may adversely modify critical habitat. In regards to the cacti, for example, the Service states that,

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[59] U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 10, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Acuña Cactus and the Fickeisen Plains Cactus," p. 11. See Appendix C.

[60] U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 14, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Gierisch Mallow," p. 5-6. See Appendix C.

[61] Personal communication with the Service on September 25, 2012.

[62] U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 10, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Acuña Cactus and the Fickeisen Plains Cactus," p. 13. See Appendix C.

> "It is possible, however, that consultation could result in an adverse modification determination, but not jeopardy for either species. Some areas of proposed critical habitat may support the acuña cactus and the Fickeisen Plains cactus at very low densities. The Federal action agency may find that affects to these few individuals does not constitute jeopardy to the species, but they may find that the actions could result in adverse modification of critical habitat. In these cases, section 7 consultation would be considered an incremental effect of designating critical habitat."[63]

73. With regard to the mallow, the Service states that,

> "...there could be situations where smaller projects are proposed that result in a localized effect within a unit. For example, if a powerline is proposed to run through a narrow linear portion of one unit, the PCE's along that line will be affected, but potentially no plants will be affected. We believe incremental effects are most likely to occur within portions of the Gierisch mallow critical habitat where the plants are not actually found but could become established in the future so long as the PCEs are retained."[64]

74. For all three species, in these above instances, section 7 consultation within occupied units may result in incremental impacts due to the designation of critical habitat. However, given that some occupied units contain low densities of plants, it may be difficult to identify the areas where the plants might not be found or affected by a proposed project. For example, in dry years, the plants may be difficult to detect as the Fickeisen plains cactus may retract into the soil and the mallow density is moisture-dependent.[65,66] For this reason, the economic analysis assumes that plants are found throughout the occupied critical habitat units and therefore incremental impacts will be limited to the proposed unoccupied subunits for the acuña cactus as described above.[67] This is a key limitation of the analysis and, as described in Chapters 3 and 4, results in a potential underestimate of the incremental impacts of critical habitat designation for the plant species.

[63] *Ibid.*, pp. 11-12.

[64] U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 14, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Gierisch Mallow," pp. 5-6. See Appendix B.

[65] Personal communication with U.S. Fish and Wildlife Service biologist, October 18, 2012.

[66] Personal communication with U.S. Fish and Wildlife Service biologist, January 22, 2013.

[67] Portions of two acuña cactus units, the Sand Tank Mountain Subunit of the Sand Tank Mountain Unit and the Box O Wash Unit, include areas greater than 900 meters from existing plants. Projects that are confined to these areas are likely to avoid jeopardy, while adversely modifying critical habitat. If such projects are identified, costs associated with conservation efforts for the cactus will be considered incremental.

EXHIBIT 2-3. RANGE OF ADMINISTRATIVE CONSULTATIONS COSTS (2013 DOLLARS)

BASELINE ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	**SERVICE**	**FEDERAL AGENCY**	**THIRD PARTY**	**BIOLOGICAL ASSESSMENT**	**TOTAL COSTS**
CONSULTATION CONSIDERING JEOPARDY (DOES NOT INCLUDE CONSIDERATION OF ADVERSE MODIFICATION)					
Technical Assistance	$430	n/a	$790	n/a	$1,200
Informal	$1,900	$2,300	$1,500	$1,500	$7,200
Formal	$4,100	$4,700	$2,600	$3,600	$15,000
Programmatic	$12,000	$10,000	n/a	$4,200	$27,000
INCREMENTAL ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	**SERVICE**	**FEDERAL AGENCY**	**THIRD PARTY**	**BIOLOGICAL ASSESSMENT**	**TOTAL COSTS**
NEW CONSULTATION RESULTING ENTIRELY FROM CRITICAL HABITAT DESIGNATION (TOTAL COST OF A CONSULTATION CONSIDERING BOTH JEOPARDY AND ADVERSE MODIFICATION)					
Technical Assistance	$570	n/a	$1,100	n/a	$1,600
Informal	$2,500	$3,100	$2,100	$2,000	$9,600
Formal	$5,500	$6,200	$3,500	$4,800	$20,000
Programmatic	$17,000	$14,000	n/a	$5,600	$36,000
NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION (UNOCCUPIED HABITAT)					
Technical Assistance	$430	n/a	$790	n/a	$1,200
Informal	$1,900	$2,300	$1,500	$1,500	$7,200
Formal	$4,100	$4,700	$2,600	$3,600	$15,000
Programmatic	$12,000	$10,000	n/a	$4,200	$27,000
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION (ADDITIVE WITH BASELINE COSTS, SHOWN ABOVE, OF CONSIDERING JEOPARDY)					
Technical Assistance	$140	n/a	$260	n/a	$400
Informal	$620	$780	$510	$500	$2,400
Formal	$1,400	$1,600	$880	$1,200	$5,000
Programmatic	$4,200	$3,500	n/a	$1,400	$9,000

Source: IEc analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2013, and a review of consultation records from several Service field offices across the country conducted in 2002.

Notes:

1. The levels of effort per consultation represent approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The cost estimates presented in this table may therefore not sum to the total costs reported due to rounding.
2. Estimates reflect average hourly time required by staff.

Indirect Impacts

75. The designation of critical habitat may, under certain circumstances, affect actions that do not have a Federal action and thus are not subject to the provisions of section 7 under the Act. Indirect impacts are those unintended changes in economic behavior that may occur outside of the Act, through other Federal, State, or local actions, and that are caused by the designation of critical habitat. For example:

- **Triggering Other State and Local Laws**. Under certain circumstances, critical habitat designation may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other State or local laws, such as the California Environmental Quality Act (CEQA). In cases where these impacts would not have been triggered absent critical habitat designation, they are considered indirect, incremental impacts of the designation. There are no State or local laws in Arizona or Utah which would be triggered by the critical habitat designation for the three plants.
- **Time Delays.** Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to reinitiate the section 7 consultation process and/or compliance with other laws triggered by the designation. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
- **Regulatory Uncertainty or Stigma.** Government agencies and affiliated private parties who consult with the Service under section 7 may face uncertainty concerning whether reasonable and prudent alternatives will be recommended by the Service and what the nature of these alternatives will be. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation. In some cases, the public may perceive that critical habitat designation may result in limitations on private property uses above and beyond those associated with anticipated conservation efforts and regulatory uncertainty described above. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed. As the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets may decrease.

2.3.3 BENEFITS

76. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.[68] OMB's Circular A-4

[68] Executive Order 12866, Regulatory Planning and Review, September 30, 1993.

distinguishes two types of economic benefits: *direct benefits and ancillary benefits*. Ancillary benefits are defined as favorable impacts of a rulemaking that are typically unrelated, or secondary, to the statutory purpose of the rulemaking.[69]

77. In the context of critical habitat, the primary purpose of the rulemaking (i.e., the direct benefit) is the potential to enhance conservation of the species. The published economics literature has documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species. In its guidance for implementing Executive Order 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research.[70] *Rather than rely on economic measures, the Service believes that the direct benefits of the proposed rule are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.*

78. Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the primary constituent elements on which the species depends. To this end, critical habitat designation can result in maintenance of particular environmental conditions that may generate other social benefits aside from the preservation of the species. That is, management actions undertaken to conserve a species or habitat may have coincident, positive social welfare implications, such as increased recreational opportunities in a region. While they are not the primary purpose of critical habitat, these ancillary benefits may result in gains in employment, output, or income that may offset the direct, negative impacts to a region's economy resulting from actions to conserve a species or its habitat.

2.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

79. Economic impacts of conservation for the three plants are considered across the areas proposed as critical habitat and considered for exclusion, as defined in Chapter 1. Results are presented by proposed critical habitat unit and subunit.

2.3.5 ANALYTIC TIME FRAME

80. Ideally, the time frame of this analysis would be based on the expected time period over which the critical habitat regulation is expected to be in place. Specifically, the analysis would forecast impacts of implementing this rule through species recovery (i.e., when the rule is no longer required). Recent guidance from OMB indicates that "if a regulation has no predetermined sunset provision, the agency will need to choose the endpoint of its analysis on the basis of a judgment about the foreseeable future."[71] The "foreseeable future" for this analysis was determined to be 20 years based on interviews with stakeholders who indicated that the affected economic activities were reasonably

[69] U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf.

[70] *Ibid.*

[71] The U.S. Office of Management and Budget, February 7. 2011. "Regulatory Impact Analysis: Frequently Asked Questions (FAQs)." Accessed on May 3, 2011 by http://www.whitehouse.gov/sites/default/files/omb/circulars/a004/a-4_FAQ.pdf.

foreseeable during this time. OMB supports this time frame stating that "for most agencies, a standard time period of analysis is ten to 20 years, and rarely exceeds 50 years."[72] Based on available data, this analysis considers economic impacts to activities from 2013 (expected year of final critical habitat designation) though 2032.

2.4 INFORMATION SOURCES

81. The primary sources of information for this report are communications with, and data provided by, personnel from the Service, other Federal agencies, State agencies, and other stakeholders. In addition, this analysis relies upon the Service's section 7 consultation records, as the plants were included in technical assistance requests and considered in consultation with other species prior to their Federal listing. A complete list of references is provided at the end of this document.

2.5 PRESENTATION OF RESULTS

82. Impacts are described in present value terms applying discount rates of seven percent throughout the body of the report. Additionally, Appendix B provides the present value of impacts in each unit applying a three percent discount rate for comparison with values calculated at seven percent.[73] Appendix B also presents undiscounted annual impact values by activity. Present value impacts are calculated according to the methods described in Exhibit 2-3.

[72] *Ibid.*

[73] The U.S. Office of Management and Budget (OMB) requires Federal agencies to report results using discount rates of three and seven percent (see OMB, Circular A-4, 2003).

EXHIBIT 2-3. CALCULATING PRESENT VALUE AND ANNUALIZED IMPACTS

This analysis compares economic impacts incurred in different time periods in present value terms. The present value represents the value of a payment or stream of payments in common dollar terms. That is, it is the sum of a series of past or future cash flows expressed in today's dollars. Translation of economic impacts of past or future costs to present value terms requires the following: a) past or projected future costs of critical habitat designation; and b) the specific years in which these impacts have been or are expected to be incurred. With these data, the present value of the past or future stream of impacts (PV_c) from year t to T is measured in 2013 dollars according to the following standard formula:[a]

$$PV_c = \sum_{t}^{T} \frac{C_t}{(1+r)^{t-2013}}$$

C_t = cost of plant critical habitat conservation efforts in year t

r = discount rate[b]

Impacts for each activity in each unit are also expressed as annualized values. Annualized values are calculated to provide comparison of impacts across activities with varying forecast periods (T). For this analysis, activities employ a forecast period of 20 years, 2013 through 2032. Annualized future impacts (APV_c) are calculated by the following standard formula:

$$APV_c = PV_c \left[\frac{r}{1-(1+r)^{-(N)}} \right]$$

N = number of years in the forecast period (in this analysis, 20 years)

[a] To derive the present value of future impacts to development activities, t is 2013 and T is 2035.
[b] To discount and annualize costs, guidance provided by the OMB specifies the use of a real rate of seven percent. In addition, OMB recommends sensitivity analysis using other discount rates such as three percent, which some economists believe better reflects the social rate of time preference. (U.S. Office of Management and Budget, Circular A-4, September 17, 2003 and U.S. Office of Management and Budget, "Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice," 68 *Federal Register* 5492, February 3, 2003.)

CHAPTER 3 | POTENTIAL BASELINE AND INCREMENTAL ECONOMIC IMPACTS FOR THE ACUÑA AND FICKEISEN PLAINS CACTI

83. This chapter discusses the activities likely to be undertaken to protect the cacti and their habitat. Protections for these species and their habitat result from implementation of the Act, as well as other Federal, state, and local regulations and related conservation actions. Any impacts resulting from the listing of the species and existing measures undertaken by land managers and project proponents are considered baseline. Impacts resulting specifically from the designation of critical habitat, beyond what is provided for the species due to its potential listing status, are considered to be incremental. This chapter describes existing baseline and future incremental protections for the cacti, and quantifies incremental costs associated with cacti conservation.

84. Section 3.1 presents a summary of results of this analysis; Section 3.2 describes the baseline protections afforded the species by Federal, State, and local regulations and guidelines; Sections 3.3 and 3.4 present and quantify the potential incremental conservation measures that may result from the designation of critical habitat for the acuña and Fickeisen plains cactus, respectively, beyond the baseline protections described in Section 3.2.

3.1 SUMMARY OF RESULTS

85. Exhibit 3-1 presents a summary of incremental costs associated with the designation of critical habitat for the cacti. The majority of these impacts are administrative, consisting of the cost of addressing adverse modification in consultations occurring in occupied habitat and the cost of initiating new consultations to address adverse modification in unoccupied areas of acuña cactus habitat (Cimarron Mountain Subunit and the Sand Tank Mountain Subunit). Within proposed acuña cactus habitat, consultations and technical assistance efforts are forecast on U.S.-Mexican border activities, grazing, BLM Resource Management Plans (RMPs), a BLM State Land Use Plan Amendment, tribal activities, transportation ROW maintenance, and the Partners for Fish and Wildlife program. Within the proposed Fickeisen plains cactus habitat, consultations and technical assistance efforts are forecast on grazing, a BLM RMP, a BLM State Land Use Plan Amendment, uranium mining, tribal activities, Kaibab National Forest Management Plans, transportation ROW maintenance, and the Partners for Fish and Wildlife Program. In addition to the administrative costs of these consultations, within the acuña cactus unoccupied Sand Tank Mountain Subunit (Subunit 4b), the costs of conducting surveys for the acuña cactus within the Barry M. Goldwater Range are considered incremental impacts of the critical habitat designation. Therefore, this unit is expected to experience the greatest impacts associated with the designation of critical habitat ($24,000).

EXHIBIT 3-1. SUMMARY OF PRESENT VALUE INCREMENTAL IMPACTS BY SPECIES AND SUBUNIT IN PROPOSED ACUNA CACTUS AND FICKEISEN PLAINS CACTUS HABITAT (2013-2023, 2013$, SEVEN PERCENT DISCOUNT RATE)

UNIT/SUBUNIT			INCREMENTAL IMPACTS
ACUNA CACTUS			
1a	Organ Pipe Cactus NM	Dripping Spring	$2,500
1b		Acuna Valley	$2,500
2a	Ajo	Ajo Townsites	$9,000
2b		Little Ajo Mountains	$4,400
3a	Sauceda Mountains	Coffeepot Mountain	$3,100
3b		Cimarron Mountain	$200
4a	Sand Tank Mountains	Javelina Mountain	$1,500
4b		Sand Tank Mountain	$24,000
5	Mineral Mountain	Mineral Mountain	$1,900
6	Box O Wash	Box O Wash	$7,900
		Acuña Cactus Subtotal	*$57,000*
FICKEISEN PLAINS CACTUS			
PROPOSED CRITICAL HABITAT			
1a	Hurricane Cliffs	Dutchman Draw	$2,900
1b		Salaratus Draw	$2,900
1c		Temple Trail	$1,500
1d		Toquer Tank	$1,500
2	Sunshine Ridge	Sunshine Ridge	$7,000
3	Clayhole Valley	Clayhole Ridge	$1,500
4	Snake Gulch	Snake Gulch	$7,100
5a	House Rock Valley	Beanhole Well	$2,000
5b		North Canyon Wash	$1,500
5c		Marble Canyon	$1,500
5d		South Canyon	$1,500
8a	Gray Mountain	Mays Wash	$1,200
8b		Gray Mountain	$5,500
9	Cataract Canyon	Cataract Canyon	$1,400
		Fickeisen Plains Cactus Areas Proposed Subtotal	*$39,000*
AREAS CONSIDERED FOR EXCLUSION			
6a	Tiger Wash	Tiger Wash 1	$4,000
6b		Tiger Wash 2	$4,000
6c		Shinumo Wash	$1,500
7	Little Colorado River Overlook	Little Colorado River Overlook	$11,000
8b	Gray Mountain	Gray Mountain	$1,500
		Fickeisen Plains Cactus Areas Considered for Exclusion Subtotal	*$22,000*
		Fickeisen Plains Cactus Subtotal	*$61,000*
		Grand Total	**$120,000**

Notes: 1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year (Year 0) of 2013 for present value calculations using costs estimated in 2013 dollars.

3.2 BASELINE PROTECTIONS

86. The primary protection for the cacti, absent the designation of critical habitat, is the listing of the species under the Act. In addition, areas within the proposed designation are subject to various other Federal, State, and local protections. These protections may prohibit activities that threaten the cacti or may call for specific conservation efforts meant to protect the cacti. Exhibit 3-2 summarizes the areas within the proposed designation that are subject to baseline protections. The following text describes the specific conservation measures undertaken as a result of these baseline protections that benefit the cacti.

87. Overall, approximately 90 percent of the proposed critical habitat for the acuña cactus and 92 percent of the proposed critical habitat for the Fickeisen Plains cactus are covered by existing land management plans that offer some baseline protection to the species.

EXHIBIT 3-2. AREAS WITH BASELINE PROTECTIONS IN PROPOSED CRITICAL HABITAT FOR THE ACUÑA CACTUS AND THE FICKEISEN PLAINS CACTUS

LAND AREA		ACRES	% OF TOTAL PCH
ACUÑA CACTUS			
Federal	BLM-Managed Lands	11,000	20%
	NPS, Organ Pipe Cactus National Monument	9,900	18%
	DOD (Air Force), Barry M. Goldwater Range	8,300	15%
State	ASLD-Managed Land	14,000	27%
Other	Tohono O'odham Nation	5,600	10%
	TOTAL	**49,000**	**90%**
FICKEISEN PLAINS CACTUS			
Federal	BLM-Managed Lands	14,000	28%
	USFS - Kaibab National Forest	2,300	5%
State	ASLD-Managed Land	14,000	28%
Other	Navajo Nation Land (Considered for Exclusion)	9,600	19%
	TNC, Coconino Plateau Natural Reserve	5,900	12%
	TOTAL	**46,000**	**93%**

Notes: The remaining acuña cactus proposed critical habitat is owned or managed by Bureau of Reclamation (791 acres) and private landowners (4,343 acres). The remaining Fickeisen plains cactus proposed critical habitat is owned by other private landowners (3,398 acres).
Sources: GIS data provided by the Service to IEc on September 20, 2012; USGS, National Gap Analysis Program, Protected Areas Database (PAD-US), accessed September 25, 2012 at http://gapanalysis.usgs.gov/padus/.

3.2.1 ENDANGERED SPECIES ACT

88. Section 7 of the Act requires that activities with a Federal nexus that may affect the cacti be subject to section 7 consultation to ensure that they are not likely to jeopardize the

species. Conservation efforts implemented as a result of these consultations offer baseline protection for the species within the proposed critical habitat areas. The baseline conservation efforts likely to be requested during consultation on the activities considered to be threats to the cacti are described below. Importantly, these are the conservation efforts most likely to result from section 7 consultation within the study area regardless of whether critical habitat is designated. Conservation measures likely to be implemented to avoid jeopardy of the cacti may include: [74, 75]

- Implement seasonal restrictions or modifications to projects occurring within occupied habitat to enable recovery of the species;
- Avoid ground-disturbing activity within specified distances from individual plants (900 meter for the acuña cactus; 1,000 meter for Fickeisen plains cactus);
- Implement in-situ conservation and long-term adaptive management monitoring to reintroduce individuals in habitat not currently occupied by existing plants;
- Offset permanent habitat loss, modification, or fragmentation with habitat that is permanently protected, including adequate funding for management;
- Restrict the size or configuration of proposed projects to avoid, reduce, or eliminate effects on the species;
- Allow no fire retardants or suppressants toxic to the cacti to be used in occupied habitat;
- Restrict method of nonnative invasive species treatment in occupied areas;
- Provide conservation measures to restore, enhance, and protect occupied habitat; and
- Implement ex-situ conservation for the purpose of preservation of the species (acuña cactus only).

89. In 2006, the Department of Homeland Security, Department of the Interior, and the Department of Agriculture signed a Memorandum of Understanding (MOU), one of the purposes of which was to provide guidance related to implementation of the Act in regards to border security activities within BLM land and the Tohono O'odham Reservation. The MOU committed the parties "to preventing illegal entry into the United States, protecting Federal lands and natural and cultural resources, and – where possible – preventing adverse impacts associated with illegal entry by [cross-border violators].[76] The MOU is applicable nationwide and includes "Responsibilities and Terms" agreed to by the DHS that may provide protections for the acuña cactus, such as:

[74] U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 10, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Acuña Cactus and the Fickeisen Plains Cactus," p. 9. See Appendix B.

[75] Personal communication with the U.S. Fish and Wildlife Service, Region 2 Field Office, on November 15, 2012.

[76] "Memorandum of Understanding Among U.S. Department of Homeland Security and U.S. Department of the Interior and U.S. Department of Agriculture Regarding Cooperative National Security and Counterterrorism Efforts on Federal Lands along the United States' Borders", March 2006, available at http://www.cis.org/articles/2010/mou.pdf.

- If a U.S. Customs and Border Protection Border Patrol (CBP-BP) agent operates in protected areas (e.g., off-road areas not designated for such use), the agent will use the lowest impact mode of transport practicable, and operate vehicles in a manner that minimizes adverse impacts on threatened and endangered species and on the resources and values of Federal lands;
- CBP-BP will notify the local Federal land manager when activities occur in protected areas, and if an activity is determined by the land manager to have significant impact on Federal land resources, CBP-BP and Federal land managers will resolve such issues immediately;
- CBP will consult with land managers to coordinate the placement and maintenance of CBP-BP infrastructure; and
- Incoming agents will attend environmental and cultural awareness training provided by land management agencies.[77]

90. In addition to the significant baseline protection provided by the Act, other existing sources of protection for the cacti exist. These baseline protections are discussed below.

3.2.2 OTHER FEDERAL PROTECTIONS

Bureau of Land Management Protections

91. Of the 53,720 acres proposed as critical habitat for the acuña cactus, approximately 20 percent are managed by the BLM, and of the 49,182 acres proposed for the Fickeisen plains cactus, approximately 30 percent are managed by the BLM. The cacti are listed as sensitive species by the BLM, requiring that the BLM manage the species and their habitat to minimize or eliminate threats affecting the status of the species, or improve the conditions of species habitat.[78] Activities occurring on BLM land that may threaten the cacti and their habitat include grazing and mining. The BLM has implemented various management policies that provide protection for the cacti. These policies are described below.

Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management[79]

92. In 2003, the BLM Arizona State Office amended its six RMPs and one Management Framework Plan (MFP) to address modern wildland fire management concerns. The amendments involved section 7 consultation with the Service regarding conservation measures for threatened, endangered, and candidate species. The Service provided

[77] "Memorandum of Understanding Among U.S. Department of Homeland Security and U.S. Department of the Interior and U.S. Department of Agriculture Regarding Cooperative National Security and Counterterrorism Efforts on Federal Lands along the United States' Borders", March 2006, available at http://www.cis.org/articles/2010/mou.pdf.

[78] U.S. Bureau of Land Management, "Special Status Species Policy Manual #6840", 2008, accessed at http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.43545.File.dat/6840.pdf as of December 28, 2012.

[79] U.S. Bureau of Land Management, Arizona Statewide Land Use Plan Amendment for Fire, Fuels and Air Quality Management, March 2004, p. D-12, accessed at http://www.blm.gov/pgdata/etc/medialib/blm/az/pdfs/nepa/library/fuels.Par.64623.File.dat/fire_ea.pdf.

technical assistance to the BLM in consideration of impacts to the cacti as candidate species. As a result, upon listing and critical habitat designation for the species, the BLM plans to map known locations and potential habitat for the cacti to facilitate planning, fire use, and vegetation treatments, and to ensure protection of the cacti during fire suppression. This conservation measure is applicable to both cacti across all Arizona State BLM Districts. Upon listing and designation of critical habitat for the cacti, the Service will need to formally reinitiate this consultation with the BLM to consider the cacti and their habitat.

Northern Arizona Withdrawal Public Land Order (PLO) 7787

93. In January 2012, the U.S. Department of Interior withdrew over one million acres of Federal mineral estates from new mining claims for a 20-year period. The moratorium prevents new mining claims from being established; however, existing locatable mineral operations and sampling on claims pre-dating the withdrawal remain unaltered. The proposed Sunshine Ridge Unit, Snake Gulch Unit, and North Canyon Wash Subunit for the Fickeisen plains cactus are located within the withdrawn boundary.[80]

94. The Service concludes that PLO 7787 removes the threat associated with the location and development of mining claims on the Fickeisen plains cactus and its habitat over the next 20 years.[81] While the withdrawal only precludes new mining claims, allowing for development of existing mining claims in these areas, the Service believes that adverse effects of mining activity within the Snake Gulch Unit and House Rock Valley Unit on Fickeisen plains cactus habitat are unlikely due to the fact that the plant grows along ledges where mineral activity is not likely to occur.[82] In addition, six mines surround the Sunshine Ridge Unit. Of these six mines, two are in reclamation status and no impacts to the population are anticipated; three are located well outside of the Fickeisen plains cactus habitat.[83] The sixth mine, EZ Mine, is located to the west of the Sunshine Ridge population and proposed for development. The Service may need to consult with the BLM under section 7 of the Act on the development of this mine depending upon the mine's footprint relative to the cactus and critical habitat.

Arizona Strip District 2008 Resource Management Plan[84]

95. In coordination with the Service, the Arizona Strip District of the BLM developed a set of conservation measures for flowering plants, including the Fickeisen plains cactus, for

[80] 77 FR 60538.

[81] In April 2012 a Federal judge for the U.S. District Court of Arizona allowed a lawsuit challenging the ban on new mining claims to move forward. If the ban is not upheld in the courts, new uranium mining activity may threaten the cactus. This analysis assumes that the current state of regulation will be upheld.

[82] 77 FR 60539.

[83] 77 FR 60539.

[84] U.S. Bureau of Land Management, "Arizona Strip Field Office Resource Management Plan Record of Decision and Approved RMP, February 2008, accessed at http://www.blm.gov/pgdata/etc/medialib/blm/az/pdfs/nepa/library/resource_management/ASFO_ROD.Par.32020.File.dat/complete.pdf.

broad-scale projects in the region. The BLM's conservation measures for fuel and vegetation treatments in Fickeisen plains cactus habitat include:

1. Buffer areas will be delineated around plant populations prior to prescribe fire and vegetation-treatment activities. The BLM will coordinate with the Service during any emergency response and wildland fire use activities to ensure protection of plant populations from fire and fire suppression activities.
2. No staging of equipment or personnel will be permitted within 100 meters of identified individuals or populations of special status plant species during fire suppression, wildland fire use, or prescribed fire. OHVs will not be allowed within the 100-meter buffer area, unless necessary for firefighter or public safety or the protection of property, improvements, or other resources.
3. No prescribed burning will be implemented within 100 meters of identified locations or unsurveyed suitable habitat of special status plan species unless specifically designed.[85]

Upon listing and designation of critical habitat for the Fickeisen plains cactus, this consultation will be reinitiated to consider impacts on the cactus and its habitat.

Sonoran Desert National Monument and Lower Sonoran Resource Management Plans

96. On September 14, 2012 the BLM's Lower Sonoran Field Office finalized two RMPs, one for the Sonoran Desert National Monument and one for the remaining BLM lands within the Lower Sonoran Field Office. These plans offer protection for the acuña cactus within the Sonoran Desert National Monument (approximately 4.8 percent of proposed critical habitat) and the Coffeepot Botanical Area of Critical Environmental Concern (ACEC) (approximately 5.1 percent of proposed critical habitat).

97. The RMPs state that "authorized surface-disturbance activities within occupied acuña cactus habitat areas will be minimized, mitigated, or avoided."[86,87] The RMPs also contain specific measures that are likely to benefit the cactus, such as limiting OHV use to designated trails and minimizing the threat from grazing. Within the Coffeepot Botanical ACEC, the RMP specifies that "livestock facilities will not be developed where they will increase livestock use within an area of known or newly discovered populations of the acuña cactus. Livestock facilities could be developed to improve natural resource conditions by improving livestock distribution."[88] The Sonoran Desert National Monument RMP does not allow grazing within the Sand Tank Mountains allotment where critical habitat for the acuña cactus is proposed.[89] The Service is expected to

[85] U.S. Fish and Wildlife Service, "Biological Opinion for the Arizona Strip Resource Management Plan," November 7, 2007.

[86] U.S. Department of the Interior, Bureau of Land Management, Lower Sonoran Field Office, September 2012, "Sonoran Desert National Monument Record of Decision & Approved Resource Management Plan."

[87] U.S. Department of the Interior, Bureau of Land Management, Lower Sonoran Field Office, September 2012, "Lower Sonoran Record of Decision & Approved Resource Management Plan."

[88] *Ibid.*

[89] U.S. Department of the Interior, Bureau of Land Management, Lower Sonoran Field Office, September 2012, "Sonoran Desert National Monument Record of Decision & Approved Resource Management Plan."

undertake one consultation with the BLM for candidate species affected by these two plans, including the acuña cactus. This consultation is expected to be undertaken in 2013.

National Forest Service Protections within Kaibab National Forest

98. Approximately four percent of the proposed critical habitat for the Fickeisen plains cactus is in the Kaibab National Forest. Activities within the Kaibab National Forest are generally guided by the National Forest Management Act (NFMA) of 1976, which directs the National Forest System to "provide the ecological conditions to both maintain the diversity of plant and animal communities and support the persistence of most native species." NFMA also directs the USFS to include species-specific directions for protection and recovery of candidate species within National Forest Land Management Plans.[90] This regulation thereby provides general protection to the Fickeisen plains cactus.

99. In general, there are few threats to the Fickeisen plains cactus within Kaibab National Forest and therefore protection of the plant has not been a focus of substantial USFS efforts. In the past, the Service has provided technical assistance related to the Fickeisen plains cactus on the Kaibab National Forest Land and Resource Management Plan, Travel Management Plan, and Integrated Weed Treatment Program. All three of these plans include consideration of the impacts to the cactus. The Integrated Weed Treatment Program includes a specification that cheatgrass will not be treated within Fickeisen plains cactus habitat.[91]

National Park Service Protections within the Organ Pipe Cactus National Monument

100. Approximately 18 percent of the area being proposed for the acuña cactus is in Organ Pipe Cactus National Monument (OPCNM) located on the U.S. border with Mexico. The mission of the NPS is to preserve and protect natural and cultural resources for future generations. According to the NPS, the majority of the area being proposed as acuña cactus critical habitat within the OPCNM is in a remote area that is presently closed to the public.[92] The remainder of the proposed area is in the Roosevelt Reserve, a 60-foot wide area adjacent to the Mexican border. The purpose of Roosevelt Reserve is to secure the border with Mexico and the NPS has little control over activity in the Reserve.[93] Outside of the Reserve, the NPS is undertaking projects to remove invasive plants and improve habitat quality, in part to offset adverse effects to threatened and endangered animals from the construction of surveillance towers for SBI*net*, a program of the DHS's Secure Border Initiative. OPCNM currently considers the acuña cactus in its planning and management efforts.[94]

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[90] 36 C.F.R. § 219.9 (2012).

[91] U.S. Department of Agriculture, Forest Service, January 2005, "Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds: Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mojave, and Yavapai Counties, Arizona."

[92] Written communication with Lee Baiza, Superintendent, Organ Pipe Cactus National Monument, on November 28, 2012.

[93] Written communication with Lee Baiza, Superintendent, Organ Pipe Cactus National Monument, on November 28, 2012.

[94] Written communication with Lee Baiza, Superintendent, Organ Pipe Cactus National Monument, on November 28, 2012.

Department of Defense Protections within the Barry M. Goldwater Range

101. Proposed critical habitat for the acuña cactus within two subunits is located within the BMGR. The proposed critical habitat within the Coffeepot Mountain Subunit is considered occupied by the species and the proposed habitat within the Sand Tank Mountain Subunit is considered unoccupied by the species. The Sikes Act of 1960 establishes resource management policies and guidance for U.S. military installations and requires the preparation of Integrated Natural Resource Management Plans (INRMP) for installations, such as the BMGR, which have significant natural resources. The BMGR has an INRMP in place and is currently in the process of revising the INRMP to include the acuña cactus.[95] The DOD has been working with the Service to outline the specific conservation measures included in the revised INRMP.[96] These conservation measures include:

- Avoid disturbances within 900 meters of plants,
- Continue monitoring and controlling invasive species,
- Control trespass of livestock and feral burros,
- Aid in *ex situ* conservation efforts, and
- Monitor illegal immigration, contraband trafficking, and border-related law enforcement to assess potential plant trampling.[97]

102. In addition to the conservation measures outlined in the INRMP, the BMGR already conducts monitoring and surveying of the cactus. Monitoring of the cactus population located within the BMGR has occurred once every five years beginning in mid-March and continuing once per week while the plants are flowering. In September 2012, the BMGR funded a systematic survey for the cactus.[98] The first part of this survey took place within the Coffeepot Mountain Subunit where a large colony of the cactus was identified. The second part of this survey is expected to occur within the unoccupied Sand Take Mountain Subunit in February 2013.[99]

[95] Public comment letter submitted by U.S. Department of Defense, Department of the Air Force, Air Education and Training Command, "Proposed Rule to List *Echinomastus erectocentrus var. acunensis* (acuña cactus) as an Endangered Species with Critical Habitat", on November 30, 2012.

[96] Personal communication with the U.S. Fish and Wildlife Service, Region 2 Field Office, on November 15, 2012.

[97] Public comment letter submitted by U.S. Department of Defense, Department of the Air Force, Air Education and Training Command, "Proposed Rule to List *Echinomastus erectocentrus var. acunensis* (acuña cactus) as an Endangered Species with Critical Habitat", on November 30, 2012.

[98] *Ibid.*

[99] Personal communication with Richard Whittle, Wildlife Biologist, 56th Range Management Office, on February 5, 2013.

3.2.3 STATE PROTECTIONS

Arizona Native Plant Law[100]

103. Under the Arizona Native Plant Law, as implemented by the Arizona Department of Agriculture (ADA), both cacti are classified as a "highly safeguarded protected native plant."[101] This classification does not explicitly address protection of cacti habitat, but provides the following protections to the species:

- Collection is prohibited on public land without a permit;
- Private landowners are required to notify Arizona Department of Agriculture within 60 days prior to destruction or removal of any protected native plant on their land; and
- Plants may not be legally possessed, taken, or transported from their growing site without a permit from the Arizona Department of Agriculture.

Arizona State Land Department (ASLD) Protocol for State Listed Species

104. ASLD manages land use activities on approximately 13 percent of the State's total land area.[102] The primary mission of the ASLD is to "enhance value and optimize economic return for Trust beneficiaries, consistent with sound stewardship, conservation, and business management principles."[103] Activities occurring on ASLD land that may threaten the cacti and their habitat include grazing and mining. Of the 53,720 acres proposed as critical habitat for the acuña cactus, approximately 27 percent are managed by the ASLD, and of the 49,182 acres proposed for the Fickeisen plains cactus, approximately 28 percent are managed by the ASLD.

105. Prior to conducting any land disturbing activity on State Trust Land, the ASLD requires a pre-construction Native Plant Survey to be conducted in accordance with an approved protocol.[104] Activities subject to these requirements include clearing rights-of-way for roads and utilities, mine operations, and construction of small communications towers. The purpose of the Native Plant Survey is to calculate the compensation that must be paid to the ASLD for the removal of specific cacti, succulents, trees, shrubs, and sub-shrubs. ASLD maintains a Native Plant Fee Schedule that establishes fees associated with the removal of a set of sensitive native plants. The cacti are considered "highly safeguarded protected" plants on the ASLD's schedule. The fee associated with the removal of plants in this category are "independently evaluated and assessed."[105]

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[100] Ariz. Rev. Stat. § 3-901 to 3-316.

[101] Ariz. Rev. Stat. § 3-909.

[102] Arizona State Land Department, "State Land Department Annual Report", FY2010-2011, located at http://www.land.state.az.us/report/report2011_full.pdf, p. 22, on December 27, 2012.

[103] Arizona State Land Department, "Land Department Mission Statement", located at http://www.land.state.az.us/support/missiongoals.htm on December 27, 2012.

[104] Arizona State Land Department, "Native Plant Surveys", accessed at http://www.land.state.az.us/programs/natural/nativePlantSurveys.htm on January 4, 2012.

[105] Arizona State Land Department, ASLD Native Plant Survey Protocol Native Plant Fee Structure, accessed at http://www.land.state.az.us/programs/natural/pdfs/Native_Plant_B.pdf on January 4, 2012.

106. Specifically related to mining activities on ASLD lands, the Department implements reclamation provisions and bonding requirements when approving a Mining Plan of Operations. ASLD gives notice to and allows all other agencies, such as the Service, to comment on proposed projects and potential impacts of concern. ASLD would not deny a mine based on the presence of an endangered or threatened species, but would likely write allowances into an ASLD lease or mining company's reclamation plan to require preservation measures for listed species based on agency input regardless of the critical habitat designation.[106]

3.2.4 PROTECTION ON TRIBAL LANDS

107. Two tribes manage land within the proposed critical habitat area and provide protections for the cacti.

Navajo Nation Protections

108. Approximately 9,552 acres (19 percent) of the proposed Fickeisen plains cactus critical habitat is located on the Navajo Nation. Nine of the 15 known populations of Fickeisen plains cactus occurring on Navajo Nation land are located within a Biological Preserve. In the Preserve area, permanent or temporary development is prohibited, unless it is compatible with the management of the area as habitat.[107] In addition, all populations occurring on Navajo Nation land are subject to a number of Tribal protections.

109. The Navajo Nation Natural Heritage Program identifies the Fickeisen plains cactus as a Group 3 species under the Navajo Endangered Species list, designating it as a "species or subspecies whose prospects of survival or recruitment are likely to be in jeopardy in the foreseeable future." Projects in habitat occupied by Group 3 species require a biological evaluation to ensure against take under Navajo Nation Law (17 N.N.C. § 507).[108]

110. In addition, the Resources Committee of the Navajo Nation Council approved Biological Resource Land Use Clearance Policies and Procedures (RCP) to protect wildlife resources, including plants and their habitat. Under the RCP, project proponents must consider impacts that a proposed project may have on biological resources, produce a Biological Assessment/Evaluation, and adhere to avoidance recommendations by the Navajo Nation Department of Fish and Wildlife. The RPC applies to all Fickeisen plains cactus populations on Navajo Nation land.[109]

111. A joint management plan for the two Tribal parks containing cactus populations is currently under development. This plan will cover 14 of the 15 Fickeisen plains cactus

[106] Personal communication with Joe Dixon, ASLD Minerals Section Manager, on December 7, 2012.

[107] Navajo Nation Department of Fish and Wildlife and Department of Justice, in cooperation with the U.S. Fish and Wildlife Service, "Navajo Nation Fickeisen Plains Cactus Management Plant", December 2012, p. 16. Accessible on the public docket.

[108] Navajo Nation Code 17 N. N. C. § 507, as cited in Navajo Nation Department of Fish and Wildlife and Department of Justice, in cooperation with the U.S. Fish and Wildlife Service, "Navajo Nation Fickeisen Plains Cactus Management Plant", December 2012, p. 6. Accessible on the public docket.

[109] Personal communication with U.S. Fish and Wildlife Service biologist, January 22, 2013.

populations located on Navajo Nation land. The joint management plan for the parks will address Fickeisen plains cactus habitat protection and mitigation measures specifically.[110]

112. In addition to the Navajo listing and existing tribal policies that are applicable in protecting the cactus, the Tribe surveys and monitors cactus populations on their lands. During a recent survey, the majority of the plants were tagged for annual monitoring.[111]

Tohono O'odham Protections

113. Both subunits of the Sauceda Mountain Unit of proposed critical habitat for the acuña cactus overlap the Tohono O'odham Reservation. The Cimarron Mountains Subunit, located entirely in the Tribe's reservation land, is considered unoccupied and the Coffeepot Mountain Subunit, located partially within the reservation, is considered occupied. The Tohono indicate that they recently visited the tribal land within the Coffeepot Mountain Subunit and verified the existence of the cactus within that area. The Tribe is currently planning a more formal survey of the known acuña cactus population within their land and intends to also conduct surveys in the unoccupied Cimarron Mountains Subunit.[112,113] The acuña cactus is on the Tribe's native plant list, which provides protections to the species similar to what is provided by Federal listing (e.g., prohibits take). In addition, the Tohono O'odham Nation intends to develop a management plan for the species.[114] If the Tribe moves forward with this plan, they may seek advice from the Service. This analysis assumes that the Tribe will move forward with the plan and receive technical assistance from the Service to review the plan.

3.2.5 THE NATURE CONSERVANCY LANDS (COCONINO PLATEAU NATURAL RESERVE LANDS)

114. The Nature Conservancy (TNC) acquired a conservation easement on private land, which benefits almost 30 percent of the existing population of Fickeisen plains cactus (11 percent of proposed critical habitat). The easement contributes to conservation of the Fickeisen plains cactus by protecting habitat from subdivision, minimizing development, and maintaining the ecological values of the land.[115]

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[110] Navajo Nation Department of Fish and Wildlife and Department of Justice, in cooperation with the U.S. Fish and Wildlife Service, "Navajo Nation Fickeisen Plains Cactus Management Plant", December 2012, p. 16. Accessible on the public docket.

[111] Public comment letter submitted by the Navajo Nation Department of Justice on November 30, 2012.

[112] Public comment letter submitted from the Tohono O'odham Nation Office of the Chairman and Vice Chairwoman, on November 30, 2012.

[113] Personal communication with Karen Howe, Ecologist, Wildlife and Vegetation Management Program, Tohono O'odham Nation, February 6, 2013.

[114] Personal communication with Karen Howe, Ecologist, Wildlife and Vegetation Management Program, Tohono O'odham Nation, December 7, 2012.

[115] U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 10, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Acuña Cactus and the Fickeisen Plains Cactus," p. 9. See Appendix B.

3.3 INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION FOR THE ACUÑA CACTUS

115. As described in Chapter 2, this analysis quantifies the potential incremental impacts of the Proposed Rule. Incremental impacts are those resulting from the designation of critical habitat above and beyond those impacts resulting from the existing Federal, State, and local protections described above. The Service has indicated that in the case of the cacti, incremental impacts are likely to be limited to the administrative cost of consultation with the Service except for projects located within the unoccupied subunits for the acuña cactus and in rare cases within occupied units where localized projects may not adversely affect the plants, but may adversely modify critical habitat. As described in Chapter 2, it may be difficult to identify the areas where the plants might not be found or affected by a proposed project and thus the economic analysis assumes that plants are found throughout the occupied critical habitat units. Therefore, incremental impacts are limited to the administrative cost of consultation in occupied units and all impacts to projects occurring within the unoccupied subunits. Below we discuss incremental impacts by activity for the acuña cactus. The costs associated with these incremental impacts are summarized in Section 3.3.8.

3.3.1 ACTIVITIES ON BLM LAND

Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management

116. As described in Section 3.2.2, upon listing and designation of critical habitat for the acuña cactus the Service will need to reinitiate consultation with the BLM on their Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management. The consultation has a 10-year life cycle, which is set to expire in 2014. Therefore, this analysis assumes that the Service will reinitiate consultation for all species in 2014 and will add the cacti at that time. The consultation will be reinitiated again for all species, including the cacti, in 2024. Costs associated with this consultation are split between the acuña cactus and the Fickeisen plains cactus then divided equally over the units and subunits that contain BLM-managed land. The reinitiation of this consultation is not anticipated to change this plan in any significant way due to the designation of critical habitat. All BLM-managed areas are occupied by the species and therefore any changes resulting from the reinitiation are expected to occur in the baseline.

Lower Sonoran Field Office RMPs

117. As described in Section 3.2.2, the BLM's Lower Sonoran Field Office recently finalized two RMPs, one for the Sonoran Desert National Monument and one for the remaining BLM lands within the Lower Sonoran Field Office. The Service is expected to consult with the BLM under section 7 of the Act on these plans to address impacts on listed species and designated critical habitat. This analysis assumes this consultation will occur in 2013 and will require formal consultation. Costs associated with this consultation are divided over the five proposed subunits with land managed by the BLM Lower Sonoran Field Office (Ajo Townsites, Little Ajo Mountains, Coffeepot Mountain, Javelina Mountain, and Sand Tank Mountain Subunits). Consideration of adverse modification of critical habitat for the acuña cactus during consultation is not anticipated to change these

plans in any significant way. All BLM-managed areas are occupied by the species and therefore any changes resulting from the reinitiation are expected to occur in the baseline.

Livestock Grazing

118. According to the BLM, grazing activity in proposed acuña cactus habitat is light and impacts to the species are not expected because the acuña cactus is commonly found on ridge areas unlikely to be utilized by livestock.[116] However, the cactus may also be found on low slopes and valleys where cattle are more likely to be grazed.[117] This analysis assumes that the BLM will undertake a programmatic consultation with the Service on grazing activities within allotments containing critical habitat for the acuña cactus. This programmatic consultation will need to be reinitiated once every ten years (the life of a permit). The costs associated with these consultations are split between the acuña cactus and the Fickeisen plains cactus and divided evenly over the units that have BLM grazing allotments. The units of acuña cactus critical habitat that have BLM grazing allotments include the Ajo Unit (Little Ajo Mountain and Ajo Townsites Subunits), the Mineral Mountain Unit, and the Box O Wash Unit.

119. In addition to grazing on BLM lands, grazing occurs on private and state-managed lands in the Mineral Mountain and Box O Wash Units. These grazing activities may be subject to a Federal nexus compelling consultation in the case that ranchers receive NRCS funding for projects under program such as the Wildlife Habitat Incentive Program (WHIP), the Environmental Quality Incentives Program (EQIP), and the Conservation Stewardship Program (CSP).[118] NRCS anticipates that approximately one NRCS funded project every ten years will occur in the Box O Wash Unit.[119] NRCS has conducted a statewide programmatic consultation with the Service covering multiple species and various NRCS activities, which will be reinitiated upon listing and designation. During consultation, the Service may recommend the following conservation measures for grazing:

- Constructing exclusionary fencing;
- Establishing water holes and salt licks in areas that will draw livestock away from the plants; and
- Removing livestock from critical habitat during the species' growing and reproductive seasons.[120]

120. Since the Box O Wash Unit of proposed acuña cactus habitat is considered occupied, costs associated with implementing these conservation measures would be considered baseline impacts. If project impacts cannot be mitigated under the programmatic

[116] Personal communication with Tim Hughes, BLM Endangered Species Coordinator, December 27, 2012.

[117] Personal communication with U.S. Fish and Wildlife Service biologist, January 22, 2013.

[118] Email communication with Byron Lambeth, USDA NRCS AZ State Rangeland Management Specialist, on January 3, 2013.

[119] Email communication with Byron Lambeth, USDA NRCS AZ State Rangeland Management Specialist, on January 15, 2013.

[120] Personal communication with the Service on September 25, 2012.

consultation, NRCS will pursue formal consultation at the project level.[121] This analysis assumes the NRCS programmatic consultation will be reinitiated in 2013 to account for NRCS activities in cactus habitat and that per-project formal consultations will not be necessary. The incremental cost of consultation is apportioned evenly across both cactus species and then across all affected units.

3.3.2 BARRY M. GOLDWATER RANGE ACTIVITIES

121. As described above, the BMGR is current working with the Service to revise their INRMP to include the acuña cactus. Costs associated with this revision are expected to occur prior to the publication of the Final Rule. The costs associated with carrying out the conservation efforts outlined in the INRMP would be considered baseline impacts in the occupied Coffeepot Mountain Subunit as this subunit is occupied by the species and the Service does not expect critical habitat designation to generate conservation measure for the cactus beyond what would be recommended due to the presence of the species.

122. As the Sand Tank Mountain Subunit is not occupied by the cactus, any conservation measures recommended would be recommended due to the designation of critical habitat. As such, impacts of implementing these conservation measures would be incremental impacts of the designation. The BMGR has indicated, however, that due to the extremely remote nature of the unoccupied unit, future activities in the area are unlikely and therefore potential adverse effects on the habitat are not expected.[122]

123. The currently funded survey efforts occurring in the Coffeepot Mountain and Sand Tank Mountain Subunits are expected to be completed prior to the publication of the Final Rule and are therefore not included in this analysis. The BMGR has indicated that, if funding is available, the DOD would like to conduct another survey of a similar magnitude. This survey would likely cover one plot in the Coffeepot Mountain Subunit and additional areas within the unoccupied Sand Tank Mountain Subunit.[123] This survey effort would cost approximately $23,000.[124] The availability and timing of future funding for this effort is uncertain. However, we conservatively assume the survey is undertaken in 2013 and divide the cost equally over the two subunits within BMGR. This cost is considered an incremental impacts of the critical habitat designation in the unoccupied Sand Tank Mountain Subunit.

3.3.3 U.S.-MEXICAN BORDER ACTIVITIES

124. Proposed critical habitat for the acuña cactus is located directly adjacent and nearby the international border with Mexico. In particular, the Dripping Spring Subunit in the Organ Pipe Cactus National Monument Unit abuts the border and the Acuña Valley Subunit is within ten miles of the border. Additionally, the Ajo and Sauceda Mountains Units are within 50 miles of the border. Due to the proximity of proposed areas of acuña cactus

[121] Email communication with Byron Lambeth, USDA NRCS AZ State Rangeland Management Specialist, on January 15, 2013.

[122] Personal communication with Richard Whittle, Wildlife Biologist, 56th Range Management Office, on December 7, 2012.

[123] Personal communication with Richard Whittle, Wildlife Biologist, 56th Range Management Office, on February 5, 2013.

[124] Personal communication with Richard Whittle, Wildlife Biologist, 56th Range Management Office, on December 7, 2012.

critical habitat to the international border with Mexico, CBP-BP operations, such as OHV use when patrolling or pursuing border violators, is considered a threat to the cactus and its habitat.

125. CBP takes listed species and their habitat into consideration when drafting security policies, and conducting planned road maintenance and similar infrastructure activities. However, according to the MOU between the DHS, DOI, and USDA, national security and patrol operations supersede potential adverse impacts to species and their habitat. CBP-BP operations are not expected to change as a result of the proposed designation.[125]

126. In November 2012, CBP consulted with the Service regarding potential adverse impacts on a number of listed species resulting from the Tactical Infrastructure Maintenance and Repair Program (TIMR) along the U.S.-Mexican border in Arizona. Conservation efforts resulting from the consultation for other cacti species include purchasing offsets, controlling invasive and exotic plants, and funding research.[126] This consultation will be reinitiated in 2013 to consider potential impacts to the acuña cactus and its habitat.[127] In consultation, the Service will assess whether project footprints will overlap with proposed acuña cactus critical habitat. No additional conservation measures may be requested if habitat does not overlap with project footprints; however, to the extent that CBP is required to address conservation of the cactus, these costs will be considered baseline.[128]

3.3.4 ACTIVITIES ON TOHONO O'ODHAM RESERVATION LAND

127. Activities occurring on the Tohono O'odham Reservation in proposed acuña cactus critical habitat include grazing, potential future development of border control structures, and cultural uses.[129] Grazing within the reservation is managed by each of 11 Districts, or State-like entities within the Reservation. Proposed critical habitat for the acuña cactus falls within the Hickiwan District. Due to the proximity of the reservation to the international border, the Tribe coordinates closely with CBP regarding border security operations within the reservation, including construction and maintenance of security infrastructure such as roads and operating bases. Specific projects have not been identified within proposed critical habitat, however, any such activities would likely fall under the jurisdiction of the MOU between the DHS and the DOI, described above.[130]

128. As described above, the Tohono are considering developing a management plan for the species. This analysis assumes that the Tribe will seek technical assistance from the

[125] Personal communication with Jonathan Andrew, DOI Liaison to CBP, on November 16, 2012.

[126] U.S. Department of the Interior, Fish and Wildlife Service, Biological Opinion for the Tactical Infrastructure Maintenance and Repair Program (TIMR) along the U.S./Mexican international border in Arizona (02EAAZOO-2012-F-0170), November 6, 2012.

[127] Personal communication with U.S. Fish and Wildlife Service Southwest (Region 2) Field Office, on January 2, 2013.

[128] Personal communication with U.S. Fish and Wildlife Service Southwest (Region 2) Field Office, on January 2, 2013.

[129] Personal communication with Karen Howe, Ecologist, Wildlife and Vegetation Management Program, Tohono O'odham Nation, December 7, 2012.

[130] Personal communication with Karen Howe, Ecologist, Wildlife and Vegetation Management Program, Tohono O'odham Nation, December 7, 2012.

Service in 2013 regarding the development of a management plan for the acuña cactus. The portion of the cost of this assistance attributed to the Coffeepot Mountain Subunit includes the incremental cost of addressing adverse modification. The Cimarron Mountain Subunit is considered to be unoccupied, and therefore a greater cost is attributed to this subunit because both the costs of addressing adverse modification and jeopardy are considered incremental. This technical assistance will likely address grazing and other potential impacts from tribal activities. It is unknown whether additional formal or informal consultations would be required to address project-specific impacts after a management plan is in place, and whether the Tribe will be asked to implement acuña cactus conservation measures. To the extent that future consultations are needed and the Service requests conservation measures as a result of consultation, these impacts will be incremental costs of the designation if they occur in the Cimarron Mountain Subunit.[131]

129. The Tribe is currently planning a more formal survey of the known acuña cactus population within their land and intends to also conduct surveys in the unoccupied Cimarron Mountains Subunit.[132,133] At this time, the scope and scale of future survey efforts in the Cimarron Mountains Subunit are not known, but all costs associated with these efforts would be incremental impacts of the designation.

3.3.5 ARIZONA DEPARTMENT OF TRANSPORTATION (ADOT) CONSTRUCTION AND MAINTENANCE

130. Transportation infrastructure construction and maintenance is not identified as a threat to the acuña cactus and its habitat in the Proposed Rule; however, federally funded road projects that may impact critical habitat will require consultation with the Service. In Arizona, there is one ROW intersecting acuña cactus proposed critical habitat within the Ajo Townsites Subunit.[134] The ADOT conducts annual ROW maintenance, including brush clearing and application of herbicides. The ADOT's Best Management Practices (BMPs) include surveying for sensitive species and providing biological monitors while maintenance activities are carried out. Because of these baseline protections, the ADOT does not expect the designation of critical habitat to affect their maintenance activities.[135] The ADOT will consult with the Service on these activities. This analysis assumes that the ADOT will undergo technical assistance with the Service each year to address annual ROW maintenance activities.

3.3.6 PARTNERS FOR FISH AND WILDLIFE CONSERVATION PROGRAM

[131] Personal communication with Karen Howe, Ecologist, Wildlife and Vegetation Management Program, Tohono O'odham Nation, December 7, 2012.

[132] Public comment letter submitted from the Tohono O'odham Nation Office of the Chairman and Vice Chairwoman, on November 30, 2012.

[133] Personal communication with Karen Howe, Ecologist, Wildlife and Vegetation Management Program, Tohono O'odham Nation, February 6, 2013.

[134] Personal communication with Kristin Gade, ADOT, on December 20, 2012.

[135] *Ibid*.

131. The Service expects that it will conduct intra-service consultations for private conservation via the Partners for Fish and Wildlife Conservation Program.[136] The Program is described as the "primary mechanism for delivering voluntary on-the-ground habitat improvement projects on private lands for the benefit of Federal trust species." The Service conducts programmatic intra-Service consultations regarding projects undertaken as part of the program.[137] This analysis assumes the Service will conduct one intra-Service programmatic consultation for future conservation projects that may affect proposed critical habitat for the cacti on private lands. The costs associated with this consultation are split between the acuña cactus and the Fickeisen plains cactus then divided equally over the units and subunits that contain private land. For the acuña cactus this includes the Little Ajo Mountains Subunit, Ajo Townsites Subunit, and Box O Wash Unit. Because the timing of this consultation is not known, the analysis conservatively assumes the consultation will occur in 2013.

3.3.7 INCREMENTAL COSTS OF CRITICAL HABITAT DESIGNATION FOR THE ACUÑA CACTUS

132. The majority of the economic activity in proposed critical habitat for the acuña cactus is projected in areas considered occupied by the species (i.e., all units except the Cimarron Mountain Subunit and the Sand Tank Mountain Subunit). All incremental impacts in occupied areas are limited to the administrative cost of consultation. In addition to these administrative costs, we expect incremental impacts associated with future survey efforts by the BMGR in the unoccupied Sand Tank Mountain Subunit. The incremental costs associated with the proposed critical habitat designation for the acuña cactus are summarized in Exhibit 3-3.

[136] U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 10, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Acuña Cactus and the Fickeisen Plains Cactus," p. 9. See Appendix B.

[137] U.S. Fish and Wildlife Service, Service Manual, Part 640 (640 FW 1). Accessed at http://www.fws.gov/policy/640fw1.html on January 5, 2013.

EXHIBIT 3-3. SUMMARY OF PRESENT VALUE INCREMENTAL IMPACTS BY SUBUNIT IN PROPOSED ACUNA CACTUS CRITICAL HABITAT (2013-2023, 2013$, SEVEN PERCENT DISCOUNT RATE)

UNIT/SUBUNIT			TOTAL	REASON FOR COST
1a	Organ Pipe Cactus NM	Dripping Spring	$2,500	Consultation on TIMR
1b		Acuña Valley	$2,500	Consultation on TIMR
2a	Ajo	Ajo Townsites	$9,000	Consultation on BLM RMPs Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing Technical assistance on annual ADOT ROW maintenance Programmatic consultation on Partners for Fish & Wildlife Programs
2b		Little Ajo Mountains	$4,400	Consultation on BLM RMPs Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing Programmatic consultation on Partners for Fish & Wildlife Programs
3a	Sauceda Mountains	Coffeepot Mountain	$3,100	Consultation on BLM RMPs Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing Technical assistance on Tohono O'odham Management Plan
3b		Cimarron Mountain	$200	Technical Assistance on Tohono O'odham Management Plan
4a	Sand Tank Mountains	Javelina Mountain	$1,500	Consultation on BLM RMPs Consultation on BLM State Land Use Plan Amendment
4b		Sand Tank Mountain	$24,000	Consultation on BLM RMPs Consultation on BLM State Land Use Plan Amendment BMGR Survey Costs
5	Mineral Mountain	Mineral Mountain	$1,900	Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing
6	Box O Wash	Box O Wash	$7,900	Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing NRCS statewide programmatic consultation Programmatic consultation on Partners for Fish & Wildlife Programs
TOTAL			**$57,000**	

Notes:
1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year (Year 0) of 2013 for present value calculations using costs estimated in 2013 dollars.

3.4 INCREMENTAL IMPACTS FOR FICKEISEN PLAINS CACTUS

133. All areas proposed as critical habitat for the Fickeisen plains cactus are considered occupied by the species. Therefore, incremental impacts are likely to be limited to the administrative cost of consultation. Below we discuss incremental impacts by activity for

the Fickeisen plains cactus. The costs associated with these incremental impacts are summarized in Section 3.4.8.

3.4.1 LIVESTOCK GRAZING

134. Livestock grazing has occurred on BLM managed lands in the Arizona Strip since the mid-1800s. All proposed units on BLM-managed land within the Arizona Strip have active grazing allotments with varying levels of grazing use. Impacts to cactus populations associated with grazing, including direct mortality from trampling, have been documented on BLM lands.[138]

135. The BLM intends to work with the Service to minimize grazing impacts on the cactus. Conservation efforts may include the construction of exclusionary fencing around cactus populations and habitat. The BLM estimates fencing costs to be approximately $3,000 to $4,000 per mile for materials and an additional $3,000 to $4,000 per mile for labor [139] Any conservation measures implemented to avoid grazing impacts would be considered baseline costs as they would be implemented to protect the species, absent the designation of critical habitat. This analysis assumes that the BLM will undertake a programmatic consultation with the Service on grazing activities within allotments containing critical habitat for the Fickeisen plains cactus. This programmatic consultation will need to be reinitiated once every ten years (the life of a permit). The costs associated with these consultations are split between the acuña cactus and the Fickeisen plains cactus and divided evenly over the units that have BLM grazing allotments. The units of proposed critical habitat for Fickeisen plains cactus that have BLM grazing allotments include the Hurricane Cliffs Unit, Sunshine Ridge Unit, Clayhole Valley Unit, and House Rock Valley Unit.

136. In addition to grazing on BLM lands, grazing may occur on private, ASLD-managed, and Tribal land. These grazing activities may be subject to a Federal nexus compelling consultation in the case that ranchers receive NRCS funding for projects under program such as WHIP, EQIP, and CSP.[140] NRCS anticipates that approximately two funded projects per year will occur in the Cataract Canyon area, two funded projects every ten years will occur in areas north of the Grand Canyon (including in the House Rock Valley Unit, Hurricane Cliffs Unit, and the Sunshine Ridge Unit), and an occasional project will occur on Navajo Nation land in the Tiger Wash Unit and Gray Mountain Subunit.[141] NRCS has conducted a statewide programmatic consultation with the Service covering multiple species and most NRCS activities, which will be reinitiated upon listing and designation of critical habitat for the cactus. During consultation, the Service may recommend the following conservation measures for grazing:

- Constructing exclusionary fencing;

[138] 77 FR 60535.

[139] Personal communication with Tim Hughes, BLM Endangered Species Coordinator, December 27, 2012.

[140] Email communication with Byron Lambeth, USDA NRCS AZ State Rangeland Management Specialist, on January 3, 2013.

[141] Email communication with Byron Lambeth, USDA NRCS AZ State Rangeland Management Specialist, on January 15, 2013.

- Establishing water holes and salt licks in areas that will draw livestock away from the plants; and
- Removing livestock from critical habitat during the species' growing and reproductive seasons.[142]

137. Since all areas of proposed Fickeisen plains cactus habitat are considered occupied, costs associated with implementing these conservation measures are considered to be baseline impacts. If project effects cannot be mitigated under the programmatic consultation, NRCS will pursue formal consultation at the project level.[143] This analysis assumes the NRCS programmatic consultation will be reinitiated in 2013 to account for NRCS activities in cactus habitat and that per-project formal consultations will not be necessary. The incremental cost of consultation is apportioned evenly across both cactus species and then across all affected units and subunits with private, ASLD-managed, and Tribal land.

3.4.2 BLM LAND MANAGEMENT ACTIVITIES

Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management

138. As described in Section 3.2.2, upon listing and designation of critical habitat for the Fickeisen plains cactus, the Service will need to reinitiate consultation with the BLM on their Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management. The consultation has a 10-year life cycle, which is set to expire in 2014. Therefore, this analysis assumes that the Service will reinitiate consultation for all species in 2014 and will add the cacti at that time. The consultation will be reinitiated again for all species, including the cacti, in 2024. Costs associated with this consultation are split between the acuña cactus and the Fickeisen plains cactus then divided equally over the units and subunits that contain BLM-managed land. The reinitiation of this consultation is not anticipated to change this plan in any significant way due to the designation of critical habitat. All BLM-managed areas are occupied by the species and therefore any changes resulting from the reinitiation are expected to occur in the baseline.

Arizona Strip District RMP

139. As described in Section 3.2.2, upon listing and designation of critical habitat for the Fickeisen plains cactus, the Service will need to reinitiate consultation with the BLM on the Arizona Strip District RMP. This analysis assumes this consultation will be reinitiated in 2013 and will require a formal level of effort. Costs associated with this consultation are divided over the 10 proposed subunits with land managed by the BLM Arizona Strip District Field Office (all subunits within the Hurricane Cliffs, Sunshine Ridge, Clayhole Valley, and House Rock Valley Units). The reinitiation of this consultation is not anticipated to change this plan in any significant way due to the designation of critical habitat. All BLM-managed areas are occupied by the species and therefore any changes resulting from the reinitiation are expected to occur in the baseline.

[142] Personal communication with the Service on September 25, 2012.

[143] Email communication with Byron Lambeth, USDA NRCS AZ State Rangeland Management Specialist, on January 15, 2013.

3.4.3 URANIUM MINING

140. Proposed Fickeisen plains cactus habitat in the Coconino Plateau and the Arizona Strip overlays areas of high-quality uranium ore deposits which are subject to future mining. However, the Service concludes that uranium mining is not a threat to the cactus or its habitat due to the following reasons:[144]

- A 20-year moratorium on new hardrock mining claims instated in 2012 on legally withdrawn Federal lands prevents new mining claims from being established in three units of proposed cactus habitat (see Section 3.2.2 above);
- The specific location of cacti habitat near canyon rims leaves it unlikely to be impacted by mine development;
- BLM-required conservation measures will provide protections from habitat impacts from future mine development; and,
- Existing habitat protections from the Coconino Plateau Natural Reserve Lands will prevent habitat fragmentation from potential mine development where it may occur on surrounding State land.

For these reasons, this analysis does not project future impacts with respect to mining in Fickeisen plains cactus habitat. Potential future mining activity in Fickeisen plains cactus habitat is described in more detail below.

141. Three areas of proposed critical habitat for the Fickeisen plains cactus are within the areas withdrawn from future mining claims under PLO 7787: Sunshine Ridge Unit (entirety), Snake Gulch Unit (majority of one of three total sub-populations), and House Rock Valley Unit (entirety). There are existing valid mining claims surrounding House Rock Valley Unit; however, the potential risk of mining impacts is considered low as potentially affected populations are on ledges and along the rim of the canyon wash, where mining activity is unlikely. Similarly, the Snake Gulch Unit is also located proximate to canyon rims.[145]

142. Surrounding the Sunshine Ridge Unit, three mines have approved mining operations that pre-date the withdrawal, only one of which, EZ Mine, poses a potential threat to Fickeisen plains cactus habitat. Potential impacts to cactus habitat would result from loss of habitat due to mine development and habitat degradation or fragmentation from road construction, materials transport, and new power lines. The BLM will conduct an Environmental Assessment for the mine and may need to consult with the Service regarding potential impacts to the cactus and its habitat depending upon the mine's footprint relative to the cactus and its critical habitat.[146] This analysis conservatively assumes that the BLM will consult with the Service in 2013 to assess the need for conservation measures associated with development of the EZ Mine. Because the area is occupied by the cactus, all recommended conservation measures are baseline impacts

[144] 77 FR 60538-60540.

[145] 77 FR 60538-60539.

[146] 77 FR 60539.

associated with the listing of the species. Incremental impacts are limited to the administrative cost of consultation.

143. Additionally, there are seven breccia pipes confirmed to have uranium resources surrounding the Sunshine Ridge and Snake Gulch Units. If a mining claim with valid existing rights to these minerals is developed into a uranium mine, the BLM would require measures such as preconstruction surveys to flag avoidance areas in order to minimize impacts to the species and its habitat.[147] At this time no mining plans exist for these resources, therefore the analysis does not include costs associated with future consultations.

144. Lands on the Arizona Strip that are outside the withdrawal area boundary remain open to uranium mining development. The company VANE Minerals holds mineral rights on State lands near the Cataract Canyon Unit. As of 2011, no mineral resources had been established, but if a uranium resource is confirmed the potential exists for a mine to be developed. The impact to the cactus of future mining on State lands may be minimized due to the fact that mining and associated infrastructure development on neighboring Coconino Plateau Natural Reserve Lands is prohibited. In addition, some of the cacti in the area are growing on the rim of Cataract Canyon where mining development is not likely.[148] As no future plans currently exist for mines on State lands, this analysis does not forecast any impacts associated with this activity.

3.4.4 ACTIVITIES WITHIN KAIBAB NATIONAL FOREST

145. In general, there are few threats to the Fickeisen plains cactus within Kaibab National Forest. Grazing within cactus habitat is negligible because there is no food source or water for the cattle.[149] In the past, the USFS constructed water tanks for mule deer and bighorn sheep in the vicinity of the cactus habitat, but in the future they will limit the placement of tanks within five miles of cactus critical habitat.[150] In addition, recreation is not considered a threat due to the remote nature of the critical habitat. There are no roads within the proposed critical habitat and the likelihood that recreators would hike through the area is very low.[151]

146. In the past, the Service provided technical assistance related to the Fickeisen plains cactus on the Kaibab National Forest Land and Resource Management Plan, Travel Management Plan, and Integrated Weed Treatment Program. We expect that the Service will consult with the USFS on these three plans upon the listing and designation of critical habitat for the cactus. Incremental impacts associated with these consultations would be limited to the administrative cost of considering the adverse modification

[147] *Ibid.*

[148] *Ibid.*

[149] Personal communication with Barbara Phillips, North Kaibab Ranger District Botanist, on December 17, 2012.

[150] Personal communication with Dustin Burger, North Kaibab Ranger District Management Specialist, on December 18, 2012.

[151] *Ibid.*

standard. This analysis assumes an informal level of effort associated with these consultations occurring in 2013.

3.4.5 ACTIVITIES ON NAVAJO NATION LAND

147. The Navajo Nation expects that the following activities will take place in Fickeisen plains cactus proposed habitat over the next 20 years:

- The Tribe has preliminary plans for tourist developments in the vicinity of the Little Colorado River Gorge (near the Little Colorado River Overlook Unit) and the Marble Canyon (near the Tiger Wash 1 and 2 Subunits), including recreational and wind energy development projects.
- All proposed areas within the Navajo Nation are subject to livestock grazing. According to the Tribe, "grazing of livestock is a sacred activity that is deeply embedded in the Diné [Navajo People] worldview."[152]
- Recreational OHV use in Fickeisen plains habitat is not prevalent; however, new two-track dirt roads are frequently made, likely by locals herding livestock, and may lead to inadvertent trampling of the cactus.

148. The Tribe is addressing these threats by developing a management plan in order to be considered for exclusion. The intent of this plan would be to provided protective measures intended to avoid take under Navajo Nation Law (17 N.N.C. § 507) and adverse impacts to cactus habitat.[153] If designated, the Tribe will likely undergo section 7 consultation with the Service, through BIA, on the tourism facility and wind energy projects. The likelihood these consultations will occur, however, is uncertain. According to the Tribe, the development projects remain speculative at this time.[154] This analysis, conservatively assumes one formal consultation will occur for each of these projects in 2013.

149. With respect to grazing, the Service notes that they have not previously consulted with BIA on this activity and believe future consultations are unlikely.[155] However, the majority of the areas being proposed within the reservation are Tribal trust lands for which the Federal government holds the legal title in trust for the beneficial interest of the Tribe. Tribal trust land is held communally by the tribe and is managed by the Tribal government.[156] In general, a Federal nexus may exist on trust lands through BIA. According to the BIA, the need for a Federal nexus may depend on the type of grazing and whether a BIA-issued grazing permit is necessary. For example, small-scale grazing

[152] Public comment letter submitted by the Navajo Nation Department of Justice on November 30, 2012.

[153] Navajo Nation Code 17 N. N. C. § 507, as cited in Navajo Nation Department of Fish and Wildlife and Department of Justice, in cooperation with the U.S. Fish and Wildlife Service, "Navajo Nation Fickeisen Plains Cactus Management Plant", December 2012, p. 6. Accessible on the public docket.

[154] Personal communication with Andrea Hazelton, Botanist, Navajo Nation Department of Fish and Wildlife, on December 20, 2012.

[155] Personal communication with U.S. Fish and Wildlife Service biologist, January 22, 2013.

[156] Tribal Energy and Environmental Information Clearinghouse, *Tribal and Indian Lands: Definitions of common terminology related to tribal and Indian land ownership*, accessed at http://teeic.anl.gov/triballand/index.cfm on February 8, 2013.

occurring on family-held leases passed down by generation would likely not require a Federal nexus, while more commercial-scale grazing may.[157] This analysis conservatively assumes that one formal consultation with the BIA occurs on grazing activity within the Navajo Reservation in 2013.

3.4.6 ADOT CONSTRUCTION AND MAINTENANCE

150. Transportation infrastructure construction and maintenance is not identified as a threat to the Fickeisen plains cactus and its habitat in the Proposed Rule; however, Federally-funded road projects that may impact critical habitat will require consultation with the Service. In Arizona, there are two ROWs intersecting Fickeisen plains cactus proposed critical habitat. One of these occurs where SR 64 intersects the Little Colorado River Overlook Unit within the Navajo Nation, which is being considered for exclusion, and the other occurs where I-89 intersects the Gray Mountain Subunit.[158] The ADOT conducts annual ROW maintenance, including brush clearing and application of herbicides. This analysis assumes the ADOT, via the Federal Highway Administration (FHWA), will pursue technical assistance with the Service annually for ROW maintenance. The ADOT does not expect the designation to affect ROW maintenance procedures, as the agency's BMPs provide a high level of baseline protection, such as surveying for the plant and providing a biological monitor during activity to ensure avoidance.[159]

3.4.7 PARTNERS FOR FISH AND WILDLIFE CONSERVATION PROGRAM

151. The Service expects that it will conduct intra-service consultations for private conservation via the Partners for Fish and Wildlife Conservation Program.[160] The Program is described as the "primary mechanism for delivering voluntary on-the-ground habitat improvement projects on private lands for the benefit of Federal trust species." The Service conducts programmatic intra-Service consultations regarding projects undertaken as part of the program.[161] This analysis assumes the Service will conduct one intra-Service programmatic consultation for future conservation projects that may affect proposed critical habitat for the cacti on private lands. The costs associated with this consultation are split between the acuña cactus and the Fickeisen plains cactus then divided equally over the units and subunits that contain private land. For the Fickeisen plains cactus this includes Gray Mountain (Gray Mountain and Mays Wash Subunits), Hurricane Cliffs (Dutchman Draw and Salaratus Draw Subunits), and Cataract Canyon Units. Because the timing of this consultation is not known, the analysis conservatively assumes the consultation will occur in 2013.

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[157] Personal communication with Calvert Curley, Natural Resources Manager, Bureau of Indian Affairs, February 4, 2013.

[158] Personal communication with Kristin Gade, ADOT, on December 20, 2012.

[159] Personal communication with Kristin Gade, ADOT, on December 20, 2012.

[160] U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 10, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Acuña Cactus and the Fickeisen Plains Cactus," p. 9. See Appendix B.

[161] U.S. Fish and Wildlife Service, Service Manual, Part 640 (640 FW 1). Accessed at http://www.fws.gov/policy/640fw1.html on January 5, 2012.

3.4.8 INCREMENTAL COST ESTIMATES FOR FICKEISEN PLAINS CACTUS

152. All incremental impacts associated with the designation the proposed critical habitat for the Fickeisen plains cactus are due to the administrative cost of consultation. The incremental costs associated with the proposed critical habitat designation for the Fickeisen plains cactus are summarized in Exhibit 3-4.

EXHIBIT 3-4. SUMMARY OF PRESENT VALUE INCREMENTAL IMPACTS BY SUBUNIT IN PROPOSED FICKEISEN PLAINS CACTUS CRITICAL HABITAT (2013-2023, 2013$, SEVEN PERCENT DISCOUNT RATE)

UNIT/SUBUNIT			TOTAL	REASON FOR COST
PROPOSED CRITICAL HABITAT				
1a	Hurricane Cliffs	Dutchman Draw	$2,900	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing NRCS statewide programmatic consultation Programmatic consultation on Partners for Fish & Wildlife Programs
1b		Salaratus Draw	$2,900	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing NRCS statewide programmatic consultation Programmatic consultation on Partners for Fish & Wildlife Programs
1c		Temple Trail	$1,500	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing
1d		Toquer Tank	$1,500	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing
2	Sunshine Ridge	Sunshine Ridge	$7,000	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing NRCS statewide programmatic consultation Consultation on EZ Mine
3	Clayhole Valley	Clayhole Ridge	$1,500	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing
4	Snake Gulch	Snake Gulch	$7,100	Consultations on Kaibab NF Management
5a	House Rock Valley	Beanhole Well	$2,000	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing NRCS statewide programmatic consultation
5b		North Canyon Wash	$1,500	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing
5c		Marble Canyon	$1,500	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing
5d		South Canyon	$1,500	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment

UNIT/SUBUNIT			TOTAL	REASON FOR COST
				Statewide programmatic consultation on BLM grazing
8a	Gray Mountain	Mays Wash	$1,200	Consultation on BLM State Land Use Plan Amendment Programmatic consultation on Partners for Fish & Wildlife Programs
8b		Gray Mountain	$5,500	Annual ADOT ROW maintenance Programmatic consultation on Partners for Fish & Wildlife Programs
9	Cataract Canyon	Cataract Canyon	$1,400	NRCS statewide programmatic consultation Programmatic consultation on Partners for Fish & Wildlife Programs
		SUBTOTAL	**$39,000**	
CONSIDERED FOR EXCLUSION				
6a	Tiger Wash	Tiger Wash 1	$4,000	Consultation on Navajo development projects and grazing NRCS statewide programmatic consultation
6b		Tiger Wash 2	$4,000	Consultation on Navajo development projects and grazing NRCS statewide programmatic consultation
6c		Shinumo Wash	$1,500	Consultation on Navajo grazing NRCS statewide programmatic consultation
7	Little Colorado River Overlook	Little Colorado River Overlook	$11,000	Consultation on Navajo development projects and grazing Annual ADOT ROW Maintenance
8b	Gray Mountain	Gray Mountain	$1,500	Consultation on Navajo grazing NRCS statewide programmatic consultation
		SUBTOTAL	**$22,000**	
		TOTAL	**$61,000**	

Notes:
1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year (Year 0) of 2013 for present value calculations using costs estimated in 2013 dollars.

3.5 LIMITATIONS AND UNCERTAINTIES

153. The primary, potentially substantial, source of uncertainty in this analysis is with regard to the potential for projects in occupied habitat to not identify the presence of the plant. In these cases, any recommended conservation measures will be considered incremental costs of the designation.

154. The following project-specific limitations introduce additional uncertainty to this cost analysis:

- If project impacts cannot be mitigated under the programmatic consultation on NRCS-funded activities, NRCS will pursue formal consultation at the project level. If project-specific consultations are necessary, then the costs may be understated.

- Future funding for BMGR surveys is uncertain. If funding is not available, then the costs may be overstated. On the other hand, if funding is available to allow for surveys across multiple years, then the costs may be understated.
- To the extent that activities on the Tohono O'odham Reservation require consultation with the Service and the Service recommends conservation measures as a result of consultation, costs associated with these conservation measures will be incremental if they occur in the Cimarron Mountain Subunit.
- The need for consultation on EZ Mine will depend on the mine's footprint relative to Fickeisen plains cactus habitat. If consultation is not necessary, then the costs may be overstated.
- The need for consultation with BIA on grazing activities within the Navajo Nation will depend on the type of grazing and whether a permit is necessary. If there is no Federal nexus for these grazing activities, then the costs may be overstated.
- Development projects on Navajo Nation land are considered speculative.[162] To the extent that these projects do not occur, forecast consultation costs may be overstated.

[162] Personal communication with Andrea Hazelton, Botanist, Navajo Nation Department of Fish and Wildlife, on December 20, 2012.

CHAPTER 4 | POTENTIAL BASELINE AND INCREMENTAL ECONOMIC IMPACTS FOR THE GIERISCH MALLOW

155. This chapter discusses the activities likely to be undertaken to protect the Gierisch mallow and its habitat. Protections for this species and its habitat result from implementation of the Act, as well as other Federal and State regulations and conservation actions. Any impacts resulting from the listing of the species and existing measures undertaken by land managers and project proponents are considered baseline. Impacts resulting specifically from the designation of critical habitat, beyond what is provided for the species otherwise, are considered to be incremental. This chapter quantifies costs associated with both baseline and incremental protections where possible.

156. Section 4.1 presents a summary of results; Section 4.2 presents and quantifies the baseline protections afforded the species by Federal and State regulations and other protections; Section 4.3 presents and quantifies the potential incremental conservation measures that may result from the designation of critical habitat for the mallow, beyond the baseline protections described in Section 4.2.

4.1 SUMMARY OF RESULTS

157. Exhibit 4-1 presents a summary of the baseline and incremental costs associated with Gierisch mallow conservation efforts. Incremental costs are entirely administrative, consisting of the cost of addressing adverse modification in each of the following consultations: one formal consultation for the Black Rock Mine, one technical assistance on the Georgia-Pacific mine, two programmatic consultations to address grazing on BLM land, two formal consultations to address BLM land management plans, one informal consultation on an ADOT project to widen I-15, and annual technical assistances on ROW maintenance in the I-15 corridor. Baseline costs include the administrative cost to address jeopardy in each of the consultations listed above and the cost of conservation efforts implemented to avoid impacts to the species.

158. A key factor not addressed in this analysis that contributes to uncertainty in estimated impacts is the likelihood that a specific project will identify the presence of the mallow in critical habitat when conducting surveys for a project. In instances where a project does not find individual mallow plants in critical habitat, any recommended conservation measures will be considered incremental costs of the designation. In addition, a number of potential conservation measures were unable to be quantified. To the extent that these conservation measures are recommended, additional baseline impacts not reflected here may be incurred by project proponents.

EXHIBIT 4-1. SUMMARY OF PRESENT VALUE IMPACTS BY UNIT IN PROPOSED GIERISCH MALLOW HABITAT (2013-2032, 2013$, SEVEN PERCENT DISCOUNT RATE)

UNIT		BASELINE IMPACTS	INCREMENTAL IMPACTS	REASON FOR COST
1	Starvation Point	$250,000	$27,000	Technical assistance on Georgia-Pacific Mine Statewide programmatic consultations on BLM grazing Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment
2	Black Knolls	$520,000	$24,000	Consultation on Black Rock Mine Statewide programmatic consultation on BLM grazing Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Annual technical assistance on ADOT ROW maintenance Consultation on ADOT I-15 widening project
	Total	**$770,000**	**$51,000**	

Notes:
1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year of 2013 for present value calculations using costs estimated in 2013 dollars.

4.2 BASELINE PROTECTIONS

159. The primary protection for the mallow, absent the designation of critical habitat, is the listing of the species under the Act. In addition, areas within the proposed designation are subject to various other Federal and State protections. These protections may prohibit activities that threaten the mallow or may call for specific conservation efforts meant to protect the species. Exhibit 4-2 summarizes the areas subject to these protections, which are described in greater detail below. Measures undertaken in accordance with these baseline protections are described in more detail and quantified, where possible, in the subsequent section. Almost all of the proposed critical habitat (99 percent) is subject to baseline conservation through Federal or state land management.

EXHIBIT 4-2. AREAS WITH EXISTING PROTECTIONS IN PROPOSED CRITICAL HABITAT FOR THE GIERISCH MALLOW

LAND AREA		ACRES	% OF TOTAL PCH
Federal	Bureau of Land Management (AZ)	9,400	73%
	Bureau of Land Management (UT)	2,000	16%
State	Arizona	1,200	10%
	Total	**13,000**	**99%**

Notes: The remaining 180 acres (1 percent) of proposed critical habitat are Utah State lands, administered by the Utah Trust Lands Administration. There are no known protections for the mallow provided on these lands.
Sources: GIS data provided by the Service to IEc on September 20, 2012; USGS, National Gap Analysis Program, Protected Areas Database (PAD-US), accessed September 25, 2012 at http://gapanalysis.usgs.gov/padus/.

4.2.1 ENDANGERED SPECIES ACT

160. Section 7 of the Act requires that activities with a Federal nexus that may affect the mallow be subject to section 7 consultation to ensure that they are not likely to jeopardize the species. Conservation efforts implemented as a result of these consultations offer baseline protection for the species within the proposed critical habitat areas. The baseline conservation efforts likely to be requested during consultation on the activities considered to be threats to the mallow are described below. Importantly, these are the conservation efforts most likely to result from section 7 consultation within the study area regardless of whether critical habitat is designated. Conservation measures likely to be implemented to avoid jeopardy of the mallow may include:[163, 164]

- Implement seasonal restrictions or modifications to projects occurring within occupied habitat to enable recovery of the species;
- Avoid ground-disturbing activity within 1,200 meters of individual plants;
- Implement in-situ conservation and long-term adaptive management monitoring to reintroduce individuals in occupied habitat;
- Offset permanent habitat loss, modification, or fragmentation with habitat that is permanently protected, including adequate funding for management; and
- Restrict the size or configuration of proposed projects to avoid, reduce, or eliminate effects on the species.

In addition to the significant baseline protection provided by the Act, other existing sources of protection for the mallow exist. These baseline protections are discussed below.

[163] U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 14, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Gierisch Mallow," p. 5-6. See Appendix C.

[164] Personal communication with the U.S. Fish and Wildlife Service, Region 2 Field Office, on November 15, 2012.

4.2.2 BLM PROTECTIONS

161. Of the 12,822 acres proposed as critical habitat for the mallow, 89 percent are managed by the BLM. The mallow is listed as a sensitive species by the BLM, requiring that the BLM manage the species and its habitat to minimize or eliminate threats affecting the status of the species, or improve the conditions of species habitat.[165] This regulation does not prevent activities that threaten the mallow from occurring within the proposed habitat, but may lead to the BLM implementing mitigation measures to prevent unnecessary or undue degradation of the habitat. In the past, the BLM has required seed collection of the mallow by mine operators to aid in reestablishing the species in reclaimed areas.[166] The BLM has implemented various management policies that provide protection for the mallow. These policies are described below.

Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management[167]

162. In 2003, the BLM Arizona State Office amended its six RMPs and one MFP to address modern wildland fire management concerns. The amendments involved section 7 consultation with the Service regarding conservation measures for threatened, endangered, and candidate species. At this time, the mallow was not specifically considered as a candidate species, but the plan does include measures for other sensitive species that may also benefit the mallow. Upon listing and designation of critical habitat for the mallow, the Service will need to formally reinitiate this consultation with the BLM to consider the mallow and its habitat.

Arizona Strip District 2008 Resource Management Plan[168]

163. In coordination with the Service, the Arizona Strip District of the BLM developed a set of conservation measures for flowering plants, including the mallow, for broad-scale projects in the region. The BLM's conservation measures for fuel and vegetation treatments in mallow habitat include:

    4. Buffer areas will be delineated around plant populations prior to prescribe fire and vegetation-treatment activities. The BLM will coordinate with the Service during any emergency response and wildland fire use activities to ensure protection of plant populations from fire and fire suppression activities.

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[165] U.S. Bureau of Land Management, "Special Status Species Policy Manual #6840", 2008, accessible at http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.43545.File.dat/6840.pdf as of December 28, 2012.

[166] 77 FR 49903.

[167] U.S. Bureau of Land Management, Arizona Statewide Land Use Plan Amendment for Fire, Fuels and Air Quality Management, March 2004, p. D-12, accessed at http://www.blm.gov/pgdata/etc/medialib/blm/az/pdfs/nepa/library/fuels.Par.64623.File.dat/fire_ea.pdf.

[168] U.S. Bureau of Land Management, "Arizona Strip Field Office Resource Management Plan Record of Decision and Approved RMP, February 2008, accessed at http://www.blm.gov/pgdata/etc/medialib/blm/az/pdfs/nepa/library/resource_management/ASFO_ROD.Par.32020.File.dat/complete.pdf.

5. No staging of equipment or personnel will be permitted within 100 meters of identified individuals or populations of special status plant species during fire suppression, wildland fire use, or prescribed fire. OHVs will not be allowed within the 100-meter buffer area, unless necessary for firefighter or public safety or the protection of property, improvements, or other resources.
6. No prescribed burning will be implemented within 100 meters of identified locations or unsurveyed suitable habitat of special status plan species unless specifically designed.[169]

Upon listing and designation of critical habitat for the mallow, this consultation will be reinitiated to consider impacts on the mallow and its habitat.

4.2.3 STATE PROTECTIONS

Arizona Native Plant Law[170]

164. Under the Arizona Native Plant Law, as implemented by the ADA, the mallow is classified as a "highly safeguarded protected native plant."[171] This classification does not explicitly protect mallow habitat, but provides the following protections to the species:

- Collection is prohibited on public land without a permit;
- Private landowners are required to notify Arizona Department of Agriculture within 60 days prior to destruction or removal of any protected native plant on their land; and
- Plants may not be legally possessed, taken, or transported from their growing site without a permit from the Arizona Department of Agriculture.

ASLD Protocol for State Listed Species

165. ASLD manages land use activities on approximately 13 percent of the State's total land area.[172] The primary mission of the ASLD is to "enhance value and optimize economic return for Trust beneficiaries, consistent with sound stewardship, conservation, and business management principles."[173] Ten percent of proposed critical habitat for the mallow is managed by the ASLD.

166. Prior to conducting any land disturbing activity on State Trust Land, the ASLD requires a pre-construction Native Plant Survey to be conducted in accordance with an approved protocol.[174] Activities subject to these requirements include clearing rights-of-way for

[169] U.S. Fish and Wildlife Service, "Biological Opinion for the Arizona Strip Resource Management Plan," November 7, 2007.

[170] Ariz. Rev. Stat. § 3-901 to 3-316.

[171] Ariz. Rev. Stat. § 3-909.

[172] Arizona State Land Department, "State Land Department Annual Report", FY2010-2011, located at http://www.land.state.az.us/report/report2011_full.pdf, p. 22, on December 27, 2012.

[173] Arizona State Land Department, "Land Department Mission Statement", located at http://www.land.state.az.us/support/missiongoals.htm on December 27, 2012.

[174] Arizona State Land Department, "Native Plant Surveys", accessed at http://www.land.state.az.us/programs/natural/nativePlantSurveys.htm on January 4, 2012.

roads and utilities, mine operations, and construction of small communications towers. The purpose of the Native Plant Survey is to calculate the compensation that must be paid to the ASLD for the removal of specific cacti, succulents, trees, shrubs, and sub-shrubs. ASLD maintains a Native Plant Fee Schedule that establishes fees associated with the removal of a set of sensitive native plants. The mallow is considered a "highly safeguarded protected" plant on ASLD's schedule. The fee associated with the removal of plants in this category are "independently evaluated and assessed."[175]

167. Specifically related to mining activities on ASLD lands, the Department implements reclamation provisions and bonding requirements when approving a Mining Plan of Operations. ASLD gives notice to and allows all other agencies, such as the Service, to comment on proposed projects and potential impacts of concern. ASLD would not deny a mine based on the presence of an endangered or threatened species, but would likely write allowances into an ASLD lease or mining company's reclamation plan to require preservation measures for listed species based on agency input.[176]

4.3 BASELINE AND INCREMENTAL IMPACTS

168. Baseline impacts for the mallow result from section 7 consultations under the Act, as well as existing BLM and ASLD policies, as described above. Impacts resulting specifically from the designation of critical habitat, beyond what is provided for the species and its habitat in the baseline, are considered to be incremental costs of the proposed designation. This section describes and quantifies the baseline and incremental impacts by economic activity. Quantified impacts include both administrative costs of consultation and, where information is available, the costs of efforts recommended to avoid adverse impacts on the mallow and its habitat.

169. The activities assessed include gypsum mining, livestock grazing, species and habitat management, and transportation projects. The Service identified gypsum mining and livestock grazing as a threat to the mallow and its habitat in both proposed critical habitat units. The BLM will be required to consult with the Service on the impact of their management activities on the mallow. Transportation was not identified as a threat specifically, but federally-funded transportation projects are expected to occur in proposed critical habitat and consultation with the Service will be required.

170. Recreational land uses, specifically OHV use and target shooting, were also identified as potential threats to the mallow and its habitat; however, these activities are not authorized (illegal) in mallow habitat and therefore no regulatory mechanism or Federal nexus exists. Similarly, illegal dumping was identified as a threat, but lacks a regulatory mechanism and resultant Federal nexus compelling consultation to consider mallow habitat conservation. As such, this analysis does not assess impacts to these activities.

[175] Arizona State Land Department, ASLD Native Plant Survey Protocol Native Plant Fee Structure, accessed at http://www.land.state.az.us/programs/natural/pdfs/Native_Plant_B.pdf on January 4, 2012.

[176] Personal communication with Joe Dixon, ASLD Minerals Section Manager, on December 7, 2012.

4.3.1 GYPSUM MINING

171. The primary threat of concern for the Gierisch mallow is gypsum mining in Arizona. Approximately 42 percent of known populations are located within BLM and ASLD mining claims.[177] There is a Federal nexus for mining activity if it occurs on lands managed by the BLM (89 percent of the designation for mallow); however, no Federal nexus exists for mining on ASLD land (ten percent of the proposed designation). Generally, the level of mining activity is related to trends in the housing market as gypsum is a key input for wallboard manufacturing. In proposed critical habitat, there are two existing gypsum mines, as well as several issued exploration permits.

Black Rock Gypsum Mine

172. The Black Knolls Unit overlaps Black Rock Gypsum Mine, an active gypsum mine operated by Western Mining Minerals, Inc. Current operations affect the resident mallow population, which is the largest population in Arizona.[178] Additionally, the mine operator has proposed an expansion that may affect the mallow and its habitat.[179] Existing BLM regulations protecting sensitive species (see Section 4.2.2 above) do not prevent this expansion into mallow habitat and Western Mining Minerals has obtained the requisite BLM permits for the expansion. Mining operations have not yet reached the expansion area due to slowing demand for gypsum; however, the expansion zone is likely to be impacted in three to ten years. The exact timing will depend on market demand for gypsum.[180] At this time, the BLM and Western Mining Minerals will need to consult with the Service under the jeopardy standard and at that time will also need to consider adverse modification of critical habitat.

173. In the active mine area, Western Mining Minerals currently conducts conservation efforts for the mallow in cooperation with the BLM and Red Butte Garden, a non-profit organization associated with the University of Utah. These conservation measures include:

- Reclaiming and restoring mined lands and avoiding over-use of targeted areas;
- Regularly reviewing mining plans with the BLM;
- Working cooperatively with the BLM on seed collecting and transplanting efforts, as part of the reclamation process; and
- Collecting and providing seeds to researchers at Red Butte Garden [181]

[177] 77 FR 49900. Mining was not identified as a threat to the mallow in Utah.

[178] 77 FR 49898.

[179] 77 FR 49898.

[180] Personal communication with the Service, September 25, 2012; 77 FR 49898.

[181] Public comment letter from Darrel Williams, General Manager, Western Mining and Minerals, Inc., Vice President, U.S. Board of Operations, CertainTeed Gypsum, Inc., "Official Comments on Proposal to give Arizona-Utah Plant Endangered Species Protection", October 16, 2012.

Though specific information regarding the cost of the conservation measures borne by Western Mining Minerals is unavailable at this time, the BLM has indicated that Red Butte Garden's efforts to store seeds and propagate new mallow populations have been funded with a grant of $60,000 over three years.[182]

174. The mining plan for the expansion area include conservation efforts for the mallow similar to those described above, including seed collection and conducting experiments to see if the plant can recover in reclaimed areas.[183] According to the BLM, the agency is currently in negotiations with the mining company regarding utilization of their permit and successful negotiations are likely dependent on whether replanting efforts constitute sufficient mitigation to avoid impacts to the plant.[184]

175. This analysis assumes that one formal consultation will occur on the expansion of Black Rock Mine in 2015. Baseline impacts associated with this consultation include the administrative cost of considering the jeopardy standard as well as the cost to collect and store mallow seeds and propagate new plant populations.

176. The Service does not expect to request additional conservation measures due to critical habitat designation beyond those requested for the plant itself.[185] Therefore, incremental costs associated with this project are limited to the administrative cost of considering the adverse modification standard during consultation. The baseline and incremental impacts are provided in Exhibit 4-3.

Georgia-Pacific Mine Operations

177. Georgia-Pacific owns a currently inactive mine on ASLD land in the Starvation Point Unit of critical habitat, and owns placer mining claims on 250 acres of BLM land in the southernmost portion of the Black Knolls Unit.[186,187] According to Georgia-Pacific, the company has not undertaken significant mining operations on its claims and leases in mallow habitat, though preliminary stripping has occurred on an approximately 20-acre area of ASLD land, and exploratory drilling has taken place on BLM land.[188]

178. The currently inactive mine in the Starvation Point Unit is expected to reactivate mining within the next two to five years.[189] This lease consists of approximately 400 acres of

[182] Personal communication with Tim Hughes, AZ BLM Endangered Species Coordinator, December 27, 2012.

[183] Personal communication with the Service, September 25, 2012.

[184] Personal communication with Tim Hughes, AZ BLM Endangered Species Coordinator, December 27, 2012.

[185] U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 14, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Gierisch Mallow," p. 5-6. See Appendix C.

[186] A placer mining claim grants the right to mine on public land to a party that discovers valuable minerals in surrounding loose material, such as sand or gravel.

[187] Public comment from Hogan Lovells US LLP, on behalf of Georgia-Pacific, "Comments to Proposed Rule 'Endangered and Threatened Wildlife and Plants; Determination Status for the Gierisch Mallow and Designation of Critical Habitat'," October 16, 2012.

[188] *Ibid.*

[189] Personal communication with Bill Barger, Director Mining Operations at Georgia-Pacific LLC, on January 25, 2013.

mineral rights, all within critical habitat, which will expire in 2026.[190] Assuming an estimated market value of $16 per ton, the value of the mining lease is approximately $200 million.[191] There is no Federal nexus for mining on ASLD-managed land necessitating consultation with the Service. However, Georgia-Pacific has worked in cooperation with the ASLD to research potential conservation options. This analysis assumes that the ASLD will seek technical assistance from the Service in 2015 regarding this project. The preferred conservation measure the company would pursue is collecting and transplanting mallow seeds. The current mining plans would allow gypsum deposits suitable for mallow habitat to remain on, at most, 15 acres of the 400-acre lease area. The company would research options such as transplanting gypsum content into reclaimed areas to create additional habitat. Georgia-Pacific estimates this type of measure to cost $200 per acre reclaimed. At this cost, mallow habitat restoration at the Georgia-Pacific mine site is estimated to cost $77,000. This analysis conservatively applies these reclamation costs to the baseline in 2015, the earliest the mine is forecast to begin operations. The baseline and incremental impacts are provided in Exhibit 4-3.

Other Mining Activity

179. Though Georgia-Pacific is currently the only mineral lessee on ASLD land, there are a small number of five-year exploration permits in the area, including one just south of the Georgia-Pacific mine and a second in the Black Knolls Unit. In the past, substantial mining activity has resulted from exploration permits; however, future activity will depend on the market demand for gypsum. Exhibit 4-4 provides a map of existing mineral leases in the area. According to the ASLD, it is unusual for exploration activities to impact sensitive areas because only small land areas are affected and mining companies have flexibility in altering their plans.[192]

EXHIBIT 4-3. IMPACTS TO MINING IN PROPOSED GIERISCH MALLOW HABITAT (2013-2032, 2013$, SEVEN PERCENT DISCOUNT RATE)

UNIT		BASELINE IMPACTS	INCREMENTAL IMPACTS
1	Starvation Point	$68,000	$350
2	Black Knolls	$66,000	$4,400
	Total	**$130,000**	**$4,700**

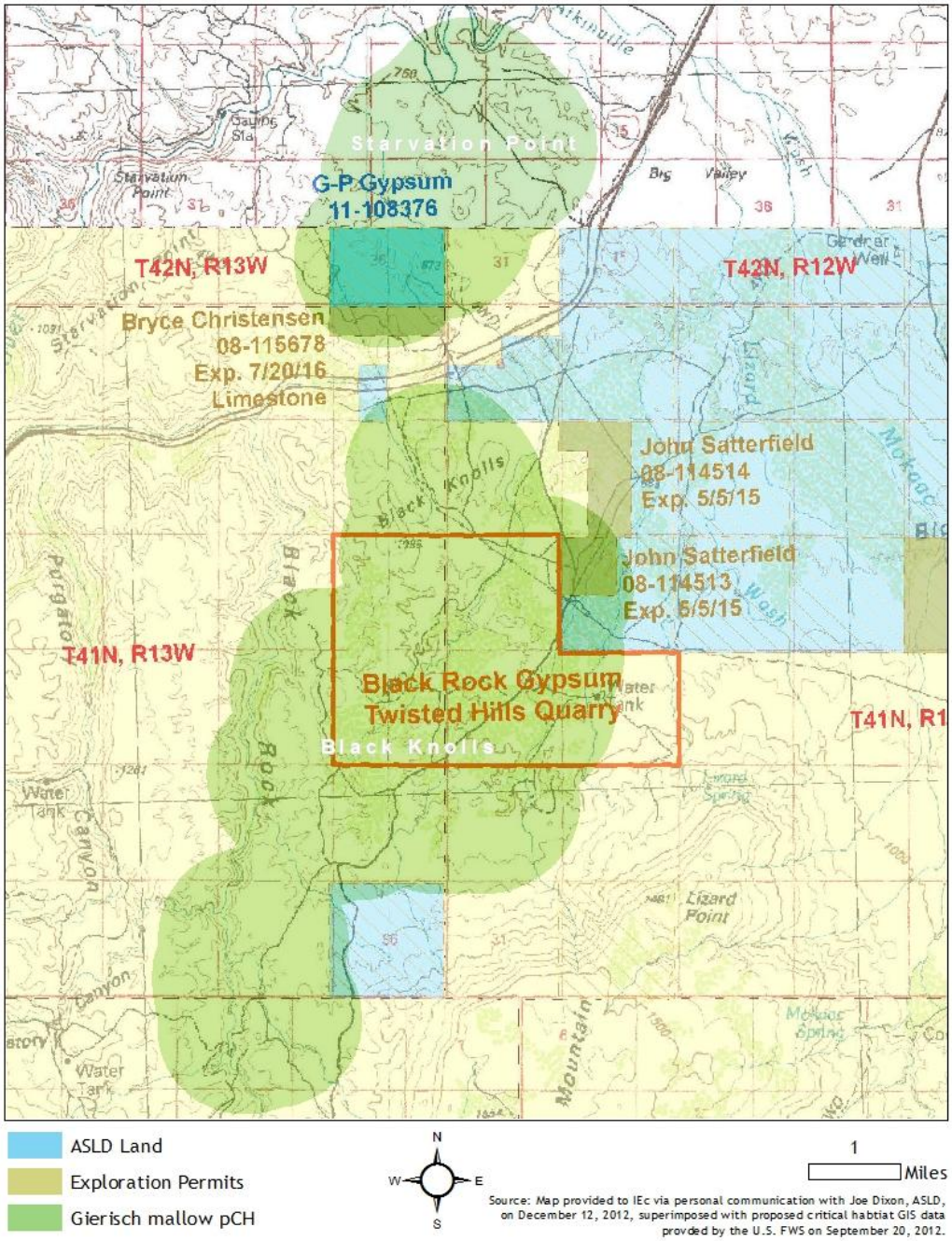
Notes: 1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year of 2013 for present value calculations using costs estimated in 2013 dollars.

[190] Public comment from Hogan Lovells US LLP, on behalf of Georgia-Pacific, "Comments to Proposed Rule 'Endangered and Threatened Wildlife and Plants; Determination Status for the Gierisch Mallow and Designation of Critical Habitat'," October 16, 2012.

[191] Personal communication with Bill Barger, Director Mining Operations at Georgia-Pacific LLC, on January 25, 2013.

[192] Personal communication with Joe Dixon, ASLD Minerals Section Manager, on December 7, 2012.

EXHIBIT 4-4. ASLD MINERAL LEASES AND EXPLORATION PERMITS IN GIERISCH MALLOW HABITAT



4.3.2 LIVESTOCK GRAZING

180. The Service identified livestock grazing on BLM land as a moderate threat to the mallow, specifically in the Black Knolls Unit of proposed critical habitat. Generally, livestock do not utilize the steep slope areas where the mallow is found. The Service anticipates that individual plant-level impacts and moderate soil disturbance may result from grazing in mallow habitat; however, population-level impacts are unlikely.[193]

181. Grazing allotments occur in all areas of proposed mallow habitat in Arizona and Utah, on both State and BLM land except within the footprints of active mines.[194] There are three grazing allotments in Arizona and one in Utah that intersect proposed mallow critical habitat. Details on these allotments are provided in Exhibit 4-5. Overall, approximately 9,500 acres, or about 11 percent, of these allotments are in proposed critical habitat.

EXHIBIT 4-5. GRAZING ALLOTMENTS IN GIERISCH MALLOW PROPOSED CRITICAL HABITAT

ALLOTMENT	STATE	ALLOTMENT SIZE (ACRES)	PORTION IN PCH (ACRES)	PERIMETER (METERS)[1]	NOTES
STARVATION POINT UNIT (GRAZING NOT IDENTIFIED AS A THREAT)					
Curly Hollow	UT	28,000	2,039	10,930	Portions BLM and Utah State Trust land; Mallow only occurs in one pasture, grazed from November through February
Lambing-Starvation	AZ, UT	13,457	1,270	9,949	Mallow occurs in two of three pastures, both used in spring; ASLD and Utah State have grazing leases here, but they are managed by BLM
BLACK KNOLLS UNIT					
Lambing-Starvation	AZ	13,457	742	11,172	Mallow occurs in two of three pastures, both used in spring; ASLD and Utah State have grazing leases here, but they are managed by BLM
Black Rock	AZ	40,531	4,053	28,397	Mallow exists in pastures that are typically used in spring, rotated for use every other year; Portion intersects Black Rock Mine (excluded from total shown)
Purgatory	AZ	4,905	1,430	17,005	Mallow occurs in a small portion, mostly on steep slopes not normally utilized by livestock
	TOTAL	**86,893**	**9,534**	**77,453**	

Sources: 77 FR 49898-49900; Utah BLM grazing allotment GIS data, "gra_allot_poly", 2011, accessed December 7, 2012 at http://www.blm.gov/ut/st/en/prog/more/geographic_information/gis_data_and_maps.html; Arizona BLM grazing allotment GIS data, "az_graz_allots", accessed on December 7, 2012 at http://www.blm.gov/az/st/en/prog/maps/gis_files.html.
Note: Does not take into consideration the shape of mine footprints.

[193] 77 FR 49900.

[194] 77 FR 49898.

182. This analysis assumes that the BLM will undertake one programmatic consultation for Arizona and one programmatic consultation for Utah with the Service on grazing activities within allotments containing critical habitat for the mallow. These programmatic consultations will need to be reinitiated once every ten years (the life of a permit). Potential conservation measures that may be recommended for the mallow during consultation include:

- Constructing exclusionary fencing;
- Establishing water holes and salt licks in areas that will draw livestock away from the plants; and
- Removing livestock from critical habitat during the species' growing and reproductive seasons.[195]

183. Because livestock generally do not utilize the steep slopes where the mallow are found, this analysis assumes that the conservation measure most likely to generate a change in management of the grazing allotments is the construction of exclusionary fencing. The cost of fencing is estimated to be approximately $4,000 per mile for materials and $4,000 per mile for labor, or about $5.00 per meter.[196] This analysis applies the fencing costs above to the perimeter of the portions of each allotment that is proposed as critical habitat. Estimated impacts to grazing activities are presented in Exhibit 4-6.

EXHIBIT 4-6. IMPACTS TO GRAZING IN PROPOSED GIERISCH MALLOW HABITAT (2013-2032, 2013$, SEVEN PERCENT DISCOUNT RATE)

UNIT		BASELINE IMPACTS	INCREMENTAL IMPACTS
1	Starvation Point	$170,000	$20,000
2	Black Knolls	$300,000	$6,800
	Total	**$470,000**	**$27,000**

Notes:
1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year of 2013 for present value calculations using costs estimated in 2013 dollars.

4.3.3 BLM LAND MANAGEMENT ACTIVITIES

Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management

184. As described in Section 4.2.2, upon listing and designation of critical habitat for the mallow the Service will need to reinitiate consultation with the BLM on their Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management. The

[195] 77 FR 49911; Personal communication with the Service on September 25, 2012.

[196] Personal communication with Tim Hughes, AZ BLM Endangered Species Coordinator, December 27, 2012.

consultation has a 10-year life cycle, which is set to expire in 2014. Therefore, this analysis assumes that the Service will reinitiate consultation for all species in 2014 and will add the mallow at that time. The consultation will be reinitiated again for all species, including the mallow, in 2024. Costs associated with this consultation are divided equally over the two proposed units. The reinitiation of this consultation is not anticipated to change this plan in any significant way. All BLM-managed areas are occupied by the species and therefore any changes resulting from the reinitiation are expected to occur in the baseline. This analysis assumes that the impacts associated with this reinitiation will be limited to administrative costs.

Arizona Strip District RMP

185. Upon listing and designation of critical habitat for the mallow, the Service will need to reinitiate consultation with the BLM on the Arizona Strip District RMP. This analysis assumes this consultation will be reinitiated in 2013 and will require a formal level of effort. Costs associated with this consultation are divided over the two proposed units for the mallow. The reinitiation of this consultation is not anticipated to change this plan in any significant way. All BLM-managed areas are occupied by the species and therefore any changes resulting from the reinitiation are expected to occur in the baseline. This analysis assumes that the impacts associated with this reinitiation will be limited to administrative costs.

EXHIBIT 4-7. IMPACTS ASSOCIATED WITH BLM LAND MANAGEMENT ACTIVITIES IN PROPOSED GIERISCH MALLOW HABITAT (2013-2032, 2013$, SEVEN PERCENT DISCOUNT RATE)

UNIT		BASELINE IMPACTS	INCREMENTAL IMPACTS
1	Starvation Point	$18,000	$6,000
2	Black Knolls	$18,000	$6,000
	Total	**$36,000**	**$12,000**

Notes:
1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year of 2013 for present value calculations using costs estimated in 2013 dollars.

4.3.4 ROAD CONSTRUCTION AND MAINTENANCE

186. Transportation infrastructure construction and maintenance is not identified as a threat to the mallow and its habitat in the Proposed Rule; however, federally-funded road projects that may impact critical habitat will require consultation with the Service. In Utah, there are no roads intersecting critical habitat that would receive Federal funding.[197] In Arizona,

[197] Utah SGID (State Geographic Information Database), "SGID93.TRANSPORTATION.Roads", accessed September 27, 2012.

I-15 intersects the Black Knolls Unit. According to the ADOT, the ROW for the I-15 corridor will likely undergo annual maintenance, which can include activities such as brush clearing and application of herbicides. The ADOT is also planning to conduct shoulder widening and repaving on this section of I-15 in the summer and fall of 2013.[198] This analysis assumes the ADOT, via the FHWA, will pursue technical assistance with the Service annually for ROW maintenance, and will do an informal consultation for I-15 road widening in 2013.

187. Due to the high level of baseline protection provided by the ADOT BMPs, incremental conservation measures are unlikely. The ADOT is typically able to implement more simple avoidance measures for these sorts of activities. Baseline BMPs for the mallow include requiring surveys for the plant and flagging avoidance areas where it is found, providing a biological monitor during project activity if the area is found to be occupied, and transplanting if individual plants are impacted.[199] The cost of surveys and transplanting were not available; however, having a biological monitor onsite is estimated to cost up to $120 per hour.[200] This analysis applies the baseline biological monitoring costs to ADOT projects within the proposed critical habitat. Impacts to transportation activities are presented in Exhibit 4-7.

EXHIBIT 4-8. IMPACTS TO TRANSPORTATION IN PROPOSED GIERISCH MALLOW HABITAT (2013-2032, 2013$, SEVEN PERCENT DISCOUNT RATE)

UNIT		BASELINE IMPACTS	INCREMENTAL IMPACTS
1	Starvation Point	$0	$0
2	Black Knolls	$130,000	$7,000
	Total	**$130,000**	**$7,000**

Notes:
1. Baseline project modification costs assume one full time employee for one week, annually, for ROW monitoring for the period of analysis, and one full time employee for three months (60 work days) for I-15 widening.
2. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
3. For this cost analysis, we assume a base year of 2013 for present value calculations using costs estimated in 2013 dollars.

[198] AZ Department of Transportation, Statewide Projects: I-15 Paving Project Virgin River Gorge to Utah State Line, accessed at http://www.azdot.gov/Highways/Projects/I15_VirginRiverGorge_UtahStateLine/index.asp on December 31, 2012.

[199] Personal communication with Kristin Gade, ADOT, on December 20, 2012.

[200] Personal communication with Nevada Department of Transportation on December 13, 2011, with regard to assessing costs for flycatcher conservation measures.

4.4 LIMITATIONS AND UNCERTAINTIES

188. The primary, potentially substantial, source of uncertainty in this analysis is the likelihood that a project proponent will identify individual plants in occupied habitat. In instances where the plant is not identified in critical habitat, any recommended conservation measures will be considered incremental costs of the designation. Additionally, this analysis was unable to quantify a number of conservation measures that may be recommended by the Service. To the extent that these costs are not included in this analysis, baseline costs of mallow conservation will be underestimated.

CHAPTER 5 | POTENTIAL ECONOMIC BENEFITS

189. The primary intended benefit of critical habitat is to support conservation of threatened and endangered species, such as the three Arizona plants. Various economic benefits, measured in terms of social welfare or regional economic performance, may also result from species and habitat conservation. The benefits of species and habitat conservation can be placed into two broad categories: (1) those associated with the primary goal of species conservation (i.e., direct benefits), and (2) those additional beneficial services that derive from the habitat conservation measures but are not the purpose of the Act (i.e., ancillary benefits, such as reducing downstream water treatment costs).

5.1 QUANTIFYING DIRECT ECONOMIC BENEFITS OF CRITICAL HABITAT DESIGNATION FOR THE THREE ARIZONA PLANTS

190. Quantification and monetization of species conservation benefits requires information on the incremental change in the probability of three Arizona plants conservation that is expected to result from the designation. As discussed in Chapters 3 and 4, the majority of the incremental impacts associated with the designation of critical habitat for the plants are expected to be administrative, consisting of the cost of addressing adverse modification in section 7 consultation. The analysis assumes that, except in unoccupied areas, additional conservation efforts will not be requested due to the designation of critical habitat. Therefore the change in the probability of conservation due to the designation is expected to be small.

191. In addition, the published valuation literature does not support monetization of incremental changes in conservation probability for these species. Specifically, economists apply a variety of methodological approaches in estimating both use and nonuse values for species and for habitat improvements, including stated preference and revealed preference methods. Stated preference techniques include the contingent valuation method and conjoint analysis or contingent ranking methods. In simplest terms, these methods employ survey techniques, asking respondents to state what they would be willing to pay for a resource or for programs designed to protect that resource. A substantial literature has developed that describes the application of this technique to the valuation of natural resource assets.

192. More specific to use values for species or habitats, revealed preference techniques examine individuals' behavior in markets in response to changes in environmental or other amenities (i.e., people "reveal" their value by their behavior). For example, travel cost models are frequently applied to value access to recreational opportunities, as well as to value changes in the quality and characteristics of these opportunities. Basic travel cost models are rooted in the idea that the value of a recreation resource can be estimated by analyzing the travel and time costs incurred by individuals visiting the site. Another

revealed preference technique is hedonic analysis, which is often employed to determine the effect of specific site characteristics on property values.

193. Numerous published studies estimate individuals' willingness to pay to protect endangered species.[201] The economic values reported in these studies reflect various groupings of benefit categories (including both use and non-use values). For example, these studies assess public willingness to pay for wildlife-viewing opportunities, for the option for seeing or experiencing the species in the future, to assure that the species will exist for future generations, and simply knowing a species exists, among other values. This literature, however, addresses a relatively narrow range of species and circumstances compared to the hundreds of species and habitats that are the focus of the Act. Specifically, existing studies focus primarily on large mammal, bird, and fish species, and generally do not report values for incremental changes in the probability of species conservation and recovery.[202] Importantly for this analysis, we are not aware of any published studies that estimate the value the public places on preserving these three plant species.

194. An ideal study for use in valuing the use and non-use values that may derive from critical habitat designation for the three Arizona plants would be specific to the species, the policy question at hand (economic benefits specifically of the critical habitat designation), and the relevant population holding such values (e.g., citizens of Arizona or of the U.S.). No such study has been undertaken to date.

195. Absent primary research specific to the policy question, resource management decisions can often be informed by applying the results of existing valuation research to a new policy question -- a process known to economists as benefit transfer. Benefit transfer involves the application of unit value estimates, functions, data, and/or models from existing studies to estimate the benefits associated with the resource under consideration.

196. OMB has written guidelines for conducting credible benefit transfers. The important steps in the OMB guidance are: (1) specify the value to be estimated for the rulemaking; and (2) identify appropriate studies to conduct benefits transfer based on the following criteria:

- The selected studies should be based on adequate data, sound and defensible empirical methods and techniques.
- The selected studies should document parameter estimates of the valuation function.

[201] See, for example, Richardson, L. and J. Loomis. March 2009. The Total Economic Value of Threatened, Endangered, and Rare Species: An Updated Meta-Analysis. Ecological Economics 68(5): 1535-1548.

[202] One exception is the Richardson and Loomis (2009) study referenced in the previous footnote. The authors developed a model to estimate the value of critical habitat designations based on a meta-analysis of 31 studies published between 1985 and 2005. The model generates composite willingness to pay values for species conservation based on an estimate of the percent change in species population likely to result from the critical habitat designation. However, none of the underlying studies estimate values for plant species. Thus, even if information about the change in the populations of the three Colorado plants likely to result from the designation were available, the appropriateness of the application of this model to plant species is questionable.

- The study and policy contexts should have similar populations (e.g., demographic characteristics). The market size (e.g., target population) between the study site and the policy site should be similar.
- The good, and the magnitude of change in that good, should be similar in the study and policy contexts.
- The relevant characteristics of the study and policy contexts should be similar.
- The distribution of property rights should be similar so that the analysis uses the same welfare measure (i.e., if the property rights in the study context support the use of willingness-to-accept measures while the rights in the rulemaking context support the use of willingness-to-pay measures, benefits transfer is not appropriate).
- The availability of substitutes across study and policy contexts should be similar.

197. According to these criteria, no existing studies are available for transfer of value estimates to the current policy question in order to quantify the value the public would place on actions taken to enhance probability of conservation and recovery of the three plant species.

5.2 POTENTIAL BASELINE AND INCREMENTAL BENEFITS OF CONSERVATION EFFORTS FOR THE THREE ARIZONA PLANTS

198. This section describes the categories of benefits potentially resulting from three Arizona plants conservation efforts within the study area. Exhibit 5-1 summarizes potential benefits associated with the specific conservation efforts for the three Arizona plants described in Chapters 3 and 4 of this report. The first column summarizes the conservation efforts for the three Arizona plants. The second column identifies potential categories of ancillary benefits that may derive from implementation of these conservation efforts. A description of these categories of benefits is provided below. The final column of the exhibit identifies the units in which baseline or incremental benefits may occur.

199. The categories of economic benefit that may derive from conservation efforts for the three Arizona plants described in this report include:

- **Educational benefits:** Surveying and monitoring of project sites for the three Arizona plants confers educational benefits in that more is known about the species and where populations exist. This knowledge could help direct future conservation efforts.
- **Aesthetic benefits:** Social welfare gains may be associated with enhanced aesthetic quality of the habitat. Preferences for aesthetic improvements may be measured through increased willingness-to-pay to visit a habitat region for recreation or increased visitation.

200. The extent to which the education value of critical habitat designation improves the efficacy of future conservation effort for the species is significantly uncertain. The value of these educational benefits would in turn be improved probability of conservation and

recovery for these species. For the reasons described above, available data are not available to monetize this educational benefit.

201. In addition to these categories of potential benefit, all of the conservation efforts described in Exhibit 5-1 are related to the broader conservation and recovery of the species. All conservation efforts therefore relate to the maintenance or enhancement of the use and non-use value (e.g., existence value) that the public may hold specifically for the three Arizona plants. Further, many of the conservation efforts undertaken for the three Arizona plants may also result in improvements to ecosystem health, such as reduced nonnative species, reduced habitat fragmentation, and habitat conservation, which are shared by other, coexisting species. The maintenance or enhancement of use and non-use values for these other species, or for biodiversity in general, may also result from these conservation efforts for the three Arizona plants.

EXHIBIT 5-1. CONSERVATION EFFORTS FOR THE THREE ARIZONA PLANTS AND POTENTIAL ASSOCIATED ANCILLARY BENEFITS

CONSERVATION EFFORT	POTENTIAL ASSOCIATED ANCILLARY BENEFITS	UNITS APPLIED	
		BASELINE BENEFIT	INCREMENTAL BENEFIT
ACUÑA AND FICKEISEN PLAINS CACTI			
Avoid ground disturbing activity within specified distances from individual plants	• No ancillary benefits	Acuña cactus: 3a	None*
Survey and monitoring	• Educational benefits	Acuña cactus: 3a, 5, 6 Fickeisen plains cactus: 1b, 2, 3, 5a, 6a, 6b, 6c, 7, 8a, 8b, 9	Acuña cactus: 4b
Control invasive species	• Aesthetic benefits	Acuña cactus: 3a, 4b	None*
Offset habitat loss or modification	• Aesthetic benefits	Acuña cactus: 1a, 1b	None*
Restrict use of fire retardants or suppressants	• No ancillary benefits	Acuña cactus: 1a, 1b, 2a, 2b, 3a, 4a, 4b, 5, 6 Fickeisen plains cactus: 1a, 1b, 1c, 1d, 2, 3, 4, 5a, 5b, 5c, 5d, 8a	None*
Establish water holes and salt licks in areas that will draw livestock away from plants	• No ancillary benefits	Fickeisen plains cactus: 1a, 1b, 1c, 1d, 2, 3, 4, 5a, 5b, 5c, 5d, 8a	None*
Exclusionary fencing	• No ancillary benefits	Fickeisen plains cactus: 1a, 1b, 1c, 1d, 2, 3, 4, 5a, 5b, 5c, 5d, 8a	None*

CONSERVATION EFFORT	POTENTIAL ASSOCIATED ANCILLARY BENEFITS	UNITS APPLIED	
		BASELINE BENEFIT	INCREMENTAL BENEFIT
Seasonal restriction on grazing	• No ancillary benefits	Fickeisen plains cactus: 1a, 1b, 1c, 1d, 2, 3, 4, 5a, 5b, 5c, 5d, 8a	None*
GIERISCH MALLOW			
Survey and monitoring	• Educational benefits	1, 2	None*
Reclaiming and restoring project sites	• Aesthetic benefits	1, 2	None*
Seed collection and transplanting	• No ancillary benefits	1, 2	None*
Establish water holes and salt licks in areas that will draw livestock away from plants	• No ancillary benefits	1, 2	None*
Exclusionary fencing	• No ancillary benefits	1, 2	None*
Seasonal restriction on grazing	• No ancillary benefits	2	None*
Restrict size or configuration of project	• No ancillary benefits	2	None*

Note:
*If no plants are found within a project site then conservation efforts and related benefits may be considered incremental impacts.

REFERENCES

16 U.S.C. §1533(b)(2).

16 U.S.C. 1532.

175 F. 3d 1027, 1044 (D.C. Cir. 1999).

2 U.S.C. 1531 *et seq.*

2012 Proposed Rule. 77 FR 49894-49919.

2012 Proposed Rule. 77 FR 60510-60579.

36 C.F.R. § 219.9 (2012).

40 FR 27824 as cited in 77 FR 60513.

5 U.S.C. §§601 *et seq.*

64 FR 43255.

73 FR 76251.

773 F. 2d 327 (D.C. Cir. 1985).

Ariz. Rev. Stat. § 3-901 to 3-316.

Ariz. Rev. Stat. § 3-909.

Arizona Cattle Growers v. Salazar, 606 F. 3d 1160 (9th Cir. 2010), cert. denied, 179 L. Ed. 2d 300, 2011 U.S. LEXIS 1362, 79 U.S.L.W. 3475 (2011).

Arizona State Land Department, "Land Department Mission Statement", located at http://www.land.state.az.us/support/missiongoals.htm on December 27, 2012.

Arizona State Land Department, "Native Plant Surveys", accessed at http://www.land.state.az.us/programs/natural/nativePlantSurveys.htm on January 4, 2012.

Arizona State Land Department, "State Land Department Annual Report", FY2010-2011, located at http://www.land.state.az.us/report/report2011_full.pdf, p. 22, on December 27, 2012.

Arizona State Land Department, ASLD Native Plant Survey Protocol Native Plant Fee Structure, accessed at http://www.land.state.az.us/programs/natural/pdfs/Native_Plant_B.pdf on January 4, 2012.

AZ Department of Transportation, Statewide Projects: I-15 Paving Project Virgin River Gorge to Utah State Line, accessed at http://www.azdot.gov/Highways/Projects/I15_VirginRiverGorge_UtahStateLine/index.asp on December 31, 2012.

Center for Biological Diversity et al, Plaintiffs, v. United States Bureau of Land Management et al., Defendants and American Sand Association, et al, Defendant Intervenors. Order re: Cross Motions for Summary Judgment, Case 3:03-cv-02509 Document 174 Filed 03/14/2006, pages 44-45.

Dun and Bradstreet, D&B - Dun's Market Identifiers, searched via Dialog File 516 on January 7, 2013.

Email communication with Byron Lambeth, USDA NRCS AZ State Rangeland Management Specialist, on January 3, 2013.

Email communication with Byron Lambeth, USDA NRCS AZ State Rangeland Management Specialist, on January 15, 2013.

Email communication with Joe Dixon, ASLD Minerals Section Manager, on December 7, 2012.

Energy Fuels Inc., 2012 Annual Information Form, December 20 2012, accessed at http://www.energyfuels.com/_resources/2012_AIF.pdf on January 7, 2013.

Energy Fuels Inc., Consolidated Financial Statements For the Years Ended September 2012 and 2011, accessed at http://www.energyfuels.com/_resources/financials/September_30_2012_Financials.pdf on January 7, 2013.

Executive Order 12866, *Regulatory Planning and Review*, September 30, 1993.

Executive Order 13211, *Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use*, May 18, 2001.

Executive Order 13563, *Improving Regulation and Regulatory Review*, January 18, 2011.

Gifford Pinchot Task Force v. United States Fish and Wildlife Service, 378 F.3d 1059 (9th Cir. 2004); *Sierra Club v. U. S. Fish and Wildlife Service*, 245 F.3d 434 (5th Cir. 2001).

Gramlich, Edward M., A Guide to Benefit-Cost Analysis (2nd Ed.), Prospect Heights, Illinois: Waveland Press, Inc., 1990.

Home Builders Association of Northern California v. United States Fish and Wildlife Service, 616 F.3d 983 (9th Cir. 2010), cert. denied, 179 L. Ed 2d 301, 2011 U.S. Lexis 1392, 79 U.S.L.W. 3475 (2011).

"Memorandum of Understanding Among U.S. Department of Homeland Security and U.S. Department of the Interior and U.S. Department of Agriculture Regarding Cooperative National Security and Counterterrorism Efforts on Federal Lands along the United States' Borders", March 2006, available at http://www.cis.org/articles/2010/mou.pdf.

Navajo Nation Code 17 N. N. C. § 507, as cited in Navajo Nation Department of Fish and Wildlife and Department of Justice, in cooperation with the U.S. Fish and

Wildlife Service, "Navajo Nation Fickeisen Plains Cactus Management Plant", December 2012, p. 6. Accessible on the public docket.

Navajo Nation Department of Fish and Wildlife and Department of Justice, in cooperation with the U.S. Fish and Wildlife Service, "Navajo Nation Fickeisen Plains Cactus Management Plant", December 2012, p. 16. Accessible on the public docket.

New Mexico Cattle Growers Assn. v. United States Fish and Wildlife Service, 248 F.3d 1277 (10th Cir. 2001).

Personal communication with Andrea Hazelton, Botanist, Navajo Nation Department of Fish and Wildlife, on December 20, 2012.

Personal communication with Andrea Hazelton, Botanist, Navajo Nation Department of Fish and Wildlife, on February 1, 2013.

Personal communication with Barbara Phillips, North Kaibab Ranger District Botanist, on December 17, 2012.

Personal communication with Bill Barger, Director Mining Operations at Georgia-Pacific LLC, on January 25, 2013.

Personal communication with Calvert Curley, Natural Resources Manager, Bureau of Indian Affairs, February 4, 2013.

Personal communication with Dustin Burger, North Kaibab Ranger District Management Specialist, on December 18, 2012.

Personal communication with Joe Dixon, ASLD Minerals Section Manager, on December 7, 2012.

Personal communication with Jonathan Andrew, DOI Liaison to CBP, on November 16, 2012.

Personal communication with Karen Howe, Ecologist, Wildlife and Vegetation Management Program, Tohono O'odham Nation, December 7, 2012.

Personal communication with Karen Howe, Ecologist, Wildlife and Vegetation Management Program, Tohono O'odham Nation, February 6, 2013.

Personal communication with Kristin Gade, ADOT, on December 20, 2012.

Personal communication with Nevada Department of Transportation on December 13, 2011, with regard to assessing costs for flycatcher conservation measures.

Personal communication with Richard Whittle, Wildlife Biologist, 56th Range Management Office, on December 7, 2012.

Personal communication with Richard Whittle, Wildlife Biologist, 56th Range Management Office, on February 5, 2013.

Personal communication with the Service on September 25, 2012.

Personal communication with the U.S. Fish and Wildlife Service, Region 2 Field Office, on November 15, 2012.

Personal communication with Tim Hughes, AZ BLM Endangered Species Coordinator, December 27, 2012.

Personal communication with U.S. Fish and Wildlife Service biologist, October 18, 2012.

Personal communication with U.S. Fish and Wildlife Service Southwest (Region 2) Field Office, on January 2, 2013.

Personal communication with U.S. Fish and Wildlife Service biologist, January 22, 2013.

Pub Law No. 104-121.

Public comment from Hogan Lovells US LLP, on behalf of Georgia-Pacific, "Comments to Proposed Rule 'Endangered and Threatened Wildlife and Plants; Determination Status for the Gierisch Mallow and Designation of Critical Habitat'," October 16, 2012.

Public comment letter from Darrel Williams, General Manager, Western Mining and Minerals, Inc., Vice President, U.S. Board of Operations, CertainTeed Gypsum, Inc., "Official Comments on Proposal to give Arizona-Utah Plant Endangered Species Protection", October 16, 2012.

Public comment letter submitted by the Navajo Nation Department of Justice on November 30, 2012.

Public comment letter submitted by U.S. Department of Defense, Department of the Air Force, Air Education and Training Command, "Proposed Rule to List *Echinomastus erectocentrus var. acunensis* (acuña cactus) as an Endangered Species with Critical Habitat", on November 30, 2012.

Public comment letter submitted from the Tohono O'odham Nation Office of the Chairman and Vice Chairwoman, on November 30, 2012.

Richardson, L. and J. Loomis. March 2009. The Total Economic Value of Threatened, Endangered, and Rare Species: An Updated Meta-Analysis. Ecological Economics 68(5): 1535-1548.

Saint-Gobain 2011 Annual Report, accessed at http://www.saint-gobain.com/files/Saint-Gobain-annual-report-2011.pdf on January 7, 2013.

Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act, pg. 20.

Tribal Energy and Environmental Information Clearinghouse, *Tribal and Indian Lands: Definitions of common terminology related to tribal and Indian land ownership*, accessed at http://teeic.anl.gov/triballand/index.cfm on February 8, 2013.

U.S. Bureau of Land Management, "Arizona Strip Field Office Resource Management Plan Record of Decision and Approved RMP, February 2008, accessed at

http://www.blm.gov/pgdata/etc/medialib/blm/az/pdfs/nepa/library/resource_management/ASFO_ROD.Par.32020.File.dat/complete.pdf.

U.S. Bureau of Land Management, "Fact Sheet on the BLM's Management of Livestock Grazing", November 2012, accessed on January 7, 2013 at http://www.blm.gov/wo/st/en/prog/grazing.html.

U.S. Bureau of Land Management, "Special Status Species Policy Manual #6840", 2008, accessed at http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.43545.File.dat/6840.pdf as of December 28, 2012.

U.S. Bureau of Land Management, Arizona Statewide Land Use Plan Amendment for Fire, Fuels and Air Quality Management, March 2004, p. D-12, accessed at http://www.blm.gov/pgdata/etc/medialib/blm/az/pdfs/nepa/library/fuels.Par.64623.File.dat/fire_ea.pdf.

U.S. Department of Agriculture, Forest Service, January 2005, "Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds: Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mojave, and Yavapai Counties, Arizona."

U.S. Department of the Interior, Bureau of Land Management, Lower Sonoran Field Office, September 2012, "Sonoran Desert National Monument Record of Decision & Approved Resource Management Plan."

U.S. Department of the Interior, Fish and Wildlife Service, Biological Opinion for the Tactical Infrastructure Maintenance and Repair Program (TIMR) along the U.S./Mexican international border in Arizona (02EAAZOO-2012-F-0170), November 6, 2012.

U.S. Environmental Protection Agency, Guidelines for Preparing Economic Analyses, EPA 240-R-00-003, September 2000, available at http://yosemite.epa.gov/ee/epa/eed.nsf/ webpages/Guidelines.html.

U.S. Fish and Wildlife Service, "Biological Opinion for the Arizona Strip Resource Management Plan," November 7, 2007.

U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 10, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Acuña Cactus and the Fickeisen Plains Cactus," p. 9. See Appendix B.

U.S. Fish and Wildlife Service to Industrial Economics, Inc. September 14, 2012. "Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for Gierisch Mallow," p. 5-6. See Appendix C.

U.S. Fish and Wildlife Service, "Habitat Conservation Plans Under the Endangered Species Act," April 2011, accessed at http://www.fws.gov/endangered/esa-library/pdf/hcp.pdf.

U.S. Fish and Wildlife Service, Service Manual, Part 640 (640 FW 1). Accessed at http://www.fws.gov/policy/640fw1.html on January 5, 2012.

U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf.

U.S. Office of Management and Budget, February 7. 2011. "Regulatory Impact Analysis: Frequently Asked Questions (FAQs)." Accessed on May 3, 2011 by http://www.whitehouse.gov/sites/default/files/omb/circulars/a004/a-4_FAQ.pdf.

U.S. Office of Management and Budget. 2001. Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing E.O. 13211, M-01-27, July 13, 2001, http://www.whitehouse.gov/omb/memoranda/m01-27.html.

U.S. Office of Personnel Management, 2011, Federal Government Schedule Rates, Office of Personnel Management.

USDA, National Agricultural Statistics Service. 2007 Census of Agriculture. Volume 1, Chapter 2: County Level Data, Table 1. County Summary Highlights: 2007 and Table 11. Cattle and Calves - Inventory and Sales: 2007 and 2002.

USGS, National Gap Analysis Program, Protected Areas Database (PAD-US), accessed September 25, 2012 at http://gapanalysis.usgs.gov/padus/.

Utah SGID (State Geographic Information Database), "SGID93.TRANSPORTATION.Roads", accessed September 27, 2012.

Written communication with Lee Baiza, Superintendent, Organ Pipe Cactus National Monument, on November 28, 2012.

APPENDIX A | ADDITIONAL STATUTORY REQUIREMENTS

202. This appendix addresses the remaining analytical requirements under administrative law and executive order. Section A.1 presents an analysis of impacts to small entities which is conducted pursuant to the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 and Executive Order 13272. Section A.2 assesses the effects of the Proposed Rule on State, local, and Tribal governments and the private sector as required by Title II of the Unfunded Mandates Reform Act of 1995 (UMRA). Section A.3 addresses the potential for federalism concerns as required by Executive Order 13132. And Section A.4 considers potential impacts to the energy industry in response to Executive Order 13211, entitled, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use."

203. The analyses in this appendix rely on the estimated incremental impacts resulting from the proposed critical habitat designations. The incremental impacts of the rulemaking are most relevant for these analyses because they reflect costs that may be avoided or reduced based on decisions regarding the composition of the final rule.

A.1 RFA/SBREFA ANALYSIS

A.1.1 BACKGROUND AND FRAMEWORK FOR THE THRESHOLD ANALYSIS

204. When a Federal agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions as defined by the RFA).[203] No initial regulatory flexibility analysis is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the RFA to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have significant economic impact on a substantial number of small entities. To assist in this process, this appendix provides a screening level analysis of the potential for plant critical habitat to affect small entities.

205. To ensure broad consideration of impacts on small entities, the Service has prepared this small business analysis without first making the threshold determination in the proposed rule regarding whether the proposed critical habitat designations could be certified as not having a significant economic impact on a substantial number of small entities. This small business analysis will therefore inform the Service's threshold determination.

206. This analysis is intended to improve the Service's understanding of the potential effects of the proposed rules on small entities and to identify opportunities to minimize these

[203] 5 U.S.C. § 601 et seq.

impacts in the final rulemaking. The Act requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable. Section 4(b)(2) of the Act requires that the Service designate critical habitat "on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impacts, of specifying any particular area as critical habitat." This section grants the Secretary [of the Interior] discretion to exclude any area from critical habitat if (s)he determines "the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat". However, the Secretary may not exclude an area if it "will result in the extinction of the species."

207. Three types of small entities are defined in the RFA:

- **Small Business -** Section 601(3) of the RFA defines a small business as having the same meaning as small business concern under section 3 of the Small Business Act. This includes any firm that is independently owned and operated and is not dominant in its field of operation. The Small Business Administration (SBA) has developed size standards to carry out the purposes of the Small Business Act, and those size standards can be found in 13 CFR 121.201. The size standards are matched to North American Industry Classification System (NAICS) industries. The SBA definition of a small business applies to a firm's parent company and all affiliates as a single entity.
- **Small Governmental Jurisdiction -** Section 601(5) defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. Special districts may include those servicing irrigation, ports, parks and recreation, sanitation, drainage, soil and water conservation, road assessment, etc. When counties have populations greater than 50,000, those municipalities of fewer than 50,000 can be identified using population reports. Other types of small government entities are not as easily identified under this standard, as they are not typically classified by population.
- **Small Organization -** Section 601(4) defines a small organization as any not-for-profit enterprise that is independently owned and operated and not dominant in its field. Small organizations may include private hospitals, educational institutions, irrigation districts, public utilities, agricultural co-ops, etc.

208. The courts have held that the RFA/SBREFA requires Federal agencies to perform a regulatory flexibility analysis of forecast impacts to small entities that are directly regulated. In the case of *Mid-Tex Electric Cooperative, Inc., v. Federal Energy Regulatory Commission (FERC),* FERC proposed regulations affecting the manner in which generating utilities incorporated construction work in progress in their rates. The generating utilities that expected to be regulated were large businesses; however, their customers -- transmitting utilities such as electric cooperatives -- included numerous small entities. In this case, the court agreed that FERC simply authorized large electric generators to pass these costs through to their transmitting and retail utility customers,

and FERC could therefore certify that small entities were not directly impacted within the definition of the RFA.[204]

209. Similarly, *American Trucking Associations, Inc. v. Environmental Protection Agency* (EPA) addressed a rulemaking in which EPA established a primary national ambient air quality standard for ozone and particulate matter.[205] The basis of EPA's RFA/SBREFA certification was that this standard did not directly regulate small entities; instead, small entities were indirectly regulated through the implementation of State plans that incorporated the standards. The court found that, while EPA imposed regulation on States, it did not have authority under this rule to impose regulations directly on small entities and therefore small entities were not directly impacted within the definition of the RFA.

210. The SBA in its guidance on how to comply with the RFA recognizes that consideration of indirectly affected small entities is not required by the RFA, but encourages agencies to perform a regulatory flexibility analysis even when the impacts of its regulation are indirect.[206] "If an agency can accomplish its statutory mission in a more cost-effective manner, the Office of Advocacy [of the SBA] believes that it is good public policy to do so. The only way an agency can determine this is if it does not certify regulations that it knows will have a significant impact on small entities even if the small entities are regulated by a delegation of authority from the Federal agency to some other governing body."[207]

211. The regulatory mechanism through which critical habitat protections are realized is section 7 of the Act, which directly regulates only those activities carried out, funded, or permitted by a Federal agency. By definition, Federal agencies are not considered small entities, although the activities they may fund or permit may be proposed or carried out by small entities. Given the SBA guidance described above, this analysis considers the extent to which these designations could potentially affect small entities, regardless of whether these entities would be directly regulated by the Service through the proposed rule or by a delegation of impact from the directly regulated Federal agency. However, while it considers businesses that may be affected indirectly, it forecasts impacts only to those entities for which the regulatory link would not be measurably diluted.

A.1.2 SUMMARY OF IMPACTS TO SMALL ENTITIES

Acuña Cactus and Fickeisen Plains Cactus

212. Of the activities affected by the proposed designation for the cacti, none are expected to incur incremental costs to third party small entities. The forecast consultations either do not include third parties (programmatic consultations, intra-Service consultations, and

[204] 773 F. 2d 327 (D.C. Cir. 1985).

[205] 175 F. 3d 1027, 1044 (D.C. Cir. 1999).

[206] Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act, pg. 20.

[207] *Ibid.*, pg. 21.

consultations with another Federal agency) or the third parties are not considered small entities (consultations with the ADOT and the Tribes).

Gierisch Mallow

213. Of the activities potentially affected by the proposed mallow designation, none are expected to incur costs to third party small entities. The forecast consultations either do not include third parties (programmatic consultations and consultations with another Federal agency) or the third parties are not considered small entities (consultations with the ADOT and Western Mining Minerals Inc.).

A.1.3 ANALYSIS OF IMPACTS TO SMALL ENTITIES

214. As described in Chapters 3 and 4, activities that may be affected by the designations include: uranium and gypsum mining, livestock grazing, Barry M. Goldwater Range operations, U.S.-Mexican border security, Tohono O'odham and Navajo Nation Reservation activities, Kaibab National Forest activities, BLM management activities, Partners for Fish & Wildlife projects, and transportation construction and maintenance projects. We do not expect critical habitat designation to result in impacts to small entities for the following activities:

- *Gypsum Mining.* Section 4.3.1 of this analysis discusses the potential for mallow critical habitat to affect gypsum mining. One mine (Black Rock Mine) operating on BLM-managed land is expected to undergo consultation to address impacts to mallow and its critical habitat. The operating company, Western Mining Minerals, Inc., is a subsidiary of Saint-Gobain. The small business threshold for the NAICS code corresponding to gypsum mining (212399, All Other Nonmetallic Mineral Mining) is 500 employees. Saint-Gobain employs multiple thousands of people, and therefore is not considered small.[208]

  Georgia-Pacific also conducts gypsum mining operations in proposed mallow habitat, however, the company operates on ASLD managed land where no Federal nexus exists and all potential impacts resulting from mallow conservation are considered to be baseline impacts.

- *Activities on Tohono O'odham and Navajo Nation Reservation Land*. Sections 3.3.4 and 3.4.5 and of this analysis discuss the potential for cacti habitat to affect tribal activities. A number of activities on tribal land are expected to generate section 7 consultations with BIA and the Tribes acting as a third party. However, the Tribes are not considered to be small entities.

- *Transportation Construction and Maintenance.* Sections 3.3.5, 3.4.6, and 4.3.4 of this analysis discuss the potential for cacti and mallow habitat designation to affect transportation activities. Administrative costs of consultations on road and bridge construction and maintenance are expected to be borne by the Service, the

[208] Saint-Gobain 2011 Annual Report, accessed at http://www.saint-gobain.com/files/Saint-Gobain-annual-report-2011.pdf on January 7, 2013.

FHWA, and the ADOT. Therefore, no incremental impacts to small entities are anticipated related to these consultations.

215. A number of activities discussed in Chapters 3 and 4 will not involve third parties in section 7 consultation, including: consultations between the BLM and the Service on livestock grazing, a State Land Use Amendment, and RMPs; consultations between the USFS and the Service related to management plans and programs in the Kaibab National Forest; consultation between CBP and the Service on U.S.-Mexican border activity; intra-Service consultation on the Partners for Fish and Wildlife Program; and, the cost of conducting plant surveys on the Barry M. Goldwater Range incurred by the DOD. Because these consultations do not involve third parties, no impacts to small entities are expected related to these consultations and conservation efforts.

216. Estimated incremental costs that may be borne by small entities consist of administrative impacts of section 7 consultation related to uranium mining. This analysis forecasts one formal consultation for mining operations at EZ Mine, operated by Energy Fuels Inc., to address potential impacts to Fickeisen plains cactus critical habitat. The small business threshold for the NAICS code corresponding to uranium mining (212291, Uranium-Radium-Vanadium Ore Mining) is 500 employees. Energy Fuels Inc. employs approximately 370 people and is therefore considered small.[209] Energy Fuels Inc. reported revenues of over $25 million for fiscal year 2012.[210] The one consultation will result in impacts to Energy Fuels Inc. of approximately $900 on a present value basis, or approximately $80 on an annualized basis, which constitutes an impact of less than one-tenth of a percent of annual revenues.

A.2 UMRA ANALYSIS

217. Title II of UMRA requires agencies to assess the effects of their regulatory actions on State, local, and Tribal governments and the private sector.[211] Under Section 202 of UMRA, the Service must prepare a written statement, including a cost-benefit analysis, for rules that may result in the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector, of $100 million or more in any one year. If a written statement is needed, Section 205 of UMRA requires the Service to identify and consider a reasonable number of regulatory alternatives. The Service must adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule, unless the Secretary publishes an explanation of why that alternative was not adopted. The provisions of Section 205 do not apply when they are inconsistent with applicable law.

218. As stated in each of the Proposed Rules, "the designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties.

[209] Energy Fuels Inc., 2012 Annual Information Form, December 20 2012, accessed at http://www.energyfuels.com/_resources/2012_AIF.pdf on January 7, 2013.

[210] Energy Fuels Inc., Consolidated Financial Statements For the Years Ended September 2012 and 2011, accessed at http://www.energyfuels.com/_resources/financials/September_30_2012_Financials.pdf on January 7, 2013.

[211] 2 U.S.C. 1531 et seq.

Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency."[212] Therefore, this rule does not place an enforceable duty upon State, local, or Tribal governments, or the private sector.

A.3 FEDERALISM IMPLICATIONS

219. Executive Order 13132, entitled "Federalism," requires the Service to develop an accountable process to ensure "meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications."[213] "Policies that have federalism implications" are defined in the Executive Order to include regulations that have "substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government."[214] Under Executive Order 13132, the Service may not issue a regulation that has federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by State and local governments, or the Service consults with State and local officials early in the process of developing the regulation.

220. These Proposed Rules do not have direct federalism implications. The designation of critical habitat directly affects only the responsibilities of Federal agencies. As a result, the Proposed Rules do not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in the Order.

221. State or local governments may be indirectly affected by the proposed designation if they require Federal funds or formal approval or authorization from a Federal agency as a prerequisite to conducting an action. In these cases, the State or local government agency may participate in the section 7 consultation as a third party. Incremental economic impacts of the designation will likely be limited to minor additional administrative costs to the Service, Federal agencies and third parties of considering critical habitat as part of the forecast section 7 consultations. Therefore, the proposed revision of critical habitat is also not expected to have substantial indirect impacts on State or local governments.

A.4 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

222. Pursuant to Executive Order No. 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," issued May 18, 2001, Federal

[212] 77 FR 60564; 77 FR 49915.

[213] 64 FR 43255.

[214] *Ibid*.

agencies must prepare and submit a "Statement of Energy Effects" for all "significant energy actions." The purpose of this requirement is to ensure that all Federal agencies "appropriately weigh and consider the effects of the Federal Government's regulations on the supply, distribution, and use of energy."[215]

223. The Office of Management and Budget provides guidance for implementing this Executive Order, outlining nine outcomes that may constitute "a significant adverse effect" when compared with the regulatory action under consideration:

- Reductions in crude oil supply in excess of 10,000 barrels per day (bbls);
- Reductions in fuel production in excess of 4,000 barrels per day;
- Reductions in coal production in excess of 5 million tons per year;
- Reductions in natural gas production in excess of 25 million Mcf (1,000 cubic feet) per year;
- Reductions in electricity production in excess of 1 billion kilowatts-hours per year or in excess of 500 megawatts of installed capacity;
- Increases in energy use required by the regulatory action that exceed the thresholds above;
- Increases in the cost of energy production in excess of one percent;
- Increases in the cost of energy distribution in excess of one percent; or
- Other similarly adverse outcomes.[216]

224. As described in Chapter 3, critical habitat designation for the Fickeisen plains cactus is anticipated to affect uranium mining. Impacts to uranium mining, however, are limited to the administrative costs of one formal consultation for the EZ Mine, totaling less than $900 in costs for the managing company, Energy Fuels Inc., over the 20 year period of analysis. The magnitude of these consultation costs is not anticipated to reduce fuel production or energy production, or increase the cost of energy production or distribution in the Unites States in excess of one percent. Thus, none of the nine threshold levels of impact listed above is exceeded.

[215] Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing E.O. 13211, M-01-27, Office of Management and Budget, July 13, 2001, http://www.whitehouse.gov/omb/memoranda/m01-27.html.

[216] *Ibid.*

APPENDIX B | SENSITIVITY OF RESULTS TO DISCOUNT RATE

225. Exhibits B-1 through B-8 of this appendix summarize the costs of plant conservation quantified in Chapters 3 and 4 of this report assuming an alternative real discount rate of three percent (the main text of the report assumes a real discount rate of seven percent).

226. This appendix also summarizes undiscounted impacts by year. These details are provided in accordance with OMB guidelines for developing benefit and cost estimates. OMB directs the analysis to: "include separate schedules of the monetized benefits and costs that show the type and timing of benefits and costs, and express the estimates in this table in constant, undiscounted dollars."[217] These results are presented in Exhibits B-9 through B-12.

[217] Office of Management and Budget, Circular A-4, September 17, 2003, p. 18. The reference to "constant" dollars indicates that the effects of general price level inflation (the tendency of all prices to increase over time) should be removed through the **use of an inflation adjustment index.**

EXHIBIT B-1. SUMMARY OF TOTAL ESTIMATED INCREMENTAL IMPACTS BY SUBUNIT FOR THE ACUÑA CACTUS AND FICKEISEN PLAINS CACTUS (2013-2023, 2013$, THREE PERCENT DISCOUNT RATE)

UNIT/SUBUNIT			INCREMENTAL IMPACTS
ACUNA CACTUS			
1a	Organ Pipe Cactus NM	Dripping Spring	$2,500
1b		Acuña Valley	$2,500
2a	Ajo	Ajo Townsites	$11,000
2b		Little Ajo Mountains	$4,700
3a	Sauceda Mountains	Coffeepot Mountain	$3,400
3b		Cimarron Mountain	$200
4a	Sand Tank Mountains	Javelina Mountain	$1,600
4b		Sand Tank Mountain	$24,000
5	Mineral Mountain	Mineral Mountain	$2,200
6	Box O Wash	Box O Wash	$8,200
		Acuña Cactus Subtotal	*$60,000*
FICKEISEN PLAINS CACTUS			
PROPOSED CRITICAL HABITAT			
1a	Hurricane Cliffs	Dutchman Draw	$3,100
1b		Salaratus Draw	$3,100
1c		Temple Trail	$1,700
1d		Toquer Tank	$1,700
2	Sunshine Ridge	Sunshine Ridge	$7,200
3	Clayhole Valley	Clayhole Ridge	$1,700
4	Snake Gulch	Snake Gulch	$7,100
5a	House Rock Valley	Beanhole Well	$2,200
5b		North Canyon Wash	$1,700
5c		Marble Canyon	$1,700
5d		South Canyon	$1,700
8a	Gray Mountain	Mays Wash	$1,300
8b		Gray Mountain	$7,100
9	Cataract Canyon	Cataract Canyon	$1,400
		Fickeisen Plains Cactus Areas Proposed Subtotal	*$42,000*
CONSIDERED FOR EXCLUSION			
6a	Tiger Wash	Tiger Wash 1	$4,000
6b		Tiger Wash 2	$4,000
6c		Shinumo Wash	$1,500
7	Little Colorado River Overlook	Little Colorado River Overlook	$12,000
8b	Gray Mountain	Gray Mountain	$1,500
		Fickeisen Plains Cactus Areas Considered for Exclusion Subtotal	*$23,000*
		Fickeisen Plains Cactus Subtotal	*$66,000*
		Grand Total	**$130,000**

Notes: 1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year (Year 0) of 2013 for present value calculations using costs estimated in 2013 dollars.

EXHIBIT B-2. SUMMARY OF PRESENT VALUE INCREMENTAL IMPACTS BY SUBUNIT IN PROPOSED ACUÑA CACTUS CRITICAL HABITAT (2013-2023, 2013$, THREE PERCENT DISCOUNT RATE)

UNIT/SUBUNIT			TOTAL	REASON FOR COST
1a	Organ Pipe Cactus NM	Dripping Spring	$2,500	Consultation on TIMR
1b		Acuña Valley	$2,500	Consultation on TIMR
2a	Ajo	Ajo Townsites	$11,000	Consultation on BLM RMPs Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing Technical assistance on annual ADOT ROW maintenance Programmatic consultation on Partners for Fish & Wildlife Programs
2b		Little Ajo Mountains	$4,700	Consultation on BLM RMPs Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing Programmatic consultation on Partners for Fish & Wildlife Programs
3a	Sauceda Mountains	Coffeepot Mountain	$3,400	Consultation on BLM RMPs Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing Technical assistance on Tohono O'odham Management Plan
3b		Cimarron Mountain	$200	Technical Assistance on Tohono O'odham Management Plan
4a	Sand Tank Mountains	Javelina Mountain	$1,600	Consultation on BLM RMPs Consultation on BLM State Land Use Plan Amendment
4b		Sand Tank Mountain	$24,000	Consultation on BLM RMPs Consultation on BLM State Land Use Plan Amendment BMGR Survey Costs
5	Mineral Mountain	Mineral Mountain	$2,200	Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing
6	Box O Wash	Box O Wash	$8,200	Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing NRCS statewide programmatic consultation Programmatic consultation on Partners for Fish & Wildlife Programs
TOTAL			**$60,000**	

Notes:
1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year (Year 0) of 2013 for present value calculations using costs estimated in 2013 dollars.

EXHIBIT B-3. SUMMARY OF PRESENT VALUE INCREMENTAL IMPACTS BY SUBUNIT IN PROPOSED FICKEISEN PLAINS CACTUS CRITICAL HABITAT (2013-2023, 2013$, THREE PERCENT DISCOUNT RATE)

UNIT/SUBUNIT			TOTAL	REASON FOR COST
PROPOSED CRITICAL HABITAT				
1a	Hurricane Cliffs	Dutchman Draw	$3,100	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing NRCS statewide programmatic consultation Programmatic consultation on Partners for Fish & Wildlife Programs
1b		Salaratus Draw	$3,100	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing NRCS statewide programmatic consultation Programmatic consultation on Partners for Fish & Wildlife Programs
1c		Temple Trail	$1,700	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing
1d		Toquer Tank	$1,700	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing
2	Sunshine Ridge	Sunshine Ridge	$7,200	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing NRCS statewide programmatic consultation Consultation on EZ Mine
3	Clayhole Valley	Clayhole Ridge	$1,700	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing
4	Snake Gulch	Snake Gulch	$7,100	Consultations on Kaibab NF Management
5a	House Rock Valley	Beanhole Well	$2,200	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing NRCS statewide programmatic consultation
5b		North Canyon Wash	$1,700	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing
5c		Marble Canyon	$1,700	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing
5d		South Canyon	$1,700	Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Statewide programmatic consultation on BLM grazing
8a	Gray Mountain	Mays Wash	$1,300	Consultation on BLM State Land Use Plan Amendment Programmatic consultation on Partners for Fish & Wildlife Programs
8b		Gray Mountain	$7,100	Annual ADOT ROW maintenance Programmatic consultation on Partners for Fish & Wildlife Programs

UNIT/SUBUNIT			TOTAL	REASON FOR COST
9	Cataract Canyon	Cataract Canyon	$1,400	NRCS statewide programmatic consultation Programmatic consultation on Partners for Fish & Wildlife Programs
		SUBTOTAL	**$42,000**	
CONSIDERED FOR EXCLUSION				
6a	Tiger Wash	Tiger Wash 1	$4,000	Consultation on Navajo development projects and grazing NRCS statewide programmatic consultation
6b		Tiger Wash 2	$4,000	Consultation on Navajo development projects and grazing NRCS statewide programmatic consultation
6c		Shinumo Wash	$1,500	Consultation on Navajo grazing NRCS statewide programmatic consultation
7	Little Colorado River Overlook	Little Colorado River Overlook	$12,000	Consultation on Navajo development projects and grazing Annual ADOT ROW Maintenance
8b	Gray Mountain	Gray Mountain	$1,500	Consultation on Navajo grazing NRCS statewide programmatic consultation
		SUBTOTAL	**$23,000**	
		TOTAL	**$66,000**	

Notes:
1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year (Year 0) of 2013 for present value calculations using costs estimated in 2013 dollars.

EXHIBIT B-4. SUMMARY OF PRESENT VALUE IMPACTS BY UNIT IN PROPOSED GIERISCH MALLOW HABITAT (2013-2032, 2013$, THREE PERCENT DISCOUNT RATE)

UNIT		BASELINE	INCREMENTAL	REASON FOR COST
1	Starvation Point	$270,000	$31,000	Technical assistance on Georgia-Pacific Mine Statewide programmatic consultations on BLM grazing Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment
2	Black Knolls	$550,000	$28,000	Consultation on Black Rock Mine Statewide programmatic consultation on BLM grazing Consultation on AZ Strip RMP Consultation on BLM State Land Use Plan Amendment Annual technical assistance on ADOT ROW maintenance Consultation on ADOT I-15 widening project
	Total	**$820,000**	**$59,000**	

Notes:
1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year (Year 0) of 2013 for present value calculations using costs estimated in 2013 dollars.

EXHIBIT B-5. IMPACTS TO MINING IN PROPOSED GIERISCH MALLOW HABITAT (2013-2032, 2013$, THREE PERCENT DISCOUNT RATE)

UNIT		BASELINE IMPACTS	INCREMENTAL IMPACTS
1	Starvation Point	$74,000	$380
2	Black Knolls	$71,000	$4,700
	Total	**$140,000**	**$5,100**

Notes:
1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year (Year 0) of 2013 for present value calculations using costs estimated in 2013 dollars.

EXHIBIT B-6. IMPACTS TO GRAZING IN PROPOSED GIERISCH MALLOW HABITAT (2013-2032, 2013$, THREE PERCENT DISCOUNT RATE)

UNIT		BASELINE IMPACTS	INCREMENTAL IMPACTS
1	Starvation Point	$170,000	$24,000
2	Black Knolls	$300,000	$7,900
	Total	**$480,000**	**$31,000**

Notes:
1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year (Year 0) of 2013 for present value calculations using costs estimated in 2013 dollars.

EXHIBIT B-7. IMPACTS ASSOCIATED WITH BLM LAND MANAGEMENT ACTIVITIES IN PROPOSED GIERISCH MALLOW HABITAT (2013-2032, 2013$, THREE PERCENT DISCOUNT RATE)

UNIT		BASELINE IMPACTS	INCREMENTAL IMPACTS
1	Starvation Point	$20,000	$6,700
2	Black Knolls	$20,000	$6,700
	Total	**$40,000**	**$13,000**

Notes:
1. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
2. For this cost analysis, we assume a base year of 2013 for present value calculations using costs estimated in 2013 dollars.

EXHIBIT B-8. IMPACTS TO TRANSPORTATION IN PROPOSED GIERISCH MALLOW HABITAT (2013-2032, 2013$, THREE PERCENT DISCOUNT RATE)

UNIT		BASELINE IMPACTS	INCREMENTAL IMPACTS
1	Starvation Point	$0	$0
2	Black Knolls	$160,000	$8,600
	Total	**$160,000**	**$8,600**

Notes:
1. Baseline project modification costs assume one full time employee for one week, annually, for ROW monitoring for the period of analysis, and one full time employee for three months (60 work days) for I-15 widening.
2. The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.
3. For this cost analysis, we assume a base year (Year 0) of 2013 for present value calculations using costs estimated in 2013 dollars.

EXHIBIT B-9. UNDISCOUNTED INCREMENTAL IMPACTS IN PROPOSED ACUÑA CACTUS HABITAT (2013-2032, 2013$)

YEAR	BORDER ACTIVITIES	BLM/GRAZING	TOHONO O'ODHAM ACTIVITIES	TRANSPORTATION	BMGR ACTIVITIES	PARTNERS FOR FISH & WILDLIFE	TOTAL
2013	$5,000	$14,000	$410	$410	$23,000	$4,500	$47,000
2014	$0	$2,500	$0	$410	$0	$0	$2,900
2015	$0	$0	$0	$410	$0	$0	$410
2016	$0	$0	$0	$410	$0	$0	$410
2017	$0	$0	$0	$410	$0	$0	$410
2018	$0	$0	$0	$410	$0	$0	$410
2019	$0	$0	$0	$410	$0	$0	$410
2020	$0	$0	$0	$410	$0	$0	$410
2021	$0	$0	$0	$410	$0	$0	$410
2022	$0	$0	$0	$410	$0	$0	$410
2023	$0	$4,500	$0	$410	$0	$0	$4,900
2024	$0	$2,500	$0	$410	$0	$0	$2,900
2025	$0	$0	$0	$410	$0	$0	$410
2026	$0	$0	$0	$410	$0	$0	$410
2027	$0	$0	$0	$410	$0	$0	$410
2028	$0	$0	$0	$410	$0	$0	$410
2029	$0	$0	$0	$410	$0	$0	$410
2030	$0	$0	$0	$410	$0	$0	$410
2031	$0	$0	$0	$410	$0	$0	$410
2032	$0	$0	$0	$410	$0	$0	$410

EXHIBIT B-10. UNDISCOUNTED INCREMENTAL IMPACTS IN PROPOSED FICKEISEN PLAINS CACTUS HABITAT (2013-2032, 2013$)

YEAR	BLM/ GRAZING	NAVAJO NATION ACTIVITIES	URANIUM MINING	KAIBAB NF	TRANSPORTATION	PARTNERS FOR FISH & WILDLIFE	TOTAL
2013	$12,000	$17,000	$5,000	$7,100	$810	$4,500	$46,000
2014	$2,500	$0	$0	$0	$810	$0	$3,300
2015	$0	$0	$0	$0	$810	$0	$810
2016	$0	$0	$0	$0	$810	$0	$810
2017	$0	$0	$0	$0	$810	$0	$810
2018	$0	$0	$0	$0	$810	$0	$810
2019	$0	$0	$0	$0	$810	$0	$810
2020	$0	$0	$0	$0	$810	$0	$810
2021	$0	$0	$0	$0	$810	$0	$810
2022	$0	$0	$0	$0	$810	$0	$810
2023	$4,500	$0	$0	$0	$810	$0	$5,300
2024	$2,500	$0	$0	$0	$810	$0	$3,300
2025	$0	$0	$0	$0	$810	$0	$810
2026	$0	$0	$0	$0	$810	$0	$810
2027	$0	$0	$0	$0	$810	$0	$810
2028	$0	$0	$0	$0	$810	$0	$810
2029	$0	$0	$0	$0	$810	$0	$810
2030	$0	$0	$0	$0	$810	$0	$810
2031	$0	$0	$0	$0	$810	$0	$810
2032	$0	$0	$0	$0	$810	$0	$810

EXHIBIT B-11. UNDISCOUNTED BASELINE IMPACTS IN PROPOSED GIERISCH MALLOW HABITAT (2013-2032, 2013$)

YEAR	GYPSUM MINING	GRAZING	BLM LAND MANAGEMENT	TRANSPORTATION	TOTAL
2013	$0	$440,000	$15,000	$71,000	$520,000
2014	$0	$0	$15,000	$6,000	$21,000
2015	$150,000	$0	$0	$6,000	$160,000
2016	$0	$0	$0	$6,000	$6,000
2017	$0	$0	$0	$6,000	$6,000
2018	$0	$0	$0	$6,000	$6,000
2019	$0	$0	$0	$6,000	$6,000
2020	$0	$0	$0	$6,000	$6,000
2021	$0	$0	$0	$6,000	$6,000
2022	$0	$0	$0	$6,000	$6,000
2023	$0	$54,000	$0	$6,000	$60,000
2024	$0	$0	$15,000	$6,000	$21,000
2025	$0	$0	$0	$6,000	$6,000
2026	$0	$0	$0	$6,000	$6,000
2027	$0	$0	$0	$6,000	$6,000
2028	$0	$0	$0	$6,000	$6,000
2029	$0	$0	$0	$6,000	$6,000
2030	$0	$0	$0	$6,000	$6,000
2031	$0	$0	$0	$6,000	$6,000
2032	$0	$0	$0	$6,000	$6,000

EXHIBIT B-12. UNDISCOUNTED INCREMENTAL IMPACTS IN PROPOSED GIERISCH MALLOW HABITAT (2013-2032, 2013$)

YEAR	GYPSUM MINING	GRAZING	BLM LAND MANAGEMENT	TRANSPORTATION	TOTAL
2013	$0	$18,000	$5,000	$2,800	$26,000
2014	$0	$0	$5,000	$410	$5,400
2015	$5,400	$0	$0	$410	$5,800
2016	$0	$0	$0	$410	$410
2017	$0	$0	$0	$410	$410
2018	$0	$0	$0	$410	$410
2019	$0	$0	$0	$410	$410
2020	$0	$0	$0	$410	$410
2021	$0	$0	$0	$410	$410
2022	$0	$0	$0	$410	$410
2023	$0	$18,000	$0	$410	$18,000
2024	$0	$0	$5,000	$410	$5,400
2025	$0	$0	$0	$410	$410
2026	$0	$0	$0	$410	$410
2027	$0	$0	$0	$410	$410
2028	$0	$0	$0	$410	$410
2029	$0	$0	$0	$410	$410
2030	$0	$0	$0	$410	$410
2031	$0	$0	$0	$410	$410
2032	$0	$0	$0	$410	$410

APPENDIX C | INCREMENTAL EFFECTS MEMORANDA

United States Department of the Interior

U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In reply refer to:
AESO/SE

September 10, 2012

Memorandum

TO: Industrial Economics, Incorporated; Cambridge, Massachusetts
(Attention: Leslie Genova)

FROM: Field Supervisor

SUBJECT: Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to Designate Critical Habitat for the Acuña Cactus and the Fickeisen Plains Cactus

Introduction

The purpose of this memorandum is to provide information to serve as a basis for conducting an economic analysis of the proposed critical habitat for the *Echinomastus erectocentrus* var. *acunensis* (acuña cactus) and the *Pediocactus peeblesianus* var. *fickeiseniae* (Fickeisen plains cactus). This information will fulfill the request as identified in the November 30, 2010, Memorandum, *Guidance for Preparing Incremental Effects Memo* (from Jennifer Baxter, Industrial Economics, Inc., to Douglas Krofta, U.S. Fish and Wildlife Service (Service)).

Section 4(b)(2) of the Endangered Species Act (Act) requires the Service to consider the economic, national security, and other impacts of designating a particular area as critical habitat. The Service may exclude an area from critical habitat if it determines that the benefits of exclusion outweigh the benefits of including the area as critical habitat, unless the exclusion will result in the extinction of the species. To support its weighing of the benefits of excluding versus including an area as critical habitat, the Service prepares an economic analysis for each proposed critical habitat rule describing and monetizing, where possible, the economic impacts (costs and benefits) of the proposed regulation.

Determining the economic impacts of critical habitat designation involves evaluating the "without critical habitat" baseline versus the "with critical habitat" scenario. Impacts of a designation equal the difference, or the increment, between these two scenarios. Measured differences between the baseline (the world without critical habitat) and the designated critical habitat (world with critical habitat) may include (but are not limited to) changes in land or resource use, environmental quality, or time and effort expended on administrative and other

activities by Federal landowners, Federal action agencies, and in some instances, State and local governments or private third parties. These are the "incremental effects" that serve as the basis for the economic analysis.

There are a number ways that designation of critical habitat could influence activities, but one of the important functions of this memorandum is to provide detailed information about the differences between actions required to avoid jeopardy, versus actions that may be required to avoid adverse modification. The Service is working to update the regulatory definition of adverse modification since it was invalidated by a prior court ruling. In the meantime, we will rely on guidance provided by the Director's December 9, 2004, Memorandum, *Application of the "Destruction or Adverse Modification" Standard under Section 7(a)(2) of the Endangered Species Act*. This memo explains that the conclusion for a section 7 analysis of a Federal action is to determine if the "critical habitat would remain functional (or retain the current ability for the primary constituent elements to be functionally established) to serve the intended conservation role for the species..." (p. 3). The information provided below is intended to identify the possible incremental effects of critical habitat designations for the acuña cactus and the Fickeisen plains cactus under the different section 7 standards.

Background

The acuña cactus and the Fickeisen plains cactus are being proposed to be listed under the Act concurrently with the proposed designation of critical habitat. We propose to designate six units of critical habitat for the acuña cactus that total 21,742 hectares (ha) (53,725 acres (ac)) (Table 1). These units are located in Maricopa, Pima, and Pinal Counties, Arizona, from south of Florence to the U.S.-Mexico border. The Sauceda Mountains Unit and the Sand Tank Mountains Unit both include one unoccupied subunit each (Table 2). The Cimarron Mountain subunit (Sauceda Mountains Unit) is located on the Tohono O'odham Indian Reservation and the Sand Tank Mountains subunit (Sand Tank Mountains Unit) is on the Barry M. Goldwater Range that is managed by the Department of Defense. The land included in these two subunits total 5,207 ha (12,867 ac). These subunits are determined to be essential for the conservation of the acuña cactus because they provide the greatest probability of higher precipitation and cooler temperatures within suitable acuña cactus habitat throughout south-central Arizona. Thus, these subunits provide an avenue for natural expansion of the species' range and for off-site conservation efforts. The proposed critical habitat units by land ownership are Federal (55 percent), State (27 percent), tribal (10 percent), and private (8 percent). Threats identified to the acuña cactus during listing include insect predation; drought and climate change; and activities associated with illegal U.S.-Mexico border crossings.

Nine units are proposed as critical habitat for the Fickeisen plains cactus (Table 3). All nine units are occupied by the species and total approximately 19,901 ha (49,186 ac) in size. The proposed critical habitat units are located entirely within the Colorado Plateau in Mohave and Coconino Counties. More specifically, the critical habitat units occur on the Arizona Strip (on land managed by the Bureau of Land Management (BLM)), Forest Service, Navajo Nation, State trust, and private land. The proposed critical habitat units by land ownership are Federal (34 percent), State (28 percent), tribal (19 percent), and private (19 percent). Threats identified to

the Fickeisen plains cactus during listing include livestock grazing; nonnative, invasive species; rodent predation; and drought and climate change.

Table 1. Proposed critical habitat units for the Acuña Cactus.

Unit	Unit Name	Federal		State		Tribal		Private		Total	Total
		Ha	Ac	Ha	Ac	Ha	Ac	Ha	Ac	Ha	Ac
1	Organ Pipe Cactus National Monument	4,007	9,902	0	0	0	0	0	0	4,007	9,902
2	Ajo	195	483	0	0	0	0	470	1,162	666	1,645
3	Sauceda Mountains	1,481	3,659	0	0	2,256	5,575	0	0	3,737	9,234
4	Sand Tank Mountains	4,018	9,928	0	0	0	0	0	0	4,018	9,928
5	Mineral Mountain	874	2,160	217	537	0	0	0	0	1,092	2,697
6	Box O Wash	1,378	3,404	5,556	13,729	0	0	1,287	3,180	8,221	20,314
	Total	11,953	29,536	5,773	14,266	2,256	5,575	1,757	4,342	21,740	53,720

Table 2. Occupancy of Proposed Critical Habitat Units for Acuña Cactus.

Unit	Occupied at Time of Listing
Unit 1 – Organ Pipe Cactus National Monument Unit	
Dripping Spring	YES
Acuña Valley	YES
Unit 2 – Ajo Unit	
Townsites	YES
Little Ajo Mountains	YES
Unit 3 – Sauceda Mountains Unit	
Coffeepot Mountain	YES
Cimarron Mountain	NO
Unit 4 – Sand Tank Mountains Unit	
Javelina Mountain	YES
Sand Tank Mountain	NO

Unit 5 – Mineral Mountain Unit	YES
Unit 6 – Box O Wash Unit	YES

Table 3. Proposed critical habitat units for the Fickeisen Plains Cactus.

Unit	Unit Name	Federal		State		Tribal		Private		Total	Total
		Ha	Ac	Ha	Ac	Ha	Ac	Ha	Ac	Ha	Ac
1	Hurricane Cliffs	2,763	6,827	266	658	0	0	15	38	3,044	7,523
2	Sunshine Ridge	612	1,512	142	351	0	0	0	0	754	1,863
3	Clayhole Valley	338	836	76	188	0	0	0	0	415	1,024
4	Snake Gulch	945	2,335	0	0	0	0	0	0	945	2,335
5	House Rock Valley	1,767	4,366	126	312	0	0	0	0	1,893	4,678
6	Tiger Wash	0	0	0	0	2,258	5,579	0	0	2,258	5,579
7	Little Colorado River Overlook	0	0	0	0	1,170	2,891	0	0	1,170	2,891
8	Gray Mountain	246	609	87	215	438	1,083	886	2,188	1,657	4,095
9	Cataract Canyon	0	0	4,920	12,159	0	0	2,848	7,037	7,768	19,196
	Total	**6,671**	**16,485**	**5,618**	**13,883**	**3,866**	**9,553**	**3,749**	**9,263**	**19,904**	**49,184**

As described in the proposed rule, the intended conservation role of critical habitat for the acuña cactus and the Fickeisen plains cactus is the protection of existing populations sites; the potential to create new sites (for the acuña cactus); the maintenance of ecological functions within these sites, including connectivity within and between sites in close geographic proximity to one another; to provide habitat for pollinators; and keeping these areas free of major surface disturbing activities. We determined that all areas proposed for designation contain one or more of the physical and biological features for acuña cactus and the Fickeisen plains cactus.

Baseline Analysis

The following discussion describes the regulatory circumstances that are anticipated without critical habitat designated for these species. In the baseline scenario, section 7 of the Endangered Species Act requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of these species.

Conservation plans and regulatory mechanisms that provide protection to the species and its habitat without critical habitat designation

Concurrent with the proposed designation of critical habitat, the acuña cactus and the Fickeisen plains cactus are being proposed for listing as endangered species under the Act. Listing provides opportunity for conservation and protection under sections 6, 7, 9, and 10 of the Act. These include cooperative actions with States (Section 6), consultation with Federal agencies for

actions that may affect the species (Section 7(a)(2); protection against the removal or reduction to possession from areas under Federal jurisdiction, or for any act that would damage or destroy any endangered plant species in knowing violation of any state laws without a Federal permit (Section 9(a)(2)(B); and lastly, cooperative actions with other entities and landowners for the purpose of scientific or enhancement of survival activities involving the removal and reduction to possession from Federal lands (Section 10(a)(1)(A) permit).

Both species are classified as "highly safeguarded protected native plants" under the Arizona Native Plant Law. Protection is provided to the extent that collection of highly safeguarded native plants and its parts is prohibited on public land without a permit; private landowners are required to notify the Arizona Department of Agriculture within 60 days prior to destruction or removal of any protected native plant growing on their land; and protected native plants may not be legally possessed, taken or transported from the growing site without a permit from the Arizona Department of Agriculture. The Arizona Native Plant Law serves to reduce the threat of collection of the acuña cactus or the Fickeisen plains cactus in some cases, but it does not protect the habitats of these species.

Additional species protection to the Fickeisen plains cactus is provided on the Navajo Nation. The Navajo Natural Heritage Program identifies the Fickeisen plains cactus as a Group 3 species under the Navajo Endangered Species list, which are those "species or subspecies whose prospects of survival or recruitment are likely to be in jeopardy in the foreseeable future". Projects occurring within occupied habitat of the "threatened" Fickeisen plains cactus require biological evaluations to ensure against "take" of the species as defined under the Navajo Nation Code 17N.N.C. section 507.

Conservation Plans

There are no conservation plans in place that specifically address the acuña cactus and the Fickeisen plains cactus or their habitats. However, the Nature Conservancy purchased and manages private lands under a conservation easement that provide overall benefits to 29 percent of the range-wide population of Fickeisen plains cactus. It is considered part of the baseline because these benefits will continue with or without critical habitat designation. The Nature Conservancy lands are known as the Cataract Natural Reserve Lands and are located within the Cataract Ranch in Coconino County. The conservation easement contributes toward Fickeisen plains cactus conservation by protecting the habitat from subdivision, minimizing development, and maintaining the ecological values of the land.

Federal Regulations/Acts

The following Federal laws and regulations provide some benefits to the acuña cactus and the Fickeisen plains cactus and are considered part of the baseline because these benefits will continue with or without critical habitat designation.

1. Federal Land Policy and Management Act

The Federal Land Policy and Management Act of 1976 requires that ". . . the public lands be managed in a manner that will protect the quality of scientific, scenic, historical,

ecological, environmental, air and atmospheric, water resource, and archeological values; that . . . will preserve and protect certain public lands in their natural condition; (and) that will provide food and habitat for fish and wildlife . . ." Furthermore, it is the policy of the BLM "to manage habitat with emphasis on ecosystems to ensure self-sustaining populations and a natural abundance and diversity of wildlife, fish, and plant resources on public land" (BLM manual 6500.06).

2. National Forest Management Act

The National Forest Management Act of 1976 directs that the National Forest System "...where appropriate and to the extent practicable, will preserve and enhance the diversity of plant and animal communities."

3. Sikes Act

The Sikes Act [P.L. 106-65 §3031(b)(3)(D)] of 1960 sets forth resource management policies and guidance for U.S. military installations and requires the preparation of Integrated Natural Resource Management Plans (INRMP) for installations—including those, such as the Barry M. Goldwater Range, composed of withdrawn lands—with significant natural resources. The Sikes Act provides that the "... Secretary of Defense shall carry out a program to provide for the conservation and rehabilitation of natural resources on military installations..." and that an INRMP is to be prepared to facilitate implementation of that program [16 U.S.C. 670a (a)(1)(A) and (B)]. The Act also specifies that: Consistent with the use of military installations to ensure the preparedness of the Armed Forces, the Secretaries of the military departments shall carry out [the aforementioned program] to provide for—(A) the conservation and rehabilitation of natural resources on military installations; (B) the sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping and non-consumptive uses; and (C) subject to safety requirements and military security, public access to [the Barry M. Goldwater Range (BMGR)] to facilitate the use [16 U.S.C. 670a (a)(3)].

Federal agencies and other project proponents that are likely to consult with the Service under section 7 without Critical Habitat

Federal agencies and projects that would likely go through the section 7 consultation process if no critical habitat is designated include the following:

1. Department of Defense (natural resource management, military and aircraft operations).

2. U.S. Bureau of Indian Affairs (renewable energy development, road projects, utility development and upgrades).

3. U.S. Bureau of Land Management (fire suppression, fuel-reduction treatments, land and resource management plans, livestock grazing and management plans, recreation, mining permits, nonnative invasive species treatments, and renewable energy development).

4. U.S. Department of Homeland Security (border security infrastructure and operations).

5. U.S. Department of Transportation (highway and bridge construction and maintenance).

6. U.S. Fish and Wildlife Service (Partners for Fish and Wildlife program projects).

7. U.S. Forest Service (fire suppression, fuel-reduction treatments, land and resource management plans, livestock grazing and management plans, mining permits, nonnative invasive species treatments, renewable energy development, and travel management).

8. National Park Service (border security infrastructure, fire suppression, fuel-reduction treatments, natural resource protection, nonnative invasive species treatment, recreation, and travel management).

9. Natural Resource Conservation Service (wildlife habitat improvements on agricultural land and nonnative invasive species treatment).

Expected Service administrative effort for section 7 consultations without critical habitat

The acuña cactus and the Fickeisen plains cactus have been candidate species. Candidate species have no statutory protection under the Act [61 FR 7596-7613 (February 28, 1996)]. While the Service does not require Federal agencies to consult on candidate species, candidates are often considered during the consultation process for other listed species. For example, we found one project that considered effects to the acuña cactus and eight projects that considered effects to the Fickeisen plains cactus over the past 20 years (Table 4). In these cases, the Federal action agency requested our technical assistance in developing conservation recommendations aimed at minimizing or reducing effects to the species in order to conserve the species and preclude the need for listing and in furtherance of their authorities under section 7(a)(1) of the Act.

If the acuña cactus and the Fickeisen plains cactus are listed without critical habitat, we anticipate that we would broaden the scope of the analyses and provide a more thorough evaluation of the potential direct and indirect effects to the species. We anticipate that re-initiation of consultation on these projects could be required if project actions are on-going and may affect the species. Therefore, if these species are listed, we anticipate there would be an incremental cost in the administrative effort to re-initiate section 7 consultations for these species.

Table 4. Federal projects for which the Service has provided technical assistance for the acuña cactus and Fickeisen plains cactus during section 7 consultation for listed species.

Agency	**Title**	**Species**	**Consultation Number/or Project Type**
BLM	Resource Management Plan	Fickeisen plains cactus	22410-2002-F-0277-R1 22410-2007-F-0463
BLM	Arizona State Land Use Fires, and Fuels	acuña cactus and Fickeisen plains cactus	22410-2003-F-0210
BLM	Northern Arizona Mineral	Fickeisen plains	Evaluated direct/indirect effects

	Withdrawal	cactus	in Final Environmental Impact Statement
USFS	Land Resource Management Plan	Fickeisen plains cactus	RO-2012-F-0007
USFS	Travel Management, Tusayan Ranger District, Kaibab	Fickeisen plains cactus	Final Environmental Impact Statement
USFS	Travel Management, North Kaibab Ranger District, Kaibab National Forest	Fickeisen plains cactus	Preliminary Environmental Assessment
USFS	Treatment of Noxious Weeds, Coconino, Prescott, and Kaibab National Forests	Fickeisen plains cactus	Final Environmental Impact Statement
BIA	Navajo Transmission Project	Fickeisen plains cactus	22410-1993-F-0330

What types of project modifications are currently recommended or will likely be recommended by the Service to avoid jeopardy (i.e., the continued existence of the species)?

The BLM, in coordination with the Service, has developed conservation measures for the acuña cactus and the Fickeisen plains cactus for some broad-scale projects. The Arizona Strip District of the BLM considered effects to the Fickeisen plains cactus while in consultation on their 2008 Resource Management Plan. As a result, the agency established three conservation measures to minimize or reduce impacts to the Fickeisen plains cactus and other special status plants. The BLM requires that these conservation measures be applied for fuel and vegetation treatments in the habitat of the Fickeisen plains cactus. These conservation measures are described below:

1. Delineate buffer areas around plant populations prior to prescribe fire and vegetation-treatment activities. Coordinate with Service during any emergency response and wildland fire use activities to ensure protection of plant populations from fire and fire suppression activities.

2. No staging of equipment or personnel will be permitted within 100 meters of identified individuals or populations of special status plant species during fire suppression, wildland fire use, or prescribed fire. Off-road vehicles will not be allowed within the 100-meter buffer area, unless necessary for firefighter or public safety or the protection of property, improvements, or other resources.

3. No prescribed burning will be implemented within 100 meters of identified locations or unsurveyed suitable habitat of special status plant species unless specifically designed.

We also worked with the BLM, at their request, to develop the following conservation measure for the acuña cactus and the Fickeisen plains cactus for the Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management (Table 4):

1. Map known locations of the acuña cactus and Fickeisen plains cactus and avoid them during fire suppression.

Because there are no Federal regulatory requirements in place to protect candidate species, BLM's conservation measures are voluntary and at their discretion. If the acuña cactus or the Fickeisen plains cactus is listed and we determine that an action jeopardizes either of these species in future section 7 consultations, we would likely recommend similar measures to those listed above for both species. We would also likely recommend additional project modifications that could include one or more of the conservation measures below for either species, depending on the proposed action. This is not an exhaustive list.

1. Implement seasonal restrictions or modifications to projects occurring within occupied habitat to enable recovery of the species.

2. Allow no fire retardants or suppressants toxic to cacti to be used over habitats occupied by the acuña cactus or the Fickeisen plains cactus.

3. Restrict the methods of nonnative invasive species treatment within occupied areas of the acuña cactus or the Fickeisen plains cactus.

4. Provide conservation measures to restore, enhance, and protect occupied habitat.

5. Do not implement ground disturbing activities within specified distances from individual plants to protect their habitat. These distances would be based on the best available information on associated project impacts (both direct and indirect), habitat requirements, the potential for genetic exchange, and pollinator requirements. If we were not proposing critical habitat, we expect that our recommended consultation distances (habitat buffer) would be 900 m (2,953 ft) for acuña cactus and 1,000 m (3,280 ft) for Fickeisen plains cactus, which are the maximum foraging distances of the species' primary pollinators that are identified through this critical habitat designation.

6. Implement *in-situ* conservation to reintroduce individuals within unoccupied habitat coupled with long-term adaptive management monitoring.

7. Implement *ex-situ* conservation for the purpose of preservation of the species.

8. Offset permanent habitat loss, modification, or fragmentation resulting from agency actions with habitat that is permanently protected, including adequate funding to ensure the habitat is managed permanently for the protection of the species.

9. Habitat loss, modification, or fragmentation of Federal lands should not be offset with protection of other Federal lands that would otherwise qualify for protection if the standards set forth in other agency guidance were applied to those lands. In other words, lands protected as mitigation from habitat loss should not be Federal lands that are already under some form of protection or management.

Incremental Effects Analysis

The following discussion describes the regulatory circumstances that are anticipated with designation of critical habitat, as proposed, for the acuña cactus or the Fickeisen plains cactus. Once critical habitat is designated, section 7 of the Act requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat. The key factor related to the adverse modification is whether, with implementation of the proposed Federal action, the affected critical habitat will continue to have the capability to serve its intended conservation role for the species. From section 3(3) of the Act: "The terms "conserve," "conserving," and "conservation" means to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided under the Endangered Species Act are no longer necessary".

What additional Federal agencies or project proponents are likely to consult with the Service under section 7 with designated critical habitat? What kinds of additional activities are likely to undergo consultation with critical habitat?

Besides the nine Federal agencies listed in the baseline section, we do not anticipate any additional Federal agencies would likely consult under section 7 with designated critical habitat. The two unoccupied subunits being proposed as critical habitat for the acuña cactus are where we believe that incremental effects will most likely occur. Activities that could occur in these two subunits, and be evaluated for adverse modification of critical habitat under section 7 consultations, but not for jeopardy to the species, include: border security enforcement; feral burro control; fire suppression; fuels reduction; livestock grazing; mining; nonnative invasive plant treatment; and off-road-vehicle activity.

How much administrative effort will the Service likely expend to address adverse modification in its section 7 consultations with critical habitat? Estimate the difference compared to baseline.

In the two unoccupied subunits for the acuña cactus, there may be incremental project modification costs that would be attributable to the designation of critical habitat and additive to incremental administrative costs. In these cases, we believe a reasonable method to determine the potential incremental economic impacts of these activities would be to assume that, if activities with a Federal nexus would alter the physical or biological features to an extent that appreciably reduces the conservation value of critical habitat for the acuña cactus, the costs associated with conservation measures implemented to mitigate those impacts would be attributed to critical habitat designation. In cases where we determine that an adverse modification finding may be likely, we work with the Federal agency involved to identify reasonable and prudent alternatives that would eliminate or reduce those impacts to a point where adverse modification is no longer likely. The resulting project modifications would appropriately be considered to be an incremental cost of the critical habitat designation.

Compared to the baseline in occupied critical habitat units, actions located on Federal land or subject to consultation through a Federal nexus or action (Federal funds), a jeopardy analysis for these species would look at the scale and magnitude of a project's impacts relevant to the population(s) across the species' entire range. Furthermore, the jeopardy analysis would focus

on effects to the species' reproduction, numbers, or distribution. In contrast, an adverse modification analysis would focus on a project's impacts to the physical features (primary constituent elements (PCEs)), or other habitat characteristics in areas determined by the Secretary to be essential for the conservation of the species, and analyze impacts to the capability of the critical habitat unit to maintain its conservation role and function for the species.

Occupied critical habitat units and their PCEs reflect the needs of the species and are clearly defined in the proposed rule. Modifications to the PCEs of critical habitat would tend to be closely tied to adverse effects to the species; therefore, activities that would require consultation for critical habitat are primarily the same as activities that currently require consultation for the species. For instance, alterations to the natural landscape surrounding the acuña cactus (e.g., surface disturbances from newly created roads, trash, foot traffic due to illegal border activities) or the Fickeisen plains cactus (e.g., heavy livestock grazing in occupied habitat) affecting soil quality (e.g., removal of soil, soil disruption) may affect soil composition (e.g., soil compaction or erosion, reduced productivity, removal of a viable seed bank) and vegetation (e.g., removing nurse plants, increasing nonnative invasive plants). The displacement of native plants by nonnative species results in the loss of native plant diversity, which in turn, can displace or eliminate native pollinators (e.g., low pollen diversity, fragmented pollen resources, increased distance to flowers incurs high cost, loss of habitat that supports native bees). Altering these habitat components may affect such basic plant resources as water availability, nutrients, and reproduction success and may affect the survivorship of both mature plants and seedlings of both cactus species. Because the acuña cactus and the Fickeisen plains cactus are closely tied to their habitat and are not mobile, it is more likely that surface disturbances resulting in critical habitat being adversely modified would likely also constitute jeopardy to the species.

It is possible however, that consultation could result in an adverse modification determination, but not jeopardy for either species. Some areas of proposed critical habitat may support the acuña cactus and the Fickeisen plains cactus at very low densities. The Federal action agency may find that affects to these few individuals does not constitute jeopardy to the species, but may find that the actions could result in adverse modification of critical habitat. In these cases, section 7 consultations would be considered an incremental effect of designating critical habitat.

An adverse modification determination but not jeopardy may occur in the two unoccupied subunits for the acuña cactus in which, their associated critical habitat units are essential for the conservation of the species. The Cimarron Mountain and Sand Tank Mountain subunits are located at higher elevations, have lower ambient air temperatures on average, and receive greater amounts of precipitation compared to the occupied critical habitat units. These subunits and their associated critical habitat units are considered "strongholds" for acuña cactus recovery because they provide for natural expansion and off-site conservation of the species that is being affected by drought and climate change. Significant alterations to the natural landscape (e.g., high severity wildfire) affecting these subunits to such an extent that it impaired the ability of the critical habitat unit to contribute to acuña cactus recovery, would be considered an adverse modification but not a jeopardy since the species does not occur there. However, the Cimarron Mountain subunit is located on tribal lands and the Sand Tank Mountain subunit is located on military lands. Based on public comment and our analysis of proposed critical habitat, we may ultimately exclude these unoccupied critical habitat subunits from the final designation of critical

habitat. If either or both of these areas are not excluded under the final designation of critical habitat, adverse modification must be addressed in any section 7 consultations in these subunits.

What Federal agencies or project proponents are likely to consult under section 7 or to pursue habitat conservation plans (HCPs) under section 10 after the designation of critical habitat?

The same nine Federal agencies listed under the baseline analysis are also anticipated to be the primary agencies that would consult with the Service under section 7 for the acuña cactus or the Fickeisen plains cactus. We expect consultation to primarily involve actions occurring within occupied habitat for both plant species that could disturb, degrade, fragment, or eliminate their habitat. The activities described above for the nine Federal agencies are the same activities that we anticipate would be evaluated in future section 7 consultations within proposed critical habitat for both species. We do not anticipate that different types of activities in the future will undergo evaluation and consultation within proposed critical habitat units occupied by the acuña cactus and the Fickeisen plains cactus compared to those activities which we anticipate would require section 7 consultations without critical habitat.

There are no "take" prohibitions for plants listed under the Act. Therefore, the acuña cactus or the Fickeisen plains cactus could be only included in a HCP covering a listed animal species that may occur within their range, but incidental take provisions through a section 10(a)(1)(B) permit would not apply to these species. The cost of including the plants in a HCP would likely be minimal.

What types of project modifications might the Service make during a section 7 consultation to avoid destruction or adverse modification of critical habitat that are different than those for avoiding jeopardy?

Pursuant to the current framework under which section 7 consultations without critical habitat are conducted, it is unlikely that a future section 7 analysis would identify a substantially different measure to avoid the destruction or adverse modification of critical habitat than those needed to avoid jeopardizing the continued existence of the species, in occupied habitats. The only difference would be the need to consult on actions that may affect the Cimarron Mountain subunit and the Sand Tank Mountains subunit because these are unoccupied critical habitat units for the acuña cactus.

In summary, although the outcomes of individual consultations under section 7 of the Act will vary, we believe a reasonable method to determine the potential incremental impacts of this proposed critical habitat designation is to address the likelihood of the following:

- In areas where uncertainty exists over whether one of these plants is currently present at a specific site, and there is resultant uncertainty as to whether a proposed project is likely to adversely affect one of these species, the existence of critical habitat may make this point moot and result in section 7 consultation and associated costs where it otherwise would not have been initiated. This is especially true for the Fickeisen plains cactus, where the plant may not emerge in a given area during a given year because of adverse climatic conditions, thereby causing greater uncertainty as to whether the habitat is occupied.

- Some specific project sites within the limits of critical habitat subunits may be in habitat not occupied by these plants, and adverse effects to critical habitat may occur in areas where adverse effects to the plants would not otherwise be concluded. In such cases, costs related to section 7 consultations could be attributed to the designation of critical habitat. This is especially true in areas with primary constituent elements that are more than 900 m (2,953 ft) from known acuña cactus sites and 1,000 m (3,280 ft) from known Fickeisen plains cactus sites, which are the maximum foraging distances of the species' primary pollinators that are identified through this critical habitat designation.

- We are proposing to designate two unoccupied critical habitat subunits for the acuña cactus. However, one of these areas is on tribal lands and the other on military lands, therefore, based on public comment and our analysis of proposed critical habitat, we may exclude these areas from the final designation of critical habitat. If either or both of these areas are not excluded under the final designation of critical habitat, section 7 consultations would not otherwise have been necessary within these proposed subunits, unless future surveys discover plants that are currently unknown.

- In rare instances, a project may not jeopardize the plants themselves, but could result in adverse modification of critical habitat. The costs of implementing reasonable and prudent alternatives would be attributable to critical habitat.

Conclusion

In summary, it is likely that the incremental effects of the proposed designated critical habitat for the acuña cactus and the Fickeisen plains cactus will be limited to unoccupied critical habitat subunits and the buffer area around occupied sites where section 7 consultation would not likely be required if critical habitat were not designated. We anticipate the following incremental effects: (1) a minimal increase in workload for Federal action agencies and the Service to conduct re-initiated consultations for ongoing actions; (2) completing consultations for new projects occurring in the two unoccupied subunits of critical habitat for the acuña cactus; (3) new consultations from project proponents that previously did not consult, but that may be required to do so due to proposed critical habitat; and (4) possible project modifications to avoid adverse modification of critical habitat in areas where a significant alteration of habitat is proposed.

We appreciate the opportunity to provide this information for you. If you have any questions or request clarification of any the items described here, please do not hesitate to call Kathy Robertson or Debra Bills at 602-242-0210.

Debra T. Bills

for Steven L. Spangle

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United States Department of the Interior

U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In reply refer to:

September 14, 2012

Memorandum
Email Transmission

To: Industrial Economics, Inc.

From: Field Supervisor

Subject: Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for Gierisch Mallow

Introduction

The purpose of this memorandum is to provide information to serve as a basis for conducting an economic analysis of the proposed critical habitat designation for *Sphaeraclea gierischii* (Gierisch mallow). This information will fulfill the request as identified in the November 30, 2010, Memorandum, *Guidance for Preparing Incremental Effects Memo* (from Jennifer Baxter, Industrial Economics, Inc., to Douglas Krofta, U.S. Fish and Wildlife Service (Service)).

Section 4(b)(2) of the Endangered Species Act (Act) requires the U.S. Fish and Wildlife Service (Service) to consider the economic, national security, and other impacts of designating critical habitat. The Service may exclude an area from critical habitat if it determines that the benefits of exclusion outweigh the benefits of including the area as critical habitat, unless the exclusion will result in the extinction of the species. To support its weighing of the benefits of excluding versus including an area as critical habitat, the Service prepares an economic analysis for each proposed critical habitat rule describing and monetizing, where possible, the economic impacts (costs and benefits) of the proposed regulation.

Determining the economic impacts of critical habitat designation involves evaluating the "without critical habitat" baseline versus the "with critical habitat" scenario. Economic impacts of a designation equal the difference, or the increment, between these two scenarios. Measured differences between the baseline (without critical habitat) and the designated critical habitat (with critical habitat) may include, but are not limited to, changes in land or resource use, environmental quality, or time and effort expended on administrative and other activities by Federal landowners, Federal action agencies, and in some instances, State and local governments or private third parties where there is a Federal nexus. These are the "incremental effects" that serve as the basis for the economic analysis.

There are a number ways that designation of critical habitat could influence activities, but one of the important functions of this memorandum is to provide detailed information about the differences between actions required to avoid jeopardy, versus actions that may be required to avoid adverse modification. The Service is working to update the regulatory definition of adverse modification since it was invalidated by a prior court ruling. In the meantime, we will rely on guidance provided by the Director's December 9, 2004, Memorandum, *Application of the "Destruction or Adverse Modification" Standard under Section 7(a)(2) of the Endangered Species Act.* This memo explains that the conclusion for a section 7 analysis of a Federal action is to determine if the "critical habitat would remain functional (or retain the current ability for the primary constituent elements to be functionally established) to serve the intended conservation role of the species..." (p. 3). The information provided below is intended to identify the possible incremental effects of critical habitat designations for the Gierisch mallow under the different section 7 standards.

Background

The Gierisch mallow is being proposed to be listed as endangered under the Act concurrently with the proposed designation of critical habitat. We propose to designate two units of critical habitat for the Gierisch mallow. The two critical habitat units are located in Mohave County, Arizona, and Washington County, Utah, and total 5,189 hectares (ha) (12,822 acres (ac)). Both of the units are occupied by Gierisch mallow at the time of listing. The proposed critical habitat units for the Gierisch mallow include lands under Federal (89%) and State (11%) land ownership (Table 1). Threats identified to the Gierisch mallow include gypsum mining, livestock grazing, recreational activities such as target shooting, and unauthorized off-road vehicle use.,

Table 1. Gierisch mallow proposed critical habitat designation units.

	Federal		State	
Critical Habitat Unit	Arizona	Utah	Arizona	Totals
Unit 1. Starvation Point	0	1,022 ha (2,526 ac)	316 ha (782 ac)	1,339 ha (3,309 ac)
Unit 2. Black Knolls	3,586 ha (8,862 ac)	0	263 ha (651 ac)	3,850 ha (9,513 ac)
Totals	3,586 ha (8,862 ac)	1,022 ha (2,526 ac)	580 ac (1,434 ac)	5,189 ha (12,822 ac)

Baseline Analysis (without Critical Habitat)

Because this is a new listing proposal, the Gierisch mallow has no prior section 7 consultation history. The following discussion describes the regulatory circumstances that are anticipated without critical habitat designated for this species. In the baseline scenario, section 7 of the Act requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of this species.

Conservation plans and regulatory mechanisms that provide protection to the species and its habitat without critical habitat

Concurrent with the proposed designation of critical habitat, the Gierisch mallow is being proposed for listing as endangered species under the Act. Listing provides opportunity for conservation and protection under sections 6, 7, 9, and 10 of the Act. These include cooperative actions with States (Section 6), consultation with Federal agencies for actions that may affect the species (Section 7(a)(2)); protection against the removal or reduction to possession from areas under Federal jurisdiction, or for any act that would damage or destroy any endangered plant species in knowing violation of any state laws without a Federal permit (Section 9(a)(2)(B)); and lastly, cooperative actions with other entities and landowners for the purpose of scientific or enhancement of survival activities involving the removal and reduction to possession from Federal lands (Section 10(a)(1)(A) permit).

Conservation Plans

There are no conservation plans in place that specifically address the Gierisch mallow or its habitat.

State Regulations/Acts

The Gierisch mallow has been covered by the Arizona Native Plant Law since it became a candidate species in 2008. The plant is classified by the State as "highly safeguarded protected native plant". Protection is provided to the extent that collection of highly safeguarded native plants and its parts is prohibited on public land without a permit; private landowners are required to notify the Arizona Department of Agriculture within 60 days prior to destruction or removal of any protected native plant growing on their land; and protected native plants may not be legally possessed, taken or transported from the growing site without a permit from the Arizona Department of Agriculture. The Arizona Native Plant Law serves to reduce the threat of collection of Gierisch mallow in some cases, but it does not protect the habitat of this species.

The Arizona State Land Department (ASLD) prohibits any seed collection on all their state lands, and has fairly strict reclamation provisions and bonding requirements when they approve a Mining Plan of Operation. The ASLD would not deny a mine, or any other project, based on the presence of an endangered or threatened species; however, they can have stipulations written into the ASLD lease or the mining company's reclamation plan that would require them to make allowances for federally listed species.

Federal Regulations/Acts

The following Federal laws and regulations provide some benefits to the Gierisch mallow and are considered part of the baseline because these benefits will continue with or without critical habitat designation.

1. Federal Land Policy and Management Act
   The Federal Land Policy and Management Act of 1976 requires that ". . . the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that . . . will preserve and protect certain public lands in their natural condition; (and) that will provide food and habitat for fish and wildlife . . ." Furthermore, it is the policy of the Bureau of Land Management (BLM) "to manage habitat with emphasis on ecosystems to ensure self-sustaining populations and a natural abundance and diversity of wildlife, fish, and plant resources on public land" (BLM manual 6500.06).

2. Mining Law of 1872
   Mining claims on BLM lands must reclaim disturbed areas. BLM's regulations also require the mitigation of mining operations so that operations do not cause unnecessary and or undue degradation of public lands. Unnecessary or undue degradation is generally referred to as "harm to the environment that is either unnecessary to a given project or violates specified environmental protections statutes".

Federal Land Management

The Gierisch mallow is classified as a sensitive species on BLM lands. The BLM actively manages for the Gierisch mallow and all but one of the current populations occur on or near BLM lands (Arizona Strip Resource Management Plan and St. George Resource Management Plan). The most robust population of Gierisch mallow in the range of the species exists on Arizona Strip BLM land.

Federal agencies and other project proponents that are likely to consult with the Service under section 7 without critical habitat

Federal agencies and projects that would likely go through the section 7 consultation process if no critical habitat is designated include the following:

1. BLM (new mining permits, nonnative invasive plant treatments, land resource management plans, and livestock grazing management plans).

2. U.S. Department of Transportation (DOT) (highway and bridge construction and maintenance).

Expected Service administrative effort for section 7 consultations without critical habitat

The Gierisch mallow is currently a candidate species. Candidate species have no statutory protection under the Act [61 FR 7596-7613 (February 28, 1996)]. While the Service does not require Federal agencies to consult on candidate species, candidates are often considered during the consultation process for other listed species. For example, the Black Rock Mine located on BLM land in Arizona is currently active and is anticipated to expand into the largest population of Gierisch mallow. BLM has completed NEPA compliance for the expansion and approved the mine's Mining Plan of Operation to expand into areas containing the Gierisch mallow. BLM required seed collection by the mine operators to aid in reestablishing the species in reclaimed areas. In these cases, the Federal action agency requested our technical assistance in developing conservation recommendations aimed at minimizing or reducing effects to the species in order to preclude the need for listing and in furtherance of their authorities under section 7(a)(1) of the Act.

Even though there is no consultation history for Gierisch mallow, we anticipate baseline costs for section 7 consultations without critical habitat to include initiation of consultation on the Black Rock Mine project and any other mining, livestock grazing, or recreational activities that are ongoing and may affect the species.

What types of project modifications are currently recommended or will likely be recommended by the Service to avoid jeopardy (i.e., the continued existence of the species)?

The BLM developed conservation measures during the permitting process for Gierisch mallow requiring the mine operators to conduct seed collection for reestablishing the species in reclaimed areas of the Black Rock Gypsum Mine. Because there are no Federal regulatory requirements in place to protect candidate species, BLM's conservation measures would have been voluntary and at their discretion. Thus, we would recommend project modifications that could include one of more of the conservation measures below, depending on the proposed action. This is not an exhaustive list.

1. Implement seasonal restrictions or modifications to projects occurring within a known occupied area to enable recovery of the species.

2. Reduce the size or configuration of the proposed project to avoid, reduce, or eliminate the effects to the species.

3. Do not implement ground disturbing activities within specified distances from individual plants. These distances would be based on the best available information on associated project impacts (both direct and indirect), habitat requirements, the potential for genetic exchange, and pollinator requirements. If we were not proposing critical habitat, we expect that our recommended consultation distances (habitat buffer) would be the same as the pollinator habitat distances (1,200 meters (3,937 feet)) as identified through this critical habitat designation.

4. Implement *in-situ* conservation (on-site conservation of this plant's genetic resources) by reintroducing individuals within unoccupied habitat coupled with long-term adaptive management monitoring.

5. Offset permanent habitat loss, modification, or fragmentation resulting from agency actions with habitat that is permanently protected, including adequate funding to ensure the habitat is managed permanently for the protection of the species.

6. Habitat loss, modification, or fragmentation of Federal lands should not be offset with protection of other Federal lands that would otherwise qualify for protection if the standards set forth in other agency guidance were applied to those lands. In other words, lands protected as mitigation from habitat loss should not be Federal lands that are already under some form of protection or management.

Incremental Effects Analysis (with Critical Habitat)

The following discussion describes the regulatory circumstances that are anticipated with designation of critical habitat, as proposed, for the Gierisch mallow. Once critical habitat is designated, section 7 of the Act requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat. The key factor related to the adverse modification is whether, with implementation of the proposed Federal action, the affected critical habitat will continue to have the capability to serve its intended conservation role for the species. From section 3(3) of the Act: "The terms "conserve," "conserving," and "conservation" means to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided under the Endangered Species Act are no longer necessary". Thus, designation of critical habitat helps ensure that proposed project actions will not result in the adverse modification of habitat to the point that the species will not achieve recovery.

What additional Federal agencies or project proponents are likely to consult with the Service under section 7 with designation of critical habitat? What kinds of additional activities are likely to undergo consultation with critical habitat?

We expect that the same agencies (BLM and DOT), and the same type and number of projects would go through the section 7 consultation process, with or without critical habitat. However, within these two units, there is potential that critical habitat designation may result in some incremental effects. The Gierisch mallow proposed critical habitat units are occupied with no unoccupied units being proposed. Both units include the primary constituent elements (PCE's) throughout, although in some units the plants themselves are scattered or sometimes localized within smaller sections of the unit. The presence of the PCE's ensures areas where seed dispersal can occur as well as areas for continued plant dispersal to spread the populations. With these characteristics in mind, there could be situations where smaller projects are proposed that result in a localized effect within a unit. For example, if a powerline is proposed to run through a narrow linear portion of one unit, the PCE's along that line will be affected, but potentially no plants will be affected. We believe that incremental effects are most likely to occur within

portions of the Gierisch mallow critical habitat where the plants are not actually found but could become established in the future so long as the PCEs are retained.

How much administrative effort does or will the Service expend to address adverse modification in its section 7 consultations with critical habitat? Estimate the difference compared to baseline.

Because of the scattered nature, and often a more localized plant distribution of Gierisch mallow plants within the proposed two units, and that the PCE's occur throughout these two units, there may be project modification costs that would be attributable to the designation of critical habitat and additive to baseline administrative costs. In these cases, we believe a reasonable method to determine the potential economic impacts of these activities would be to assume that if activities with a Federal nexus would alter the physical or biological features to an extent that appreciably reduces the conservation value of critical habitat for Gierisch mallow, the costs associated with conservation measures implemented to mitigate those impacts would be attributed to critical habitat designation. In cases where we determine that an adverse modification finding may be likely, we would work with the Federal agency involved to identify reasonable and prudent alternatives that would eliminate or reduce those impacts to a point where adverse modification is no longer likely. The resulting project modifications would appropriately be considered an incremental cost of the critical habitat designation.

In summary, although the outcomes of individual consultations under section 7 of the Act will vary, we believe the potential incremental impacts of this proposed critical habitat designation are:

- In areas where uncertainty exists over whether Gierisch mallow is currently present at a specific site, and there is resultant uncertainty as to whether a proposed project is likely to adversely affect this species, the existence of critical habitat may make this point moot and result in section 7 consultation and associated costs where it could potentially otherwise have been avoided. In general, Gierisch mallow plants are readily identified in the field year-round, but the younger, less woody plants may become dormant during extreme drought years and not fully display aboveground making them difficult to locate.

- Some specific project sites within the limits of critical habitat may occur in areas where the plant has not been found or seen, but the PCE's are present, adverse effects to critical habitat may occur in these areas; however, there would be no adverse effects to the species because it is not present. In such cases, costs related to section 7 consultations could be attributed to the designation of critical habitat.

- In rare instances a project would not jeopardize the plants but would result in adverse modification of critical habitat. The costs of implementing reasonable and prudent alternatives would be attributable to critical habitat.

What Federal agencies or project proponents are likely to consult under section 7 or to pursue habitat conservation plants (HCPs) under section 10 after the designation of critical habitat?

As discussed above, BLM and DOT are the two agencies expected to consult. We expect consultation to primarily involve actions occurring within occupied habitat for this plant species that could disturb, degrade, fragment, or eliminate their habitat. The activities described for the Federal agencies in the baseline section above are the same activities that we anticipate would be evaluated in future section 7 consultations within proposed critical habitat for both species. We do not anticipate that different types of activities in the future will undergo evaluation and consultation within proposed critical habitat units occupied by the Gierisch mallow compared to those activities which we anticipate would require section 7 consultations absent critical habitat.

There are no "take" prohibitions for plants listed under the Act. Therefore, the Gierisch mallow could be only included in a HCP covering a listed animal species that may occur within its range, but incidental take provisions through a section 10(a)(1)(B) permit would not apply to this species. The cost of including the plants in a HCP would likely be minimal.

Conclusion

In summary, it is likely that the incremental effects of the proposed designated critical habitat for Gierisch mallow will be limited to scattered and localized areas within the critical habitat units where the plants may not be present, but the PCE's may be affected, resulting in consultations that would not be required if critical habitat were not designated. We anticipate the following incremental effects: (1) new consultations from project proponents and action agencies that previously did not consult, but may be required to due to proposed critical habitat; and (2) possible project modifications to avoid adverse modification of critical habitat in areas where a significant alteration of habitat is proposed.

We appreciate the opportunity to provide this information for you. If you have any questions or request clarification of any the items described here, please do not hesitate to call Brian Wooldridge at 928-556-2106.

Steven L. Spangle

cc: Jean Calhoun, Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

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APPENDIX D | DETAILED MAPS OF PROPOSED CRITICAL HABITAT

EXHIBIT D-1. PROPOSED DESIGNATION OF CRITICAL HABITAT FOR THE ACUÑA CACTUS

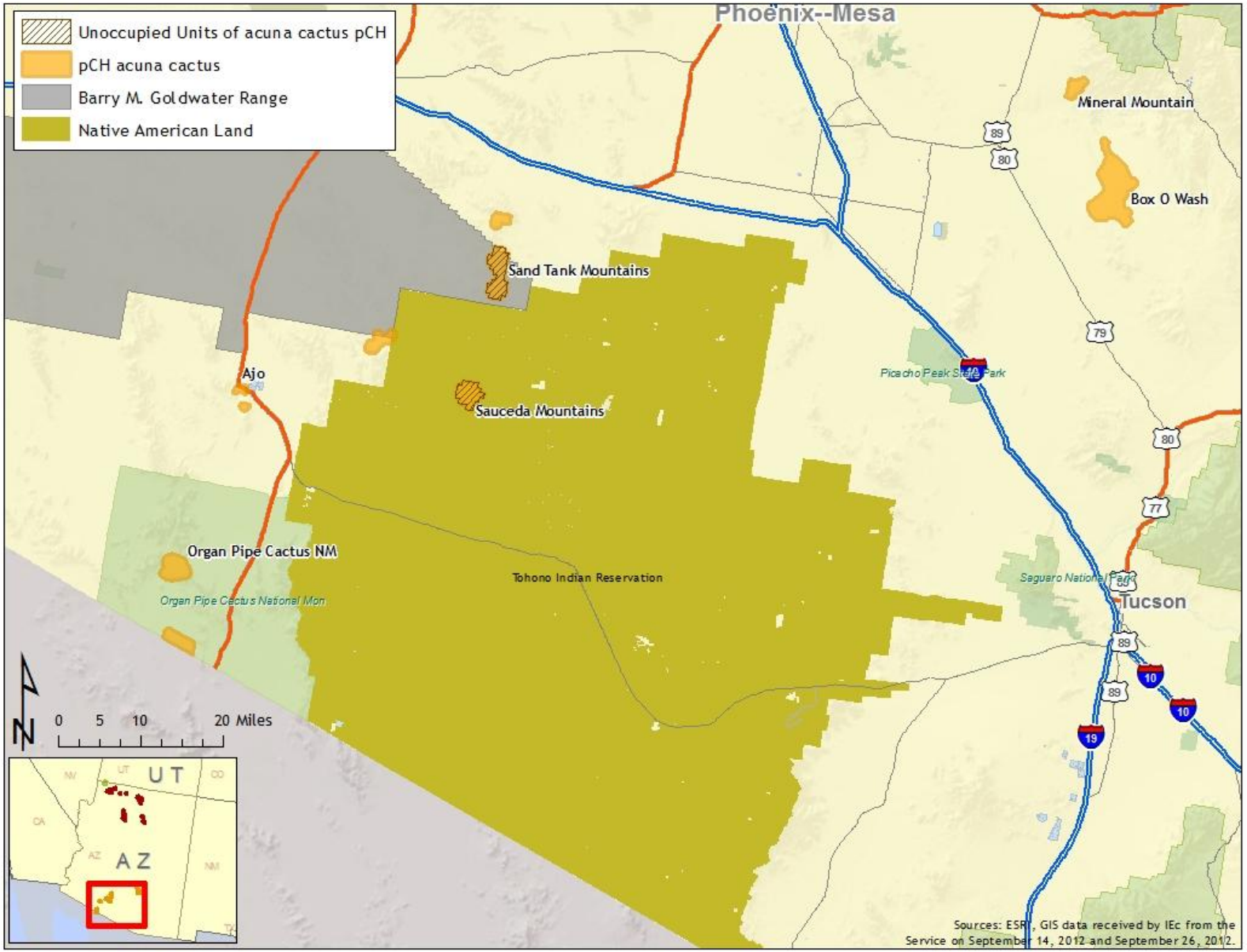

EXHIBIT D-2. PROPOSED CRITICAL HABITAT FOR THE FICKEISEN PLAINS CACTUS

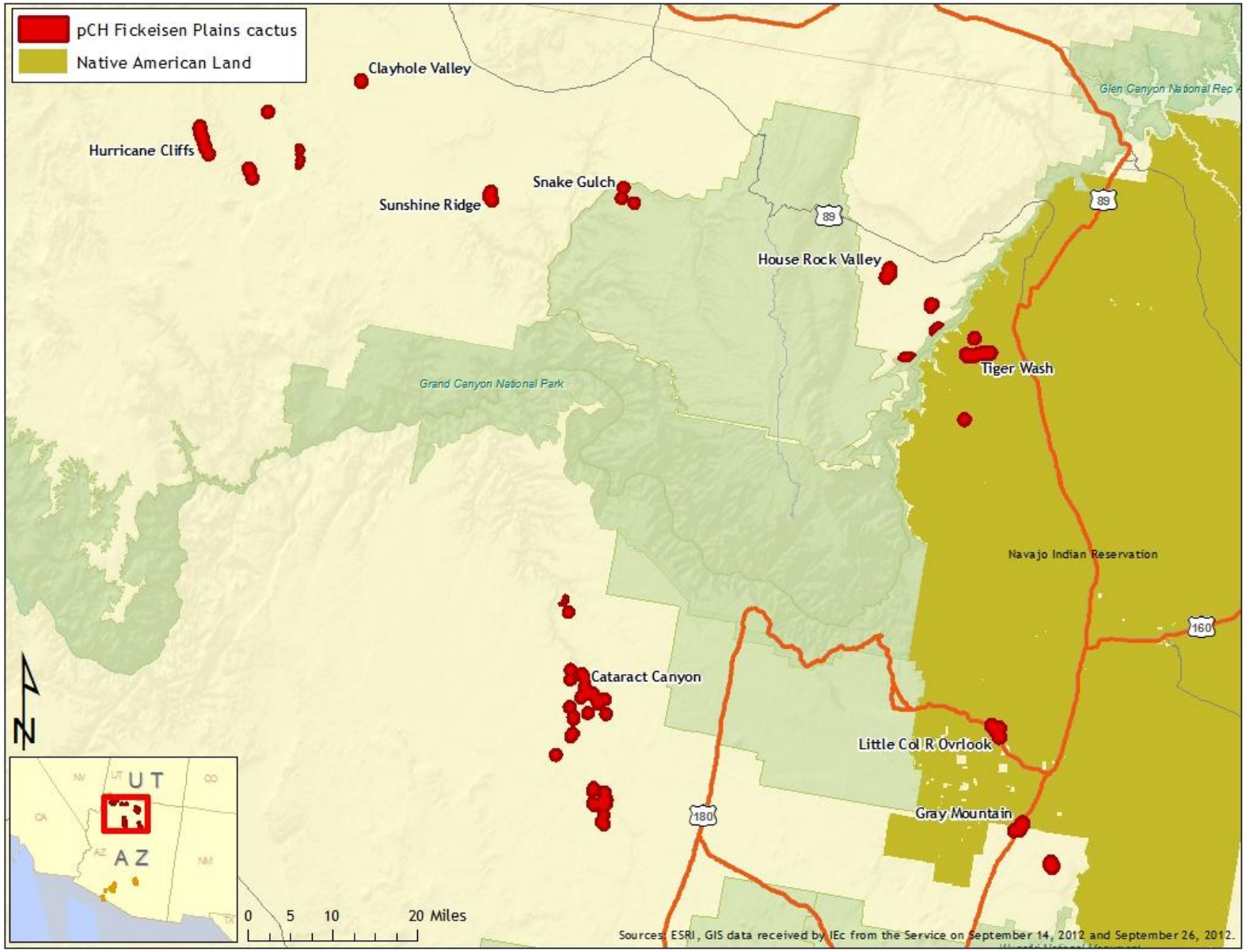

EXHIBIT D-3. PROPOSED CRITICAL HABITAT FOR THE GIERISCH MALLOW