



ECONOMIC ANALYSIS OF THE CRITICAL  
HABITAT DESIGNATION FOR THE THREE  
FORKS AND SAN BERNARDINO  
SPRINGSNAILS

Final Economic Analysis | March 9, 2012

prepared for:

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**LIST OF ACRONYMS**

Act	Endangered Species Act
ASNFs	Apache-Sitgreaves National Forests
CEQA	California Environmental Quality Act
Corps	U.S. Army Corps of Engineers
GIS	Geographic Information System
HCP	Habitat Conservation Plan
IEc	Industrial Economics, Incorporated
LPN	Listing Priority Number
NWR	National Wildlife Refuge
OMB	U.S. Office of Management and Budget
RFA	Regulatory Flexibility Act
SBA	Small Business Administration
SBREFA	Small Business Regulatory Enforcement Fairness Act
Service	U.S. Fish and Wildlife Service
The springsnails	The Three Forks and San Bernardino springsnails

## EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential economic impacts associated with the designation of critical habitat for the Three Forks springsnail (*Pyrgulopsis trivialis*) and the San Bernardino springsnail (*Pyrgulopsis bernardina*). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service).

### OVERVIEW OF THE PROPOSED DESIGNATION OF CRITICAL HABITAT

2. On April 12, 2011 the Service proposed to list the two springsnails as endangered species and to designate critical habitat for each.<sup>1</sup> Maps of the proposed critical habitat are presented in Exhibits ES-2 and ES-3. Three units comprising approximately 17.1 acres of critical habitat are proposed for the Three Forks springsnail.<sup>2</sup> The three units (Three Forks springs, Boneyard Bog springs, and Boneyard Creek springs) are in Eager, Arizona within the Apache-Sitgreaves National Forests (ASNFs), and all three springs were considered to be occupied by the species at the time of the proposed listing rule.<sup>3</sup> After the proposed listing rule was published in the Federal Register, it was discovered that prior surveys had incorrectly identified land snails. The AGFD has been conducting annual surveys at Three Forks springs since 2001, and they had originally reported very low numbers of the springsnail at Three Forks springs.<sup>4,5,6</sup> However, no voucher specimens (specimens collected to verify species identification) were actually collected until after the proposed rule published in 2011, when it was discovered that the small snails from Three Forks Springs were not Three Forks springsnails,<sup>7</sup> but rather air-breathing, land snails belonging to the family Pupillidae. As such, the Service believes the species does not currently occupy Three Forks Springs. Fortunately, the species continues to be abundant at Boneyard Bog Springs and Boneyard Creek Springs.

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<sup>1</sup> Proposed listing and critical habitat rule, (2011) 76 FR 20464-20488.

<sup>2</sup> Proposed listing and critical habitat rule, (2011) 76 FR 20464; ArcGIS shapefiles provided by the U.S. Fish and Wildlife Service; and Email and phone correspondence with Mike Martinez and Nathan Allan, Arizona Ecological Services Office, U.S. Fish and Wildlife Service, June 10, 2011.

<sup>3</sup> Proposed listing and critical habitat rule, (2011) 76 FR 20464.

<sup>4</sup> Cox, D. 2007. Electronic mail communication from Dan Cox, Arizona Game and Fish Department, to Mike Martinez, Fish and Wildlife Service, regarding Three Forks Surveys. March 2, 2007. 2 pp.

<sup>5</sup> Bailey, A. 2008. Electronic mail communication to M. Martinez, U.S. Fish and Wildlife Service, from A. Bailey, Arizona Game and Fish Department. July 24, 2008. 2 pp.

<sup>6</sup> Grosch, T. 2010. Electronic mail communication to M. Martinez, U.S. Fish and Wildlife Service, from T. Grosch, Arizona Game and Fish Department. June 8, 2010. 2 pp.

<sup>7</sup> Sorensen, J. 2011a. Electronic mail communication regarding: AZGFD's data and fieldnotes - Three Forks springsnail survey Sept 27-28 2011. October 12, 2011. 2 pp.

3. Four units comprising approximately 2.0 acres are proposed for the San Bernardino springsnail in Douglas, Arizona.<sup>8</sup> Two units of the San Bernardino critical habitat are occupied (Goat Tank and Horse Springs), one is not occupied (Tule Spring), and one has an unknown occupancy (Snail Spring).<sup>9</sup> Three units are found on publicly owned state land; the fourth is located in the San Bernardino National Wildlife Refuge (NWR). No areas have been identified for possible exclusion from the final rule.<sup>10</sup>
4. This analysis describes economic impacts of conservation efforts associated with the following categories of activity: (1) pesticide use; (2) wildfire suppression, and (3) ungulate grazing. Given the limited extent of the proposed designation, the analysis forecasts specific anticipated land use projects likely to occur in the reasonably foreseeable future based on interviews with State and local officials and other potentially affected entities.
5. Forecast impacts are organized into two categories according to “without critical habitat” and “with critical habitat” scenarios. The “without critical habitat” scenario represents the baseline for the analysis, considering protections otherwise accorded the two springsnails; for example, protections provided under 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. That is, incremental administrative and conservation efforts and associated economic impacts are those expected to occur specifically because of the designation of critical habitat for the two springsnails. Potential economic benefits of the designation are provided at the end of the report.
6. Exhibit ES-1 below describes the key findings of the analysis.

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<sup>8</sup> Proposed listing and critical habitat rule, 76 FR 20464.

<sup>9</sup> The Snail Spring unit has “unknown occupancy:” because the upper portion has dried while the lower portion, where wetted habitat still exists, has not been surveyed. The Tule Spring unit is currently unoccupied, but may have been historically occupied by the San Bernardino springsnail. (Ibid.)

<sup>10</sup> Proposed listing and critical habitat rule, (2011) 76 FR 20464-20488.

## EXHIBIT ES-1. KEY FINDINGS

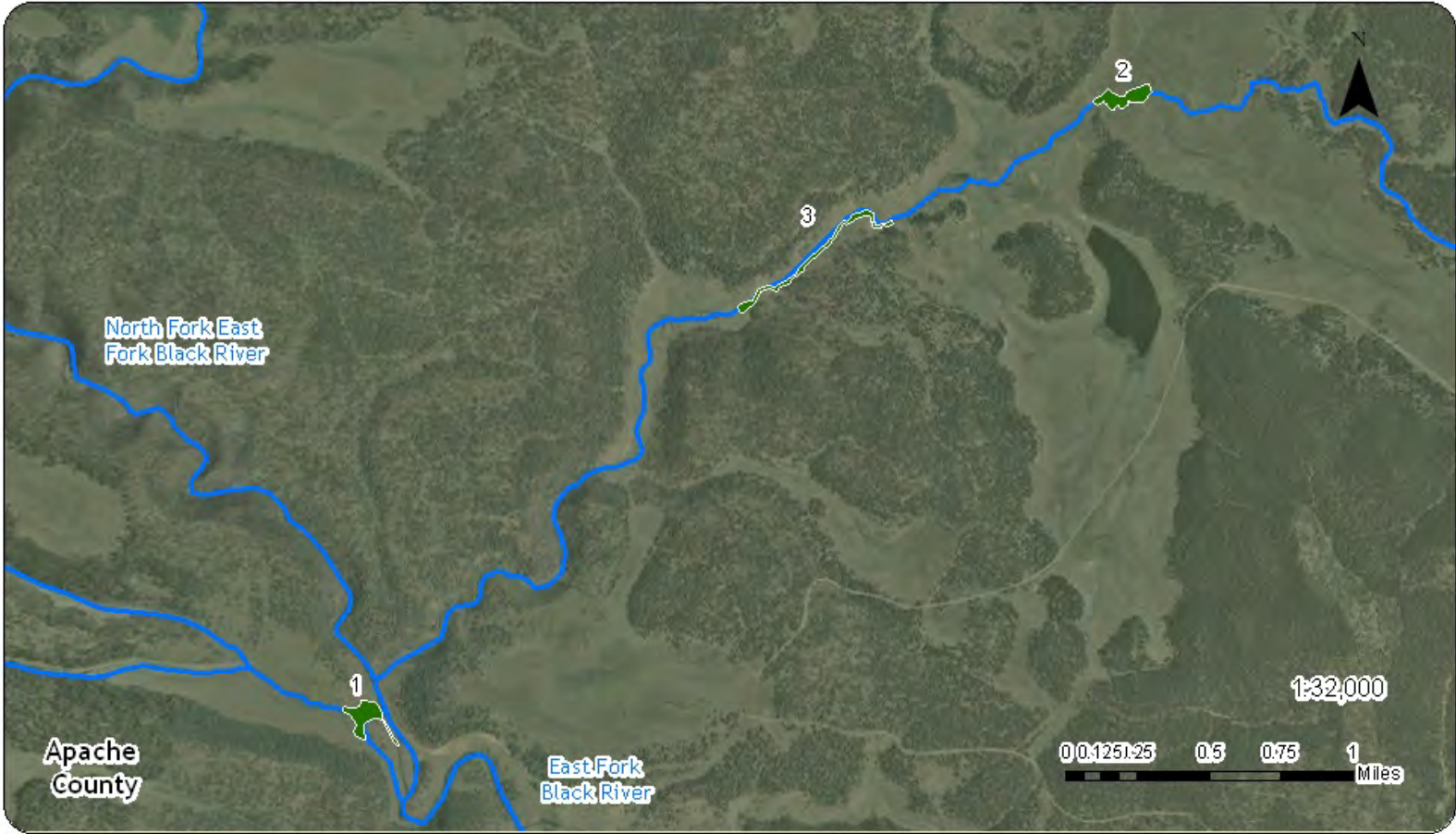
## POST-DESIGNATION INCREMENTAL IMPACTS

**Incremental Impacts:** The quantifiable incremental impacts of critical habitat designation are anticipated to be limited to minor administrative costs associated with section 7 consultations, ranging from \$66,100 to \$68,600 in present value terms assuming discount rates of seven and three percent, respectively. Proposed critical habitat units for the Three Forks springsnail, all located in the ASNFs, were considered to be occupied at the time of the proposed listing and critical habitat rule. After publication of the proposed rule, it was discovered that the Three Forks Springs unit was not really occupied by the species as previously thought. See explanation under paragraph 2 on page ES-1. Additional conservation measures beyond those likely to be undertaken based on the presence of the listed species are not anticipated.

Three of the four units proposed for the San Bernardino springsnail are located on the John Slaughter Ranch Museum, which is owned by the State of Arizona. Because the Service has deeded water rights at the ranch, a Federal nexus does exist. However, future formal consultation with the Service is not anticipated at this time because the Refuge is working informally with the manager of the John Slaughter Ranch Museum to provide an alternative water source. However, if water use changes are proposed on the John Slaughter Ranch Museum, an internal Service consultation could occur in the future. The final unit for this species is located in the San Bernardino NWR. Although the unit is currently unoccupied, the Service plans to re-introduce the species to the spring. Incremental costs are limited to minor administrative costs associated with consultation on this activity.

Incremental costs are summarized in Exhibit ES-4.

EXHIBIT ES-2. MAP OF THREE FORKS SPRINGSNAIL PROPOSED CRITICAL HABITAT



**Legend**

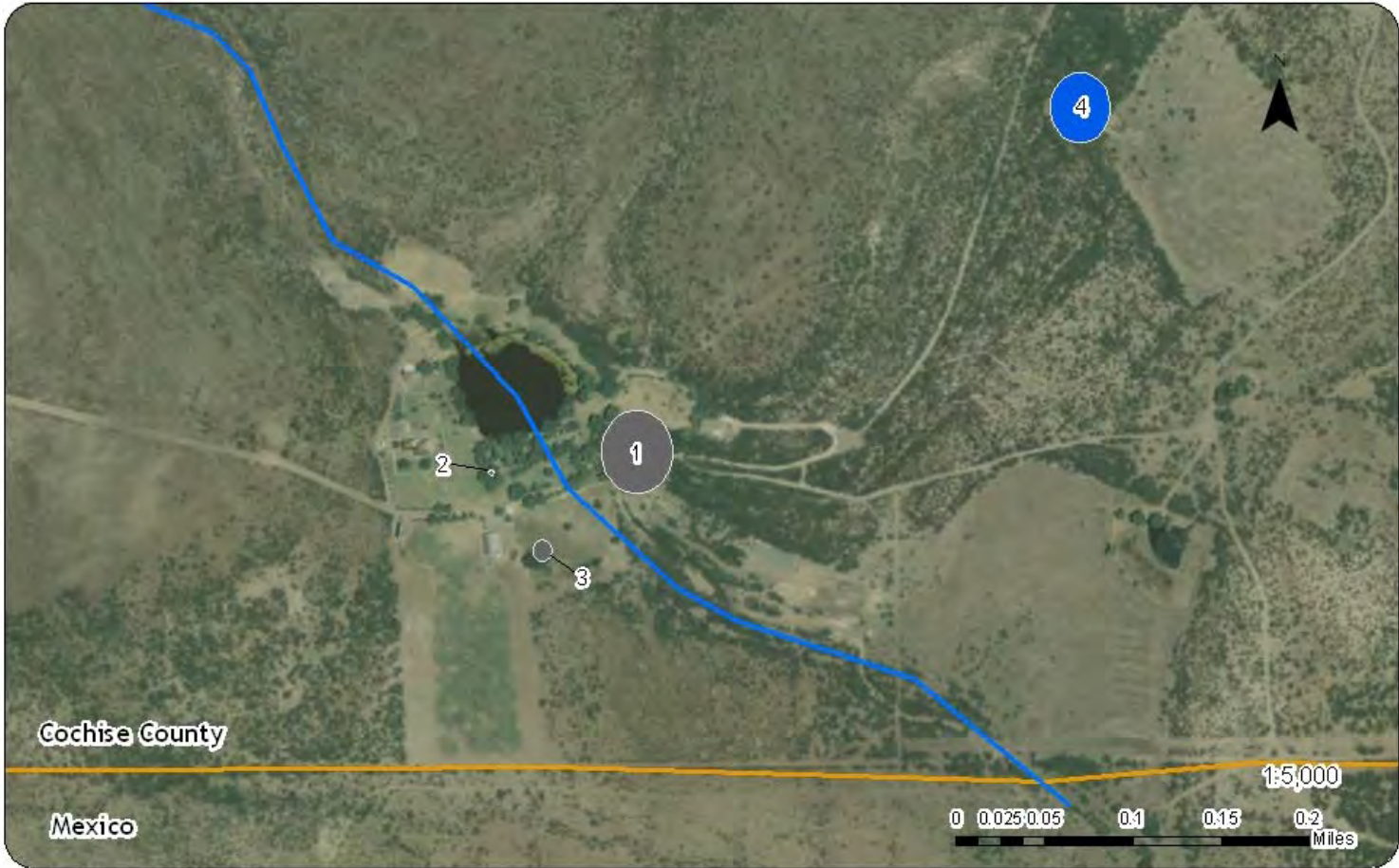
- National Forest
- Rivers

- 1. Three Forks Springs
- 2. Boneyard Bog Springs
- 3. Boneyard Creek Springs

Sources:  
 1. U.S. Fish and Wildlife Service  
 2. Environmental Systems Research Institute, Inc. (ESRI)

**IEc** Map Projection: State Plane, Arizona  
 Geodetic Reference System: NAD 83  
**INDUSTRIAL ECONOMICS, INCORPORATED**

EXHIBIT ES-3. MAP OF SAN BERNARDINO SPRINGSNAIL PROPOSED CRITICAL HABITAT



**Legend**

- John Slaughter Ranch
- National Wildlife Refuge
- Rivers

- 1. Snail Spring
- 2. Goat Tank Spring
- 3. Horse Spring
- 4. Tule Spring

Sources:  
 1. U.S. Fish and Wildlife Service  
 2. Environmental Systems Research Institute, Inc. (ESRI)

**IEC** Map Projection: State Plane, Arizona  
 Geodetic Reference System: NAD 83  
 INDUSTRIAL ECONOMICS, INCORPORATED



**DISCUSSION OF RESULTS**

8. Only minor administrative impacts are likely to result from the designation of critical habitat. This result is attributed to several factors, including: (1) four of the seven proposed units already receive extensive protection from the Federal agencies managing the parcels; (2) two of the four federally-owned units are occupied and thus will require consultation regardless of the designation; (3) reintroduction of the San Bernardino springsnail to one unoccupied unit is planned regardless of critical habitat designation; and (4) project modifications necessary to avoid adverse modification are indistinguishable from those necessary to avoid jeopardizing the species, because the species' existence heavily depends upon the spring systems in which they occur.
9. We anticipate seven potential section 7 consultations related to activities on federally managed lands. Both the ASNFs and San Bernardino NWR will need to address the springsnails in their management plans to prevent adverse modification of these units. Given the presence of springsnails in the ASNFs, the five consultations would occur without the designation. We anticipate the U.S. Forest Service will re-initiate two programmatic consultations, one for the ASNFs' Management Plan, and one for its nationwide plan on the use of fire retardants across national forests. Additionally, we anticipate up to three formal consultations, one for the response to the 2011 Wallow fire, one for potential long-term burn area rehabilitation after the Wallow fire, and one for salvaging trees within the fire perimeter.<sup>11</sup> Incremental impacts are limited to the additional administrative costs (approximately \$48,500) of considering the potential for the plans and projects to adversely modify critical habitat.
10. The San Bernardino NWR will likely reinitiate one programmatic consultation with the Service regarding its management plan, and participate in one formal consultation to reintroduce the springsnail to the site.<sup>12</sup> Because the Service plans to reintroduce the springsnail at this site regardless of whether critical habitat is designated, incremental costs are limited to the administrative costs (\$22,200) of considering adverse modification during the consultations.
11. Incremental costs are summarized in Exhibit ES-4. Because we do not have information regarding the timing of likely consultations, we conservatively assume costs are incurred immediately following promulgation of the final rule (in 2012). Total undiscounted costs are \$70,700. In conformance with the Office of Management and Budget (OMB) guidance, we also report present value impacts and impacts on an annualized basis applying real discount rates of three and seven percent.

**POTENTIAL BENEFITS OF CRITICAL HABITAT DESIGNATION**

12. The primary intended benefit of critical habitat is to support the conservation of threatened and endangered species, such as the Three Forks and San Bernardino springsnails. Thus, attempts to develop monetary estimates of the benefits of this

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<sup>11</sup> Email and phone correspondence with Mike Martinez and Ryan Gordon, Arizona Ecological Services Office, U.S. Fish and Wildlife Service, July 18, 2011.

<sup>12</sup> Ibid.

proposed critical habitat designation would focus on the public's willingness to pay to achieve the conservation benefits to the springsnails resulting from this designation.

13. Quantification and monetization of species conservation benefits requires information on the incremental change in the probability of the springsnails conservation that is expected to result from the designation. As described in this Executive Summary, modifications to future projects are likely; however, these modifications would already be expected to occur in order to prevent jeopardy of the species under the baseline. Project modifications beyond the baseline attributable solely to critical habitat are not currently anticipated, primarily because the only action currently anticipated in the unoccupied unit (Tule Springs) is a reintroduction of the species that is already expected absent critical habitat designation. Because only administrative efforts are anticipated as a result of the designation, the designation is unlikely to increase the probability that the springsnails will be conserved.

#### POTENTIAL IMPACTS TO SMALL ENTITIES AND THE SUPPLY, DISTRIBUTION, OR USE OF ENERGY

14. No small entities are anticipated to be affected by the designation. We also do not anticipate impacts to the supply, distribution, or use of energy related to this critical habitat designation.

#### KEY SOURCES OF UNCERTAINTY

15. To the extent that future economic activity is uncertain, this analysis may have failed to identify projects or land use alterations that may occur within habitat. However, given the stated conditions, project modifications due to critical habitat designation are unlikely.

#### EXHIBIT ES-4. TOTAL ESTIMATED INCREMENTAL IMPACTS BY UNIT (\$2011)

AREA	UNDISCOUNTED COSTS	PRESENT VALUE (3% DISCOUNT RATE)	PRESENT VALUE (7% DISCOUNT RATE)	ANNUALIZED VALUE (3% DISCOUNT RATE)	ANNUALIZED VALUE (7% DISCOUNT RATE)
Apache-Sitgreaves National Forests	\$48,500	\$47,100	\$45,300	\$4,300	\$5,070
San Bernardino National Wildlife Refuge	\$22,200	\$21,500	\$20,700	\$1,970	\$2,320
<b>Total</b>	<b>\$70,700</b>	<b>\$68,600</b>	<b>\$66,100</b>	<b>\$6,270</b>	<b>\$7,390</b>

Notes:

1. Totals may not sum due to rounding.
2. Annualized values based on the 13-year period of this analysis (2012-2024).

## CHAPTER 1 | INTRODUCTION AND BACKGROUND

### 1.1 INTRODUCTION

16. This chapter provides a brief introduction to the proposed critical habitat for the Three Forks and San Bernardino springsnails. It includes a summary of past legal actions that relate to the current proposal, a summary of land ownership within the current proposal, maps of the proposed units, and a summary of threats to the proposed critical habitat. All official definitions and boundaries should be taken from the Proposed Rule.<sup>13</sup>

### 1.2 BACKGROUND

#### 1.2.1 PREVIOUS FEDERAL ACTIONS

17. The Three Forks springsnail became a candidate for protection under the Endangered Species Act (the Act) on October 30, 2001, and the San Bernardino springsnail became a candidate for protection on December 6, 2007.<sup>14</sup> The Service preserved a listing priority number (LPN) of 2 for the Three Forks springsnail and San Bernardino springsnail in the annual Candidate Notice of Review on November 10, 2010, reflecting high magnitude, imminent threats and taxonomic classification as a full species.<sup>15</sup>
18. On November 17, 2011, the Service reopened the comment period on the proposed rule, and announced the availability of a draft economic analysis.<sup>16</sup> At that time, it proposed revision of the previously proposed critical habitat for the Three Forks springsnail, based on new information indicating that the species was more widely distributed along Boneyard Creek. The Service also announced the receipt of new information confirming that populations of springsnails in Sonora, Mexico, are San Bernardino springsnails. However, the Service is not designating critical habitat in Sonora, Mexico, because it does not designate critical habitat outside the United States.

#### 1.2.2 PROPOSED CRITICAL HABITAT DESIGNATION

19. On April 12, 2011 the Service proposed to list the two springsnails as endangered species and to designate critical habitat for each. Exhibit 1-1 provides information concerning ownership, acreage, and occupancy of each proposed critical habitat unit. Three units comprising approximately 17.1 acres of critical habitat are proposed for the Three Forks

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<sup>13</sup> Proposed listing and critical habitat rule, (2011) 76 FR 20464-20488.

<sup>14</sup> Ibid, 20464.

<sup>15</sup> Ibid, 20464.

<sup>16</sup> Proposed listing and critical habitat rule, reopening of comment period, (2011) 76 FR 71300.

spring snail.<sup>17</sup> The three units (Three Forks springs, Boneyard Bog springs and Boneyard Creek springs) are near Eager, Arizona within the ASNFs, and only Boneyard Bog springs and Boneyard Creek springs are occupied by the species. Exhibit 1-2 provides an overview map of the area.

20. Four units comprising approximately 2.0 acres were proposed for the San Bernardino spring snail near Douglas, Arizona.<sup>18</sup> Two units of the San Bernardino critical habitat are occupied (Goat Tank and Horse Springs), one is not occupied (Tule Spring), and one has an unknown occupancy (Snail Spring).<sup>19</sup> Three units are found on state-owned land; the fourth is located in the San Bernardino NWR. Exhibit 1-2 provides an overview map of the area.
21. The spring snails are endemic to the arid southwest, where they are generally geographically isolated. Both spring snails are aquatic, lay eggs and feed primarily on periphyton, which is a mixture of algae, detritus, bacteria and other microbes. The spring snails are generally found in springs, seeps, spring runs, and other waters, but particularly rheocrene systems where water emerges from the ground as a stream. They are most commonly found in gravel to cobble size substrates that provide an appropriate surface for grazing and laying eggs.<sup>20</sup>

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<sup>17</sup> Proposed listing and critical habitat rule, (2011) 76 FR 20464; ArcGIS layers from the U.S. Fish and Wildlife Service; and Email and phone correspondence with Mike Martinez and Nathan Allan, Arizona Ecological Services Office, U.S. Fish and Wildlife Service, June 10, 2011.

<sup>18</sup> Proposed listing and critical habitat rule, (2011) 76 FR 20464.

<sup>19</sup> The Snail Spring unit has "unknown occupancy;" because the upper portion has dried while the lower portion, where wetted habitat still exists, has not been surveyed. The Tule Spring unit is currently unoccupied, but may have been historically occupied by the San Bernardino spring snail. (Ibid.)

<sup>20</sup> Proposed listing and critical habitat rule, (2011) 76 FR 20465-20466.

EXHIBIT 1-1. SUMMARY OF LAND OWNERSHIP AND OCCUPANCY IN PROPOSED THREE FORKS AND SAN BERNARDINO SPRINGSNAIL CRITICAL HABITAT

UNIT	OWNERSHIP TYPE	TOTAL UNIT ACRES	MANAGEMENT	CURRENTLY OCCUPIED
Units for the Three Forks Springsnail				
1: Three Forks Springs	Federal	6.1	Apache-Sitgreaves National Forests	Unoccupied <sup>1</sup>
2: Boneyard Bog Springs	Federal	5.3	Apache-Sitgreaves National Forests	Occupied
3: Boneyard Creek Springs	Federal	5.8	Apache-Sitgreaves National Forests	Occupied
Total <sup>2</sup>		17.1		
Units for the San Bernardino Springsnail				
1: Snail Spring	State	1.1	John Slaughter Ranch Museum	Unknown
2: Goat Tank Spring	State	<0.1	John Slaughter Ranch Museum	Occupied
3: Horse Spring	State	<0.1	John Slaughter Ranch Museum	Occupied
4: Tule Spring	Federal	0.8	National Wildlife Refuge	Unoccupied
Total <sup>2</sup>		2.0		

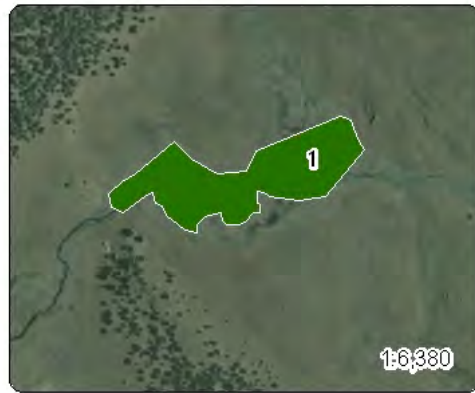
Source: IEc GIS analysis of parcels provided by the U.S. Fish and Wildlife Service, April 7, 2011; information from Proposed listing and critical habitat rule, (2011) 76 FR 20464-20488; and Email and phone correspondence with Mike Martinez and Nathan Allan, Arizona Ecological Services Office, U.S. Fish and Wildlife Service, June 10, 2011.

Notes:

- All three springs were considered to be occupied by the species at the time of the proposed listing rule (76 FR 20464; April 12, 2011). After the proposed listing rule was published in the *Federal Register*, it was discovered that prior surveys had incorrectly identified land snails. The AGFD has been conducting annual surveys at Three Forks springs since 2001, and they had originally reported very low numbers of the springsnail at Three Forks springs (Cox 2007, p. 1; Bailey 2008, p. 1; Grosch 2010, p. 1). However, no voucher specimens (specimens collected to verify species identification) were actually collected until after the proposed rule published in 2011, when it was discovered that the small snails from Three Forks Springs were not Three Forks springsnails (Sorensen 2011a, p. 1), but rather air-breathing, land snails belonging to the family Pupillidae. As such, we believe the species does not currently occupy Three Forks Springs. Fortunately, the species continues to be abundant at Boneyard Bog Springs and Boneyard Creek Springs
- Totals may not sum due to rounding.

EXHIBIT 1-2. PROPOSED CRITICAL HABITAT PARCEL OWNERSHIP

Three Forks Springsnail



- Three Forks Springsnail
1. Three Forks Springs
  2. Boneyard Bogs Springs
  3. Boneyard Creek Springs
- San Bernardino Springsnail
1. Snail Spring
  2. Goat Tank Spring
  3. Horse Spring
  4. Tule Spring



- Land Ownership**
- Apache-Sitgreaves National Forest
  - John Slaughter Ranch
  - San Bernardino National Wildlife Refuge
  - Federal Lands



San Bernardino Springsnail



**IEC** Map Projection: State Plane, Arizona  
 Geodetic Reference System: NAD 83  
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### 1.3 AFFECTED ACTIVITIES CONSIDERED IN THIS ANALYSIS

22. All of the proposed critical habitat areas in this rule are located on state or federally owned lands, and all critical habitat for both springsnails is found in relatively undeveloped and/or rural areas. Portions of critical habitat fall within the following protected areas:
- Lands within the Apache-Sitgreaves National Forests; and
  - The San Bernardino NWR.
23. Chapter 3 of the economic analysis describes efforts currently undertaken to conserve Three Forks and San Bernardino springsnails and their habitats.
24. Based on information provided in the Proposed Rule and discussions with the Service, conservation efforts to protect the Three Forks and San Bernardino springsnails may affect the following activities potentially occurring in proposed critical habitat.
- **Pesticide Use.** Pesticide and herbicide use at the John Slaughter Ranch Museum can contaminate springs and cause a threat to the springsnails. These chemicals can contaminate the food base of the springsnails and may have direct effects to the springsnails. Potential impacts to activities on the John Slaughter Ranch Museum are discussed in Chapter 3.
  - **Fire Suppression.** As stated in the Proposed Rule, increased risk of large wildfires and wildfire suppression methods threaten Three Forks and San Bernardino springsnails. Chapter 3 discusses potential impacts to fire suppression activities in and around proposed critical habitat units.
  - **Ungulate Grazing.** Although livestock grazing is excluded in all critical habitat units, elk wallowing has been observed in the Three Forks springsnail units. Chapter 3 of this economic analysis addresses potential impacts to activities due to elk wallowing.

### 1.4 ORGANIZATION OF THE REPORT

25. The remainder of this report proceeds through three additional chapters. Chapter 2 discusses the framework employed in the analysis. Chapter 3 describes the extensive baseline protections currently afforded to the springsnails and an assessment of potential economic impacts to pesticide, wildfire suppression and ungulate grazing activities. Finally, Chapter 4 briefly describes the potential benefits of the critical habitat designation.
- Chapter 2 – Framework for the Analysis
  - Chapter 3 – Current Conservation Measures for the Springsnails and their Habitats, and Potential Effects on Economic Activities
  - Chapter 4 – Economic Benefits
26. In addition, the report includes two appendices. The first, Appendix A, considers potential impacts on small entities and the energy industry. A memorandum provided by the Service describing the likely incremental effects of considering critical habitat in future section 7 consultations is included in Appendix B.

## CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS

27. The purpose of this report is to estimate the economic impact of actions taken to protect the springsnails and their habitats. 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. 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 two springsnails; 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 two springsnails.
28. This information is intended to assist the Secretary of the U.S. Department of the Interior in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.<sup>21</sup> In addition, this information allows the Service to address the requirements of Executive Orders 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).<sup>22</sup>
29. This chapter describes the framework for this analysis. First, we describe 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. This chapter then defines 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.

**2.1 BACKGROUND**

30. The OMB guidelines for conducting economic analysis of regulations 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."<sup>23</sup> In

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<sup>21</sup> 16 U.S.C. §1533(b)(2).

<sup>22</sup> 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; 5 U.S.C. §§601 *et seq.* and Pub Law No. 104-121.

<sup>23</sup> OMB, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf>.



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.

31. 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.<sup>24</sup> 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 ESA [Endangered Species Act].”<sup>25</sup>

32. 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.<sup>26</sup> For example, 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

<sup>24</sup> *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

<sup>25</sup> *Ibid.*

<sup>26</sup> 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 “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.

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 ESA 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.’<sup>27</sup>

33. Most 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.<sup>28</sup> Plaintiffs in both cases requested review by the Supreme Court, which declined to hear the cases in 2011.
34. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis:
  - a. Describes the baseline protections afforded the springsnails absent critical habitat designation; and
  - b. Monetizes the potential incremental impacts precipitated specifically by the designation of critical habitat for the species.
35. 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.<sup>29</sup> At this time the Service is analyzing whether destruction or adverse modification would occur based on the statutory language of the ESA itself, which requires the Service to consider whether the agency’s action is likely “to result in the 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. To assist us in evaluating these likely impacts, the Service provided information regarding what potential consultations could occur in the critical habitat units for the springsnails and what projection modifications may be imposed as a result of critical habitat designation. The Service also provided a memorandum characterizing the effects of critical habitat designation over and above those associated with the listing. (Appendix B). A detailed description of the methodology used to define baseline and incremental impacts is provided later in this section.

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<sup>27</sup> *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.

<sup>28</sup> *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).

<sup>29</sup> *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, 378 F.3d 1059 (9<sup>th</sup> Cir. 2004); *Sierra Club v. U. S. Fish and Wildlife Service*, 245 F.3d 434 (5<sup>th</sup> Cir. 2001).

## 2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

36. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the springsnails and their habitats (hereinafter referred to collectively as “springsnail conservation efforts”). 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 springsnail conservation efforts.
37. 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

38. 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 springsnail habitat, 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.<sup>30</sup>
39. 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.

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<sup>30</sup> 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>.

40. 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. Given the small number of acres proposed for designation in this case, measurable market impacts are not anticipated. This analysis, therefore, focuses on compliance costs.

#### 2.2.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

41. 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.<sup>31</sup> 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 and Energy Supply, Distribution, and Use

42. 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.<sup>32</sup> 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.<sup>33</sup>

#### Regional Economic Effects

43. 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.

<sup>31</sup> 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>.

<sup>32</sup> 5 U.S.C. §§601 *et seq.*

<sup>33</sup> Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

44. 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.
45. 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.
46. Given the limited nature of incremental impacts likely to result from this designation (see Chapter 3), measurable regional impacts are not anticipated.

### 2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

47. This analysis: 1) identifies those economic activities most likely to threaten the springsnails and their habitats; 2) describes the baseline regulation protection for the species; and 3) monetizes the incremental economic impacts to avoid adverse modification of the proposed critical habitat area. This section provides a description of the methodology used to separately identify baseline protections from the incremental impacts stemming from the proposed designation of critical habitat for the springsnails. 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. Further discussion of this methodology specific to the springsnails is provided in Chapter 3.

#### 2.3.1 IDENTIFYING BASELINE IMPACTS

48. 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 the 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.

49. 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 where possible, provides examples of the potential magnitude of the costs of these baseline protections. The primary focus, however, is not on baseline costs, since these will not be affected by the proposed regulation. Instead, the focus of this analysis is on monetizing the incremental impacts forecast to result from the proposed critical habitat designation.
- 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.
  - 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."<sup>34</sup> The economic impacts associated with this section manifest themselves in sections 7 and 10.
  - Under section 10(a)(1)(B) of the Act, an entity (e.g., a landowner or local government) may develop a Habitat Conservation Plan (HCP) for a listed animal 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.<sup>35</sup> 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.

Enforcement actions taken in response to violations of the Act are not included in this analysis.

50. 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

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<sup>34</sup> 16 U.S.C. 1532.

<sup>35</sup> U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

critical habitat. In these cases, they are considered incremental impacts and are discussed below.

### 2.3.2 IDENTIFYING INCREMENTAL IMPACTS

51. This analysis quantifies the potential incremental impacts of this rulemaking. 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.
52. 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.
53. 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 springsnail 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 perceptual effects on markets.

#### Direct Impacts

54. 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.
55. 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 (the Corps). Often, they will also include a third party involved in projects that involve a permitted entity, such as the recipient of a Clean Water Act section 404 permit.
56. 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, 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.

57. Section 7 consultations with the Service may be either informal or formal. *Informal consultations* 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.

#### Administrative Section 7 Consultation Costs

58. 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 nexus necessitating the consultation) serves as the liaison with the Service. While consultations are required for activities that involve a Federal nexus 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.
59. In general, three 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. **Re-initiation of consultation to address adverse modification** - Consultations that have already been completed on a project or activity (but for which the project or activity is not yet completed) may require re-initiation to address critical habitat. In this case, the costs of re-initiating the consultation, including all associated administrative and project modification costs are considered incremental impacts of the designation.



**3. 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 potential presence of the species 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.

60. 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 2-1).

**Section 7 Conservation Effort Impacts**

61. 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, and for re-initiations of past consultations to consider critical habitat, 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.

EXHIBIT 2-1. RANGE OF INCREMENTAL ADMINISTRATIVE CONSULTATIONS COSTS  
(2011 DOLLARS)

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	\$1,050	n/a	\$1,620
Informal	\$2,450	\$3,100	\$2,050	\$2,000	\$9,500
Formal	\$5,500	\$6,200	\$3,500	\$4,800	\$20,000
Programmatic	\$16,700	\$13,900	n/a	\$5,600	\$36,100
NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION (UNOCCUPIED HABITAT)					
Technical Assistance	\$428	n/a	\$788	n/a	\$1,220
Informal	\$1,840	\$2,330	\$1,540	\$1,500	\$7,130
Formal	\$4,130	\$4,650	\$2,630	\$3,600	\$15,000
Programmatic	\$12,500	\$10,400	n/a	\$4,200	\$27,100
RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION					
Technical Assistance	\$285	n/a	\$525	n/a	\$810
Informal	\$1,230	\$1,550	\$1,030	\$1,000	\$4,750
Formal	\$2,750	\$3,100	\$1,750	\$2,400	\$10,000
Programmatic	\$8,330	\$6,930	n/a	\$2,800	\$18,100
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION (ADDITIVE WITH BASELINE COSTS OF CONSIDERING JEOPARDY)					
Technical Assistance	\$143	n/a	\$263	n/a	\$405
Informal	\$613	\$775	\$513	\$500	\$2,380
Formal	\$1,380	\$1,550	\$875	\$1,200	\$5,000
Programmatic	\$4,160	\$3,460	n/a	\$1,400	\$9,030
Source: IEc analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2008, and a review of consultation records from several Service field offices across the country conducted in 2002.					
Notes:					
1. Estimates are rounded to three significant digits and may not sum due to rounding.					
2. Estimates reflect average hourly time required by staff.					

*Indirect Impacts*

62. The designation of critical habitat may, under certain circumstances, affect actions that do not have a Federal nexus 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 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.

- **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.** 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. Data allowing for the quantification of such efforts are generally unavailable.

### 2.3.3 BENEFITS

63. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.<sup>36</sup> OMB's Circular A-4 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.<sup>37</sup>
64. 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.<sup>38</sup> *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.*
65. Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the primary constituent elements on

<sup>36</sup> Executive Order 12866, Regulatory Planning and Review, September 30, 1993.

<sup>37</sup> U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf>

<sup>38</sup> Ibid.

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

66. Economic impacts of springsnail conservation are considered across the entire area proposed for critical habitat designation, as defined in Chapter 1. Results are presented by proposed critical habitat unit.

#### 2.3.5 ANALYTIC TIME FRAME

67. 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). However, absent specific information on the expected time frame for recovery of the springsnails, this analysis forecasts impacts over a “reasonably foreseeable” time frame. Based on available data, this analysis considers economic impacts to activities from 2012 (expected year of final critical habitat designation) through 2024 (the length of guidance and information for project and activity decision-making for the ASNFs' Land Management Plan).<sup>39</sup>

#### 2.4 INFORMATION SOURCES

68. The primary sources of information for this report are communications with, and data provided by, personnel from the Service, local governments and other stakeholders. In addition, this analysis relies upon the Service's section 7 consultation records and existing habitat management and conservation plans that consider the springsnails. A complete list of references is provided at the end of this document.

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<sup>39</sup> U.S. Department of Agriculture and U.S. Forest Service, Southwestern Region. 2009. *Apache-Sitgreaves National Forests Working DRAFT Land Management Plan*. Viewed at: [http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fsbdev7\\_019999.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev7_019999.pdf) on June 7, 2011.

### CHAPTER 3 | CURRENT CONSERVATION MEASURES FOR THE SPRINGSNAILS AND THEIR HABITAT, AND POTENTIAL EFFECTS ON ECONOMIC ACTIVITIES

69. This chapter discusses the conservation measures that exist for the springsnails absent the designation of critical habitat, and potential economic impacts to activities taking place in proposed critical habitat. Both the Three Forks springsnail and San Bernardino springsnail are endemic to the arid southwest, where springsnails are generally geographically isolated. Both springsnails are aquatic, lay eggs and feed primarily on periphyton, which is a mixture of algae, detritus, bacteria and other microbes. The springsnails are generally found in springs, seeps, spring runs, and other waters, but particularly rheocrene systems where water emerges from the ground as a stream. They are most commonly found in gravel to cobble size substrates that provide an appropriate surface for grazing and laying eggs.<sup>40</sup>
70. Efforts are already undertaken to protect some of the areas proposed for designation. However, according to the Service, threats to proposed units continue to exist.<sup>41</sup> Unit ownership is shown in Exhibit 1-1. Activities potentially destructive of the springsnails' habitat in these areas include:
- Pesticides (Snail, Goat Tank, Horse, and Tule Spring units);
  - Water depletion (Snail, Goat Tank, Horse, and Tule Spring units);
  - Wildfire suppression (All units);
  - Ungulate grazing (Three Forks springs, Boneyard Bog springs, and Boneyard Creek springs units); and
  - Nonnative species (crayfish and New Zealand snails) (All units).

#### 3.1 APACHE-SITGREAVES NATIONAL FORESTS

71. At the time of the proposed listing rule for the Three Forks springsnail, the three proposed units within the ASNFs were considered occupied.<sup>42</sup> Based on new information since the proposed listing rule, the Service no longer considers Three Forks springs to be currently occupied (see explanation above on page ES-1 for more detail). One of the three major goals of ASNFs' Land Management Plan is the maintenance and improvement of

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<sup>40</sup> Proposed listing and critical habitat rule. 76 FR 20465-20466.

<sup>41</sup> Proposed listing and critical habitat rule. 76 FR 20464-20488.

<sup>42</sup> Ibid.

ecosystem health. Actions the ASNFs are planning in order to achieve this goal include: reduce degrading factors, enhance and restore high risk watersheds and stream habitats, remove barriers or restore dewatered stream segments, restore streams, floodplains and riparian vegetation, improve designated roads or trails that add sediment to the ecosystem, restore unauthorized roads or trails, enhance or restore wet meadows or cienegas, reduce animal damage on riparian species, reduce tree density, decrease woody canopy, and eradicate invasive species.<sup>43</sup> On August 24, 2000, the U.S. Forest Service issued Order No. 01-343, which closed the area containing Three Forks springs to public access, and a permit is required to enter the area. As such, the area is generally not accessible to livestock or other uses. Little enforcement exists to restrict recreationalists, but adverse effects from recreationalists are considered negligible.<sup>44</sup>

72. The two activities of concern in the Three Forks springs, the Boneyard Bog springs, and Boneyard Creek springs units include wildfire suppression and ungulate grazing.<sup>45</sup> The U.S. Forest Service, which manages the ASNFs, must consult the Service on its management activities under section 7 of the Act. The Service may recommend that a fence be constructed around Boneyard Bog springs to prevent elk grazing. We assume that costs associated with this effort would be attributed to the baseline scenario; because, fencing is likely to occur regardless of critical habitat designation based on the presence of the species. Additionally, conservation recommendations for changes in wildfire suppression activities are likely with or without the designation of critical habitat.<sup>46</sup> These consultations address the entire forest, which includes occupied habitat, and additional conservation efforts specifically related to critical habitat designation appear unlikely.<sup>47</sup> Thus, the additional effort to address potential adverse modification will result only in an increase in the administrative cost of consultation.
73. Two programmatic consultations are anticipated to address the species and its critical habitat in the ASNFs. The U.S Forest Service will likely re-initiate consultations on its management plan for the ASNFs and its nationwide management plan for the use of fire retardants across national forests.<sup>48</sup> The total incremental cost of a re-initiated programmatic consultation is estimated to be approximately \$18,060, of which \$8,330 is

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<sup>43</sup> U.S. Department of Agriculture and U.S. Forest Service, Southwestern Region. 2009. *Apache-Sitgreaves National Forests Working DRAFT Land Management Plan*. Viewed at: [http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fsbdev7\\_019999.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev7_019999.pdf) on June 7, 2011.

<sup>44</sup> U.S. Fish and Wildlife Service, "Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Three Forks Springsnail and the San Bernardino Springsnail." June 2, 2011, pp. 3.

<sup>45</sup> Predation by nonnative crayfish and potential invasion of New Zealand mussels are also identified as threats in these units; however, no incremental conservation actions or consultations related to this the removal of these nonnative species are anticipated at this time. (Source: Personal correspondence with Beth Humphrey of the ASNFs, August 25, 2011 via telephone).

<sup>46</sup> Email and phone correspondence with Mike Martinez and Nathan Allan, Arizona Ecological Services Office, U.S. Fish and Wildlife Service, June 10, 2011.

<sup>47</sup> U.S. Fish and Wildlife Service, "Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Three Forks Springsnail and the San Bernardino Springsnail." June 2, 2011, pp. 6.

<sup>48</sup> Email and phone correspondence with Mike Martinez and Ryan Gordon, Arizona Ecological Services Office, U.S. Fish and Wildlife Service, July 18, 2011.

incurred by the Service, and \$9,730 (incremental costs of consultation and preparation of the biological assessment) is incurred by the U.S. Forest Service. Additionally, there will be up to three formal consultations, one for the response to the 2011 Wallow fire, one for potential long-term burn area rehabilitation after the Wallow fire, and one for salvaging trees within the fire perimeter.<sup>49</sup> The total incremental cost of a formal consultation is estimated to be approximately \$4,130, of which \$1,380 is incurred by the Service and \$2,750 (incremental costs of consultation and preparation of the biological assessment) is incurred by the U.S. Forest Service. Because we do not know when these consultations will occur, we conservatively assign costs to the first year of this analysis (2012).

### 3.2 SAN BERNARDINO NWR

74. The Tule Spring Unit is located in the San Bernardino NWR which has been managed by the Service since 1982 for the purpose of protecting water resources and providing habitat for endangered native fish. The Service provides active management on this land and has plans to restore the spring and reintroduce the San Bernardino springsnail.<sup>50</sup> Since the NWR is dedicated to conserving native species and ecosystems, it is unlikely to adversely modify critical habitat.<sup>51</sup>
75. The San Bernardino NWR is a federally managed property, and therefore, activities on the land require a section 7 consultation. The Service states in its memo that, “the Refuge would consult on any action, such as aquatic habitat restoration, fire management plans, fire suppression, refuge plans, native fish and frog reestablishment, and border security affecting the Tule Spring unit. This would not otherwise occur for the springsnail because this unit is unoccupied.”<sup>52</sup> However, the U.S. Department of Homeland Security and the San Bernardino NWR may consult on effects to Tule Spring for protection of the listed Yaqui fishes regardless of critical habitat designation of the springsnails. In addition, as discussed above, plans are already being developed to restore the spring and reintroduce the springsnail to the site. While it is possible that conservation efforts for the springsnails that are distinct from those planned for the Yaqui fish could be identified, the designation of critical habitat at the Tule Spring unit appears likely to primarily result in incremental administrative costs of considering critical habitat in future section 7 consultations.
74. One programmatic consultation with the Service is expected regarding the Refuge’s management plan, and one formal consultation is expected for the reintroduction of the springsnail to the site.<sup>53</sup> The total incremental cost of the reinitiated programmatic

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<sup>49</sup> Ibid.

<sup>50</sup> U.S. Fish & Wildlife Service. San Bernardino National Wildlife Refuge. Accessed on April 18, 2011 at <http://www.fws.gov/refuges/profiles/index.cfm?id=22523>.

<sup>51</sup> U.S. Fish and Wildlife Service, “Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Three Forks Springsnail and the San Bernardino Springsnail.” June 2, 2011, pp. 7.

<sup>52</sup> Ibid, pp. 6

<sup>53</sup> Ibid.

consultation is estimated to be approximately \$18,060, all of which is incurred by the Service. The total incremental cost of a formal consultation is estimated to be approximately \$4,130, all of which is incurred by the Service. Because we do not know when these consultations will occur, we conservatively assign costs to the first year of this analysis (2012).

### 3.3 JOHN SLAUGHTER RANCH MUSEUM

75. Three units, Snail, Goat Tank and Horse springs, are located on the John Slaughter Ranch Museum, which is located on land owned by the State of Arizona. This ranch is currently operated as part of the Johnson Historical Museum of the Southwest, and has been designated as a National Historic Landmark. The ranch features historic ranch buildings as well as a marked trail and picnic areas. The House Pond has been stocked with native fish species in cooperation with the San Bernardino National Wildlife Refuge.<sup>54</sup> The Nature Conservancy previously deeded the water rights on the ranch to the Service, but also deeded “water use” rights to the ranch, with a stipulation that the ranch use should not adversely affect wildlife. Thus, although a Federal nexus does exist related to water use on the Ranch, future formal consultation with the Service is not anticipated at this time because the Refuge is working informally with the manager of the John Slaughter Ranch Museum to provide an alternative water source. As such, impacts of critical habitat related to activities on John Slaughter Ranch Museum are not currently anticipated.<sup>55</sup> However, if water use changes are proposed on the John Slaughter Ranch Museum, an internal consultation could occur in the future.

### 3.4 CO-OCCURRENCE WITH OTHER FEDERALLY LISTED SPECIES

76. Aside from the conservation programs and practices described above, the fact that the Three Forks and San Bernardino springsnails co-occur with other endemic and listed species has supported the preservation of suitable habitat. Co-occurring threatened species include the Chiricahua leopard frog (*Lithobates chiricahuensis*), and Yaqui fishes, one of which is federally listed as endangered.<sup>56</sup>

77. The Three Forks springsnail co-exists with the threatened Chiricahua leopard frog at Three Forks springs, and therefore the springsnail receives some advantage from conservation for the frog under section 7 of the Act. Additionally, the San Bernardino springsnail co-exists in some areas with listed Yaqui fishes. For example, the U.S. Department of Homeland Security plans to build a well for the Yaqui fish assemblage and watershed for border fence mitigation that may be advantageous for springsnail habitat restoration.<sup>57</sup>

<sup>54</sup> “Welcome to Slaughter Ranch.” Accessed at <http://www.slaughterranch.com/> on September 30, 2011.

<sup>55</sup> Written communication with Service, September 21, 2011 and October 11, 2011.

<sup>56</sup> U.S. Fish and Wildlife Service. Species Report: Listings and occurrences for Arizona. Viewed on August 9, 2011 at [http://ecos.fws.gov/tess\\_public/pub/stateListingAndOccurrenceIndividual.jsp?state=AZ](http://ecos.fws.gov/tess_public/pub/stateListingAndOccurrenceIndividual.jsp?state=AZ)

<sup>57</sup> Ibid, pp. 3



## CHAPTER 4 | ECONOMIC BENEFITS

78. The primary intended benefit of critical habitat is to support the conservation of threatened and endangered species, such as the springsnails. Thus, attempts to develop monetary estimates of the benefits of this proposed critical habitat designation would focus on the public's willingness to pay to achieve the conservation benefits to the springsnails resulting from this designation.
79. Quantification and monetization of species conservation benefits requires information on the incremental change in the probability of springsnail conservation that is expected to result from the designation. As described in Chapter 3, incremental impacts of the designation are limited to minor, administrative efforts. Thus, critical habitat designation adds little benefit to baseline conservation actions.<sup>58</sup>
80. Other potential benefits may be achieved through designation of critical habitat. For example, the public may hold a value for habitat conservation, beyond its willingness to pay for conservation of a specific species. Studies have been done that estimate the public's willingness to pay to preserve wilderness areas, for wildlife management and preservation programs, and for wildlife protection in general. These studies address categories of benefits (e.g., ecosystem integrity) that may be similar to the types of benefits provided by critical habitat, but do not provide values that can be used to establish the incremental values associated with this proposed critical habitat designation (i.e., the ecosystem and species protection measures considered in these studies are too dissimilar from the habitat protection benefits that may be afforded by this designation). Again, because the designation of critical habitat for the springsnails is unlikely to preserve new areas or protect wildlife above existing baseline protections, such benefits are unlikely.
81. Similarly, economists have conducted research on the economic value of ancillary benefits, such as the preservation of open space, which may positively affect the value of neighboring parcels, or maintenance of natural hydrologic functions of an ecosystem, which result in improved downstream water quality. Ancillary benefits are unlikely given that no changes in behavior to protect such resources are anticipated to result from the designation.

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<sup>58</sup> Numerous published studies estimate individuals' willingness to pay to protect endangered species. 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. Unfortunately, this literature 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 almost exclusively on large mammal, bird, and fish species, and generally do not report values for incremental changes in species conservation. Importantly for this analysis, no studies estimate the value the public places on preserving a snail.

## REFERENCES

5 U.S.C. § 601 et seq.

16 U.S.C. 1532.

16 U.S.C. §1533(b)(2).

66 FR 54808.

72 FR 69034.

75 FR 69222.

*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).

Bailey, A. 2008. Electronic mail communication to M. Martinez, U.S. Fish and Wildlife Service, from A. Bailey, Arizona Game and Fish Department. July 24, 2008.

*Cape Hatteras Access Preservation Alliance v. Department of Interior*, 344 F. Supp. 2d 108 (D.D.C.).

*Center for Biological Diversity v. United States Bureau of Land Management*, 422 F. Supp. 2d 1115 (N.D. Cal. 2006).

*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.

Cox, D. 2007. Electronic mail communication from Dan Cox, Arizona Game and Fish Department, to Mike Martinez, Fish and Wildlife Service, regarding Three Forks Surveys. March 2, 2007.

Director, U.S. Fish and Wildlife Service, Memorandum to Regional Directors and Manager of the California-Nevada Operations Office, Subject: Application of the “Destruction or Adverse Modification” Standard under Section 7(a)(2) of the Endangered Species Act, dated December 9, 2004.

Email and phone correspondence with Mike Martinez and Nathan Allan, Arizona Ecological Services Office, U.S. Fish and Wildlife Service, June 10, 2011.

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.

*Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, 378 F.3d 1059 (9th Cir. 2004).

Grosch, T. 2010. Electronic mail communication to M. Martinez, U.S. Fish and Wildlife Service, from T. Grosch, Arizona Game and Fish Department. June 8, 2010.

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 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>.

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

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

Personal communication with Brady McGee, U.S. Fish and Wildlife Service. September 21, 2011.

Personal communication with Bill Radke, San Bernardino National Wildlife Refuge, June 15, 2011.

Proposed listing and critical habitat rule. 76 FR 20464-20488.

Sorensen, J. 2011a. Electronic mail communication regarding: AZGFD's data and fieldnotes - Three Forks springsnail survey Sept 27-28 2011. October 12, 2011.

U.S. Department of Agriculture and U.S. Forest Service, Southwestern Region. 2009. *Apache-Sitgreaves National Forests Working DRAFT Land Management Plan*. Viewed at: [http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fsbdev7\\_019999.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev7_019999.pdf) on June 7, 2011.

U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

U.S. Fish and Wildlife Service, "Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Three Forks Springsnail and the San Bernardino Springsnail." June 2, 2011.

U.S. Fish & Wildlife Service. San Bernardino National Wildlife Refuge. Accessed on April 18, 2011 at <http://www.fws.gov/refuges/profiles/index.cfm?id=22523>.

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>.

## APPENDIX A | SMALL BUSINESS ANALYSIS AND ENERGY IMPACTS ANALYSIS

82. This appendix considers the extent to which incremental impacts from critical habitat designation may be borne by small entities and the energy industry. The analysis presented in Section A.1 is conducted pursuant to the RFA as amended by the SBREFA. Information for this analysis was gathered from the SBA, the Service, and from interviews with stakeholders contacted in the development of the economic analysis. The energy analysis in Section A.2 is conducted pursuant to Executive Order No. 13211.
83. The analyses of impacts to small entities and the energy industry rely on the estimated incremental impacts resulting from the proposed critical habitat designation. The incremental impacts of the rulemaking are most relevant for the small business and energy impacts analyses because they reflect costs that may be avoided or reduced based on decisions regarding the composition of the final rule. The post-designation baseline impacts associated with the listing of the springsnails and other Federal, State, and local regulations and policies, as discussed in Chapter 3 of this report, are expected to occur regardless of the outcome of this rulemaking.

### A.1 SBREFA ANALYSIS

84. 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).<sup>59</sup> 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 the springsnails critical habitat designation to affect small entities.
85. 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 designation 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.

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<sup>59</sup> 5 U.S.C. § 601 et seq.

86. This screening analysis is based on the estimated incremental impacts associated with the proposed rulemaking. Potential baseline and incremental impacts depend on the presence of the springsnails, existence of conservation efforts, and the existence of a Federal nexus. This analysis uses the methodology outlined in Chapter 2 to distinguish between baseline and incremental impacts.
87. The quantified incremental costs of this designation are limited to the administrative costs of considering adverse modification during section 7 consultation. As described in Chapter 3, we anticipate seven such consultations will occur. The agencies participating in the consultations, the Service and the U.S. Forest Service, are not small entities.
88. This analysis does not anticipate impacts to small entities as a result of this designation, as all units are on state or federally owned land.

#### A.2 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

89. Pursuant to Executive Order No. 13211, “Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use,” issued May 18, 2001, Federal 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.”<sup>60</sup>
90. The OMB 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 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.<sup>61</sup>

<sup>60</sup> 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>.

<sup>61</sup> Ibid.

91. No modifications to future economic activities are anticipated to result from the designation of critical habitat. Furthermore, administrative compliance costs are *de minimis* and affect only federally owned conservation areas. Thus, energy-related impacts are not expected.

**APPENDIX B | INCREMENTAL MEMORANDUM PROVIDED BY THE SERVICE**



# 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

June 2, 2011

TO: Industrial Economics, Inc., Cambridge, Massachusetts

FROM: Field Supervisor, Arizona Ecological Services Office

SUBJECT: Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the Three Forks Springsnail and the San Bernardino Springsnail

## Introduction

The purpose of this memorandum is to provide information for conducting an economic analysis of the proposed critical habitat designation for the Three Forks springsnail (*Pyrgulopsis trivialis*) and the San Bernardino springsnail (*Pyrgulopsis bernardina*). 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 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 weighing the benefits of excluding versus including an area as critical habitat, an economic analysis is prepared for each proposed critical habitat designation, which describes and monetizes, where possible, the economic impacts (costs and benefits) of the proposed designation.

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.



An important function 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. In the meantime, we 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 goal of 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 all possible differences with and without critical habitat for these springsnail species under the different section 7 standards.

### Background

We propose to designate two units of critical habitat for the Three Forks springsnail and four units of critical habitat for the San Bernardino springsnail. Both the Three Forks and the Boneyard Bog Units are occupied by the Three Forks springsnail and are entirely within the Apache-Sitgreaves National Forests. The Snail Spring, Goat Tank Spring, and Horse Spring Units are all occupied by the San Bernardino springsnail and are on private lands of the John Slaughter Ranch. These occupied units support one or more physical and biological features (PBFs). The Tule Spring Unit is unoccupied, but has been determined to be essential for the conservation of the San Bernardino springsnail because the geographic area occupied at the time of listing is not sufficient for conservation and the San Bernardino National Wildlife Refuge (Refuge) has identified Tule Spring as a potential reintroduction site. In total, we are proposing 4.5 ha (11.1 ac) of critical habitat for Three Forks springsnail, and 0.8 ha (2 ac) of critical habitat for the San Bernardino springsnail. The proposed critical habitat areas constitute our best assessment of areas that meet the definition of critical habitat. The two units we propose as critical habitat for Three Forks springsnail occur in the North Fork East Fork Black River Watershed of the White Mountains on the Apache-Sitgreaves National Forests in Apache County, Arizona. The four units we propose as critical habitat for the San Bernardino springsnail are spring ecosystems along the Rio San Bernardino (also known as San Bernardino Creek or Black Draw) within the headwaters of the Rio Yaqui River on private lands and the Refuge in Cochise County, Arizona.

### Baseline Analysis

The following discussion describes the regulatory circumstances that are anticipated without designation of critical habitat for these 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 the species.

*Conservation plans, policies, and regulatory mechanisms that provide protection to the species and their habitat without critical habitat designation*

Concurrent with the proposed designation of critical habitat, the Three Forks springsnail and San Bernardino springsnail have been proposed for listing as endangered 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, consultation with Federal agencies for actions that may affect the species, prohibitions against take without special permit, and cooperative habitat protections with other entities and landowners.

Three Forks springsnail:

- The U.S.D.A. Forest Service manages habitat for the Three Forks springsnail, as the entire known range of the species occurs on the Apache-Sitgreaves National Forests. On August 24, 2000, the Forests issued Order No. 01-343, which closed the area containing Three Forks springs to public access. A permit is required to enter this area. This benefits the snail by protecting it from collection or habitat modification by the scientific community. However, the benefits of this closure are likely minimal because the Forest Service implements little enforcement to prevent access by recreationists, however, adverse effects from recreationists would likely be negligible.
- The Three Forks springsnail co-occurs with the threatened Chiricahua leopard frog at Three Forks springs. The springsnail receives some benefit from conservation actions implemented for the frog under section 7 of the Act.

San Bernardino springsnail:

- The San Bernardino springsnail occurs in close proximity to listed Yaqui fishes. However, this does not appear to provide any benefit or protection to the snail's habitats because nothing has prevented dewatering in those spring ecosystems.
- We know of no plans, policies, or regulatory mechanisms that provide protections or benefits to the species. Although it is possible that section 404 of the Clean Water Act might apply to spring ecosystems, we are unaware of any instance when the U.S. Corps of Engineers (Corps) issued a 404 permit that involved San Bernardino springsnail habitats.
- The Refuge has conducted a section 7 consultation, for effects to Yaqui fishes, on the restoration of Tule Spring for San Bernardino springsnail reintroductions. However, this effort has yet to benefit the springsnail because insufficient water is available and springsnails have not been reintroduced.
- The U.S. Department of Homeland Security provided funding to construct a well to benefit the Yaqui fish assemblage and watershed, for border fence mitigation, that may benefit the springsnail through habitat restoration.

*Federal agencies and other project proponents likely to consult with the Service under section 7, without critical habitat.*

Three Forks springsnail:

- U.S.D.A. Forest Service for aquatic habitat restoration, fire management plans, fire suppression, fuel reduction treatments, forest plans, livestock grazing allotment management plans, native fish and frog reestablishment, and travel management plans.

San Bernardino springsnail:

- U.S. Department of Homeland Security for border security operations, particularly communication and surveillance infrastructure (i.e. towers).
- The Refuge for reintroduction of San Bernardino springsnail into Tule Spring, if that site is successfully restored.

*Expected Service administrative effort for section 7 consultations, without critical habitat.*

Three Forks springsnail

Over the next ten years, we anticipate two formal consultations with the Forest Service associated with the Land Resource Management Plan and prescribed and/or emergency fire. Additionally, we anticipate two informal consultations, on grazing allotments and the travel management plan.

San Bernardino springsnail

Over the next ten years, we anticipate one consultation with Homeland Security for tower construction. We also anticipate one consultation with the Refuge for springsnail reintroductions if Tule Spring restoration is successful. We do not anticipate consultation with the Corps as we are unaware of any time in the past when they have provided a permit for an action affecting the springs on the John Slaughter Ranch.

*Types of project modifications that will likely be recommended by the Service to avoid jeopardy, without critical habitat.*

Three Forks springsnail

A hypothetical jeopardy scenario would involve habitat modification affecting several springs at once. The number of springs that would be affected by an activity will be an important consideration for this evaluation as it relates to Three Forks springsnail. This is because each proposed critical habitat unit is actually comprised of several springs or springruns. There are at least eight springs within the critical habitat unit at Three Forks springs complex and at least seven springs within the critical habitat unit at Boneyard Bog springs complex. For instance, a contaminant such as fire retardant drift that is introduced into all springs at the Boneyard Bog springs complex could eliminate springsnails from the entire complex, possibly jeopardizing the continued existence of the species. However, a stressor that causes modification of habitat at only one or two springs within one of these springs complexes, such as ungulate grazing (e.g., livestock), may not constitute jeopardy because other nearby springs would retain viable populations.

The following lists some potential project modifications likely to be recommended to avoid jeopardy for the Three Forks springsnail:

- Incorporate measures into the project design that minimize modification of substrates, water quality, water quantity, or buffers surrounding spring ecosystems.
- Fund the establishment of a captive propagation program.
- Restore and/or create habitats suitable for reintroduction purposes.
- Continue to exclude livestock.
- Fund programs to eliminate nonnative predators such as crayfish.
- Post signage informing public of closure at Three Forks springs.

### San Bernardino springsnail

A hypothetical jeopardy scenario would involve habitat modification affecting any occupied spring. For the San Bernardino springsnail, each critical habitat unit is each comprised of only one spring. Therefore, a stressor affecting a critical habitat unit for the San Bernardino springsnail will likely threaten the entire population within that unit. For instance, dewatering at Goat Tank Spring could eliminate springsnails from a site that may contain one of only two, possibly three, viable populations thus jeopardizing the continued existence of the species.

The following lists some potential project modifications likely to be recommended to avoid jeopardy for the San Bernardino springsnail:

- Incorporate measures into the project design that minimize modification of substrates, water quality, water quantity, or buffers surrounding spring ecosystems.
- Fund the establishment of a captive propagation program.
- Restore and/or create habitats suitable for reintroduction purposes.

### Adverse Modification Analysis

The following discussion describes the regulatory circumstances that are anticipated with critical habitat, as proposed, for Three Forks springsnail and San Bernardino springsnail. Once critical habitat is designated, section 7 of the Act also 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 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 be able achieve recovery (i.e. not able to be removed from the threatened or endangered species list).

*What 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?*

The Forest Service, Homeland Security, and the Service through the Refuge, are three Federal agencies that are likely to consult with the Service under section 7 with designated critical habitat. In the case of the Forest Service for Three Forks springsnail, no additional activities are likely to undergo consultation with critical habitat than without, because all proposed critical habitat areas are occupied by the species and would be consulted upon anyway because the species is present. Homeland Security and the Refuge, on the other hand, would consult for any activity affecting the Tule Spring Unit. This would not otherwise occur because the Tule Spring Unit is unoccupied by San Bernardino springsnail. However, Homeland Security and the Refuge could possibly consult on effects to Tule Spring for protection of listed Yaqui fishes.

Three Forks springsnail:

- We do not anticipate any additional kinds of activities undergoing consultation with critical habitat because all proposed units are currently occupied and actions affecting them would be consulted upon regardless.

San Bernardino springsnail:

- The Refuge would consult on any action, such as aquatic habitat restoration, fire management plans, fire suppression, refuge plans, native fish and frog reestablishment, and border security affecting the Tule Spring unit. This would not otherwise occur for the springsnail because this unit is unoccupied.

*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.*

Three Forks springsnail:

We will likely have to reinitiate consultation on four Forest Service actions. Management actions related to livestock grazing are likely to incur increases in administrative costs for an adverse modification analysis.

The proposed Three Forks springs unit is currently closed to livestock grazing, and the proposed Boneyard Bog unit is located on an allotment whose lease has been inactive for at least ten years. Although, excessive elk wallowing is currently causing detrimental changes to habitat quality at Boneyard Bog springs, neither spring complex is currently being affected by livestock. However, the closure at Three Forks and the lease at Boneyard Bog are still subject to Forest Service discretion. This activity may be consulted upon in conjunction with the Forest Service's management of grazing allotments. Depending on the scale of the impacts from livestock (i.e. number of springs affected) it is possible that consultation could result in an adverse modification determination, but not jeopardy. However, it is more likely that if livestock were again permitted in these areas, critical habitat could be adversely affected to the point that would constitute jeopardy and adverse modification.

San Bernardino springsnail:

We will likely have to reinitiate consultation with the Refuge for their management plan, or, at minimum, specific actions affecting Tule Spring. Management actions related to Tule Spring are likely to incur increases in administrative costs for an adverse modification analysis.

The Refuge is dedicated to the conservation of native species and ecosystems in the San Bernardino watershed. Any activity affecting the proposed Tule Spring unit, which is unoccupied, would have to undergo consultation, and potential effects to critical habitat of San Bernardino springs would need to be analyzed. However, the Refuge is unlikely to modify Tule Spring in a manner that is detrimental to springsnail habitat. In fact, the Refuge has already developed a proposal and plan to restore habitat at that site and reintroduce springsnails. Our analysis under a section 7 consultation is unlikely to result in a determination of adverse modification.

*What project proponents are likely to pursue habitat conservation plans (HCPs) under section 10 after the designation of critical habitat?*

Three Forks springsnail:

None. Proposed critical habitat is located entirely on the Apache-Sitgreaves National Forests, and these lands are ineligible for an HCP.

San Bernardino springsnail:

It is possible that the owner of the John Slaughter Ranch could seek an HCP for activities affecting San Bernardino springsnail and its habitat. However, the owner of the ranch has indicated little desire to participate in cooperative management. Therefore, we are cannot determine the likelihood of developing an HCP for the John Slaughter Ranch.

*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?*

Three Forks springsnail

Pursuant to the current framework under which section 7 consultations without critical habitat are conducted (as described above), 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. Although, in the case of emergency fire, the timing of the implementation of conservation measures (i.e., after the fact) might be different. Also, if we were to ever determine adverse modification from livestock grazing, an additional, suggested measure to minimize effects could be the construction of an elk fence around springs to reduce the overall effect of livestock and elk. This measure would only be a suggestion, as the Forest Service has no discretion over elk management. This measure is listed below.

- Construct a fence to limit access by elk.

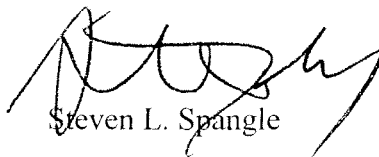
#### San Bernardino springsnail

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 Tule Spring because it is unoccupied critical habitat..

#### Conclusion

In summary, for Three Forks springsnail, the incremental effects of the proposed critical habitat are primarily associated with consulting with the Forest Service on livestock management. The degree of the incremental effects will be based on the actual number of springs affected within the critical habitat unit. For the San Bernardino springsnail, the incremental effects are primarily associated with consulting with the Refuge for activities affecting Tule Spring. The incremental effects are derived mainly from potential activities in unoccupied critical habitat at Tule Spring. We anticipate the following incremental effects: (1) an increase in workload for the Service to reinitiate consultations for ongoing actions, (2) new consultations for proposed actions in Tule Spring, which is currently unoccupied, (3) project modifications to avoid adverse modification of critical habitat on a small area that would not be required to avoid jeopardy, but would be required to ensure the species' conservation.

If you have any questions, please contact Mike Martinez (x224) or Debra Bills (x239).



Steven L. Spangle

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