Draft Economic Analysis of Critical Habitat Designation for Holmgren and Shivwits Milk-Vetch

Prepared for:

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Division of Economics
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Fourth Draft: July 2006

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The purpose of this report is to identify and analyze the potential economic impacts associated with the proposed critical habitat designation (CHD) for the Holmgren milk-vetch (*Astragalus holmgreniorum*) and Shivwits milk-vetch (*Astragalus ampullarioides*) (hereinafter, HMV and SMV individually, respectively, or "species" collectively).

Figure ES-1 summarizes key findings of the economic analysis. Results are presented in greater detail later in this summary.

Figure ES-1 - KEY FINDINGS[1]

Total impacts: Pre-designation (2001-2006) costs associated with species conservation activities are estimated to range from $9.3 to $13.7 million in 2006 dollars. Potential post-designation (2007-2026) costs are estimated to range between $8.8 and $14.1 million in undiscounted 2006 dollars. In discounted terms, potential economic costs are estimated to be $8.5 to $13.0 million (using a three percent discount rate) and $8.2 to $12.1 million (using a seven percent discount rate). In annualized terms, potential costs are expected to range from $0.6 to $0.9 million annually (annualized at three percent) and $0.9 to $1.1 million annually (annualized at seven percent).

Activities most impacted: The activities affected by species conservation efforts may include land development, transportation and utility operations, and conservation on public and tribal lands.

- Development: Development-related losses account for approximately 70 to 80 percent of forecast costs, and range from $7.2 to $10.0 million (in 2006 dollars). The costs consist of losses in Federal land value resulting from the removal of BLM administered public lands from disposal status, meaning the lands cannot be sold or exchanged for private use.
- Transportation and Utility Operations: Potential costs to transportation and utility operations in habitat proposed for designation account for another 15 to 25 percent of forecast costs. Undiscounted costs are estimated to range between $1.0 and $3.5 million (in 2006 dollars) over 20 years, or $0.8 to $2.5 million assuming a three percent discount rate and $0.6 to $1.7 million assuming a seven percent discount rate. The amounts are driven by project modification costs associated with the Southern and Western Corridor projects. These projects comprise more than 95 percent of the transportation and utility-related costs.
- Conservation on Public and Tribal Lands: Future costs associated with managing critical habitat on public and tribal lands account for an additional three percent of forecast costs. Undiscounted costs are estimated at approximately $0.5 million (in 2006 dollars) over 20 years, or $0.4 million assuming a three percent discount rate and $0.3 million assuming a seven percent discount rate. The costs primarily consist of ecological studies and habitat monitoring by BLM and USGS. These activities constitute over 95 percent of the conservation activities on public and tribal lands.

Unit impacts: Three subunits account for more than 95 percent of total undiscounted high impacts, H1a (State Line), H2b (South Hills), and H2a (Stucki Springs).

Distribution of impacts: Federal agencies and state departments of transportation account for approximately 75 to 85 percent and 15 to 25 percent of total upper-bound future impacts, respectively.

[1] Throughout the report, costs are provided in undiscounted 2006 dollars and in present value (PV) and annualized terms using three and seven percent discount rates.

BACKGROUND OF THE CRITICAL HABITAT DESIGNATION

On September 28, 2001, the U.S. Fish and Wildlife Service (Service) published a final rule listing HMV and SMV as endangered.[2] A complaint was filed against the Service for failure to designate critical habitat for the species, and in July 2005, a settlement agreement committed the Service to publish a proposed critical habitat rule to the Federal Register by March 17, 2006, and a final rule by December 16, 2006. Following this, the Service published the proposed critical habitat designation ("proposed rule") for the species in the Federal Register on March 29, 2006.[3] The proposed rule is the subject of this report.

In the proposed rule, the Service identified a total of approximately 8,896 acres of critical habitat for the species in Washington County, Utah, and Mohave County, Arizona. The proposed area consists of 6,475 acres of critical habitat for HMV (in three units) and 2,421 acres of critical habitat for SMV (in five units). Of the critical habitat acres proposed for designation, 56 percent are Federal lands (including 240 acres located on the Shivwits Indian Reservation), 41 percent are state and local government lands, and the remaining three percent are private lands. Figure ES-2, below, shows the general location of each unit/subunit of the proposed critical habitat.

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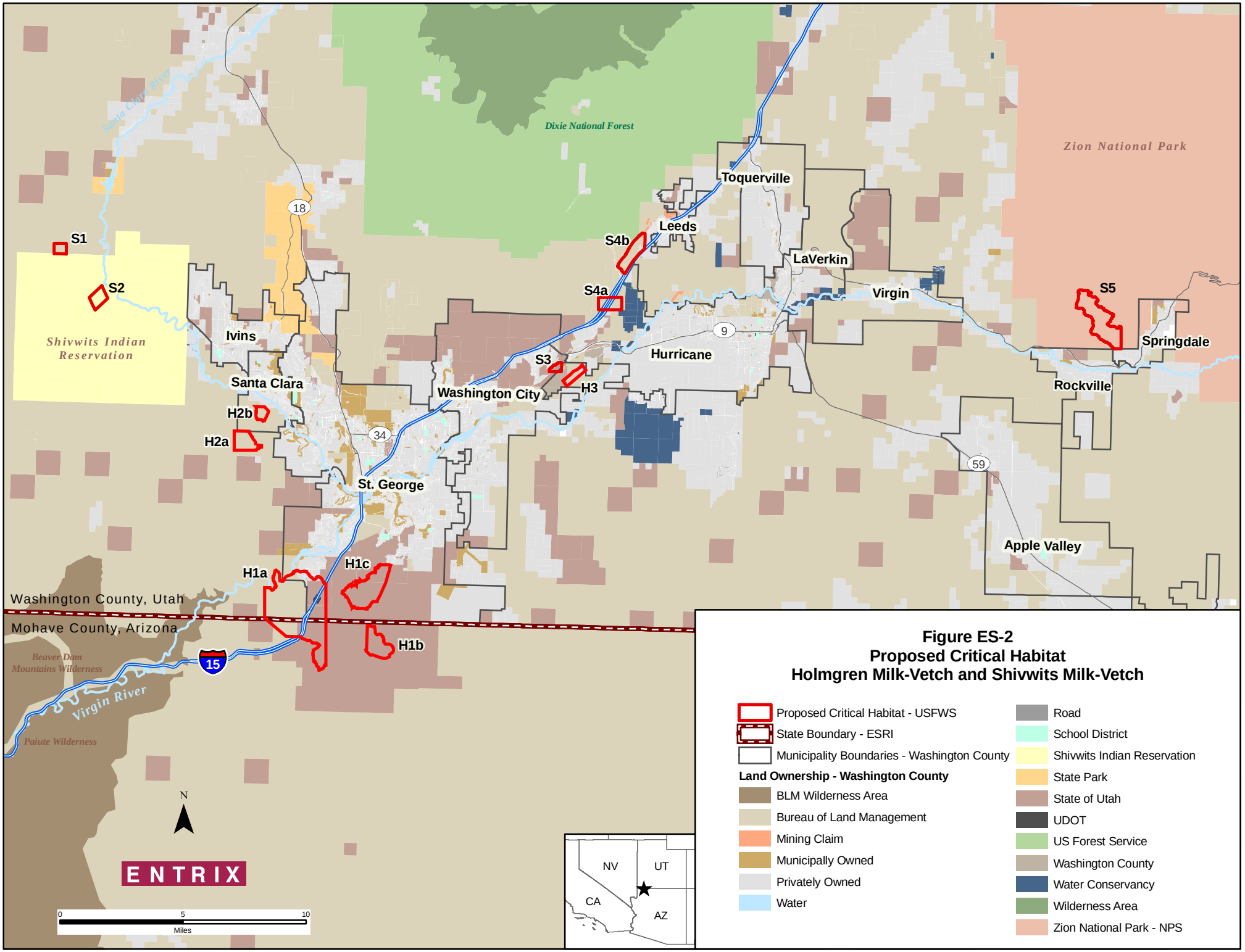
2 U.S. Fish and Wildlife Service, September 28, 2001, "Endangered and Threatened Wildlife and Plants: Determination of Endangered Status for *Astragalus holmgreniorum* (Holmgren milk-vetch) and *Astragalus ampullarioides* (Shivwits milk-vetch), Final Rule," *Federal Register*, Vol. 66, No. 189, pp. 49560-49567.

3 U.S. Fish and Wildlife Service, March 29, 2006, "Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for *Astragalus ampullarioides* (Shivwits Milk-Vetch) and *Astragalus holmgreniorum* (Holmgren Milk-Vetch), Proposed Rule," *Federal Register*, Vol. 71, No. 60, pp. 15966-16002.


Dixie National Forest
Zion National Park
Santa Clara River
Shivwits Indian Reservation
Beaver Dam Mountains Wilderness
Paiute Wilderness
Virgin River
Toquerville
Leeds
LaVerkin
Virgin
Hurricane
Washington City
Ivins
Santa Clara
St. George
Springdale
Rockville
Apple Valley
S1
S2
S3
S4a
S4b
S5
H1a
H1b
H1c
H2a
H2b
H3
18
9
34
59
15
Washington County, Utah
Mohave County, Arizona
N
ENTRIX
0
5
10
Miles
NV
UT
CA
AZ
Figure ES-2
Proposed Critical Habitat
Holmgren Milk-Vetch and Shivwits Milk-Vetch
Proposed Critical Habitat - USFWS
State Boundary - ESRI
Municipality Boundaries - Washington County
Land Ownership - Washington County
BLM Wilderness Area
Bureau of Land Management
Mining Claim
Municipally Owned
Privately Owned
Water
Road
School District
Shivwits Indian Reservation
State Park
State of Utah
UDOT
US Forest Service
Washington County
Water Conservancy
Wilderness Area
Zion National Park - NPS

To comply with the 10th Circuit's direction to include all co-extensive effects, this analysis considers the likely economic impacts of efforts to protect the species and their habitat (hereinafter referred to collectively as "species conservation activities") in the potential critical habitat. It does so by taking into account the cost of conservation-related measures that are likely to be associated with future economic activities, which may adversely affect the habitat within the proposed boundaries. Actions undertaken to meet the requirements of other Federal, state, and local laws and policies may afford protection to the species and their habitat and, thus, contribute to the efficacy of critical habitat-related conservation and recovery efforts. Therefore, the impacts of these activities are relevant for understanding the full impact of the proposed designation.

RESULTS OF THE ANALYSIS

The geographic area of the analysis includes the areas proposed for CHD. The analysis focuses on activities within, or affecting, these areas, and presents impacts at the lowest level of resolution feasible, given available data. Impacts are reported for each unit/subunit identified in the proposed rule.

Impacts are separated into costs affecting land development activities, costs affecting transportation and utility operations, costs to public and tribal land managers, and administrative costs related to the section 7 consultation process. Table ES-1 provides detailed pre- and post-designation cost information for all activities. Pre- and post-designation costs are provided in undiscounted 2006 dollars. Post-designation costs are also provided in present value (PV) and annualized terms using three and seven percent discount rates.

Table ES-1
Summary of Conservation Costs, by Activity ($1,000s)

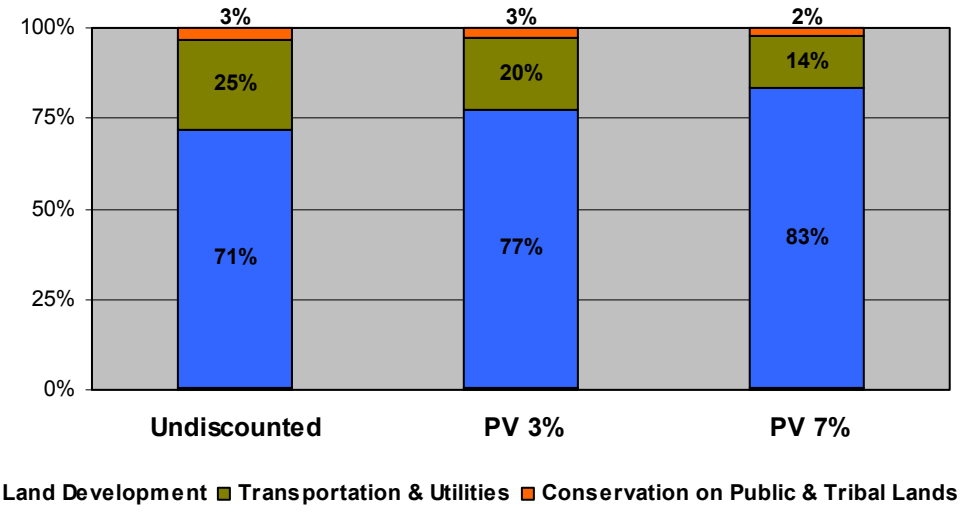
Activity	Pre-Designation (Total) (2001-2006)	Post-Designation (Total) (2007-2026)			Post-Designation (Annualized)	
		Undiscounted	3%	7%	3%	7%
Development	$0	$7,200-$10,000	$7,200-$10,000	$7,200-$10,000	$484-$672	$679-$944
Transportation & Utilities	$540-$712	$1,030-$3,477	$800-$2,546	$596-$1,732	$53-$171	$57-$164
Public & Tribal Conservation	$8,612-$12,817	$479	$374	$285	$25	$27
Section 7 Administrative	$ 176	$110	$95	$80	$6	$8
Total	**$9,328-$13,705**	**$8,819-$14,066**	**$8,469-$13,015**	**$8,161-$12,097**	**$568-$874**	**$771-$1,143**

Note: Results are shown in $1,000s. Numbers may not sum due to rounding.

Figure ES-3 illustrates the distribution of impacts across these activities, presenting relative impacts by affected activity using the upper-bound future conservation cost figures. As shown, impacts related to land development account for approximately 70 to 80 percent of anticipated impacts, followed by impacts to transportation and utility operations (approximately 15 to 25 percent) and impacts related to conservation on public and tribal lands (less than three percent).

Table D-1, located at the beginning of Appendix D, provides detailed pre- and post-designation cost information in total and for each activity on a unit-by-unit basis. Pre- and post-designation costs are provided in undiscounted 2006 dollars. Post-designation costs are also given in PV and annualized terms using three and seven percent discount rates. All costs are presented by unit/subunit, since this provides the greatest resolution for decision-makers given the available data used to estimate costs. Maps showing the location of the units/subunits are provided in Appendix C of this report.

Figure ES-3
Relative Impact by Affected Activity [a/]
(Total Upper-Bound Conservation Costs)



[a/] Section 7 administrative costs account for less than one percent of the economic impact.

Development

Development is the primary activity impacting HMV and SMV, with both recently completed projects (post-listing) and projects currently under construction extending into the proposed critical habitat on private- and state-owned lands. This development is unimpeded by the presence of the plants and their habitat, as the prohibition against "take" does not apply to plant species and no Federal nexus exists for the development activity and, thus, no section 7 consultation occurs. In fact, since the plants were listed in 2001, no section 7 consultation has taken place regarding development, but development has occurred in the vicinity of the plants since listing (e.g., see Map 5 in Appendix C). Based on city general plans and discussions with landowners planning development of private lands within the proposed CHD and land developers currently building inside the bounds of the proposed CHD, unconstrained development is expected to continue in the future on private- and state-owned lands. Since this development is likely to occur unrestricted by the section 7 consultation process, no impacts are expected on the development of private- and state-owned lands.

However, the potential disposal of BLM lands to state and local governments for future development is expected to be impacted by the proposed CHD.[4] In Utah, BLM is planning to dispose of its lands south of the City of Santa Clara. But the proposed CHD will likely lead BLM to remove the 142 acres (approximately) of Subunit H2b from disposal status. In fact, given the

4 Land disposal is the sale or exchange of BLM administered public lands for private or State lands of equal value.

location and size of Subunit H2b, BLM may remove an area larger than the subunit from disposal status in order to provide habitat connectivity. However, the layout of future land disposal sale is uncertain at this time, and the total number of acres BLM would remove from disposal status is not known.

BLM land disposals in Arizona may also be impacted by the proposed CHD. In Arizona, BLM would have disposed of a larger area of land along the I-15 corridor immediately south of the Arizona-Utah border, but for the protection of the species and the proposed CHD, 437 acres will be removed from disposal status. These include 76 acres adjacent to the proposed critical habitat in Subunit H1a. In these two instances, BLM lands within and immediately adjacent to, the proposed CHD will be maintained in their current status (i.e., grazing and public use) and not converted to their highest valued use, usually development. Consequently, in estimating development impact, this economic analysis estimates the market value of the raw, developable Federal lands that may be removed from disposal status.

These impacts will occur immediately after the lands are designated (in December 2006). Thus, the undiscounted and present value results are the same, $7.2 to $10.0 million (in 2006 dollars). The annualized impact ranges from $484,000 to $672,000 at a three percent discount rate, and from $679,000 to $944,000 at a seven percent discount rate. Approximately 65 percent of the total undiscounted high range impact falls in Subunit H1a in Arizona and 35 percent in Subunit H1b in Utah. The estimated impacts in Subunit H1a also include impacts to 76 acres of BLM land located outside of, but adjacent to, the subunit that will also be withdrawn from disposal status because of CHD.

The estimates of economic loss are likely understated. BLM will likely withdraw an area larger than Subunit H2b from disposal status due to the proposed CHD. However, the layout of future land disposal sale is uncertain at this time. Absent specific information on how BLM would design the disposal sale to mitigate for impacts to HMV, the economic analysis presents the value derived from potential future development on the BLM land within the footprint of Subunit H2b. To the extent that BLM removes an area larger than the footprint of the subunit from disposal status, the estimated impacts are understated.

Transportation and Utilities

The analysis of economic effects of HMV and SMV conservation on activities related to transportation and utilities focuses on the cost of species conservation activities incurred by state transportation departments and affected local governments and utilities in implementing transportation and utility projects and conducting ongoing road and right-of-way (ROW) maintenance activities. Pre-designation costs are estimated at $0.5 to $0.7 million in 2006 dollars. Post designation costs are expected to range from $1.0 to $3.5 million in undiscounted 2006 dollars. In discounted terms, this range is equivalent to $0.8 to $2.5 million at a three percent discount rate and $0.6 to $1.7 million at a seven percent discount rate. In annualized

terms, potential costs are expected to range from $53,000 to $171,000 annually (annualized at three percent) and $57,000 to $164,000 annually (annualized at seven percent).

More than 95 percent of the total undiscounted high range impact is associated with two large corridor projects in the vicinity of units H1 and H2, the Southern and Western Corridors. Future species conservation costs associated with these projects may total between $1.0 and $3.4 million in undiscounted 2006 dollars. Post-designation costs are dominated by the relocation of the Southern Corridor 100 feet south in order to avoid existing plant populations ($250,000) and the purchase of an estimated 50 to 125 acres of mitigation land to offset expected Western Corridor impacts ($0.8 to $3.1 million in 2006 dollars). The costs are allocated proportionally to the affected subunits. Other species conservation activities include plant surveys, the determination of Best Management Practices (BMPs), additional project planning and employee training, and the use of more expensive herbicides for maintenance activities on existing roadways (e.g., signage, pavement rehabilitation, and vegetation control projects). These maintenance costs total between $30,000 to $100,000 in undiscounted 2006 dollars, accounting for less than five percent of total transportation and utility-related costs. No utility-related impacts are anticipated.

Conservation Activities on Federal and Tribal Lands

Federal agencies, the Reservation of the Shivwits Band of the Paiute Indian Tribe of Utah, The Nature Conservancy (TNC), and two universities are performing species conservation activities on Federal and tribal lands. This analysis attempts to quantify the costs associated with these conservation activities, including purchase of land by the end of 2006 to create a preserve for HMV ($8.3 to $12.5 million in 2006 dollars), ecological studies and habitat monitoring ($472,500 in 2006 dollars), and construction of protective fencing by the end of 2006 (approximately $35,000 in 2006 dollars) to prevent disturbance caused by grazing and trampling from recreational users (including off-highway vehicle, or OHV, users). Since the fencing will only exclude 63 acres of BLM and tribal rangeland from grazing, impacts to livestock grazing (i.e., losses in animal unit months, or AUMs) are expected to be minimal (less than $20 per annum in 2006 dollars). Fencing also protects the plants from illegal off-trail, or "open-country", OHV use on BLM managed lands. OHV use is permitted on existing roads and trails on BLM lands. However, the fencing will not reduce legal use, and only redirect it in Subunit S4b, and thus, no social welfare loss is anticipated for OHV users.

Pre-designation costs are estimated to range between $8.6 and $12.8 million in undiscounted 2006 dollars. Over 95 percent of the total pre-designation costs are attributed to Subunit H1a (land purchase for plant preserve). Post-designation costs are estimated at $0.5 million in undiscounted 2006 dollars. In discounted terms, likely economic costs of activities related to conservation initiatives are estimated to be $374,000 (using a three percent discount rate) and $285,000 (using a seven percent discount rate). In annualized terms, potential costs are expected to be nearly $25,000 annually (annualized at three percent) and $27,000 annually (annualized at seven percent). More than 95 percent of post-designation undiscounted high range costs are attributed to a series of ecological monitoring studies.

Section 7 Consultations

Since the listing of HMV and SMV in 2001, five formal, four informal, and nine technical assistance consultations have been completed on the species. Of the eighteen consultations, two covered restoration actions and research activities that benefit the species, five involved programmatic consultations, or consultations on broader programs or terms and conditions for programs rather than consultations on specific projects, three involved specific assessments of two construction projects on I-15 and one airport relocation project, one involved an emergency consultation on the effects of a fire and fire suppression actions on endangered species in the vicinity of the fire, and seven involved technical assistance requests.

Five formal consultations are anticipated between 2007 and 2026; the Western Corridor transportation project, the BLM Arizona Strip Field Office Resource Management Plan (RMP)/Environmental Impact Statement (EIS), the privatization of 513 acres of BLM land leased by Washington County for the Southern Utah Shooting Sports Park, and the disposal of BLM lands in Arizona and Utah (one consultation each for the Arizona Strip and St. George Field Offices). Pre-designation costs are estimated at $176,000 in 2006 dollars. After designation, approximately $110,000 in post-designation administrative costs are forecast in undiscounted 2006 dollars, or $95,000 and $80,000 in present value terms at discount rates of three and seven percent, respectively. Annualized impacts are estimated at $6,000 (at three percent) and $8,000 (at seven percent). More than 90 percent of the total undiscounted high range impact is forecast to occur in subunits H1a, H2a, and H2b, and in Unit H3.

Amenity Values Associated with Critical Habitat Designation

Conservation activities for HMV and SMV may maintain, or generate, amenity values to adjacent property owners and residents. Amenity values are defined as beneficial impacts arising from recreational opportunities, open space, visual amenities, and an aesthetically pleasing ecosystem, which the lands being proposed as critical habitat may be able to provide in an unaltered state. In general, amenity values will be greater for critical habitat located in urban areas with considerable development densities, since these areas have relatively less open space providing such amenity services. However, the developable land forecast to be affected by CHD, namely, BLM property designated for disposal, the land designated as critical habitat for HMV and SMV is primarily located in rural areas, with abundance of open space and natural amenities. Due to the presence of close substitutes for the designated area, the designation is unlikely to generate any meaningful amenity benefit within the timeframe of this analysis. Thus, the analysis does not quantify amenity value as a component of economic impacts associated with critical habitat designation for the species.

Areas Most Likely to Experience Impacts

Figure ES-4 illustrates the ranking of proposed CHD units/subunits by cost, using the upper-bound future conservation cost figures. As shown, three subunits account for more than 95

percent of total impacts. The relative impact by affected activity within these subunits is presented in Figure ES-5, using the upper-bound future conservation cost figures.

1. H1a (State Line): Costs in Subunit H1a are driven by the removal of 437 acres of BLM land in Arizona from disposal status, including 76 acres adjacent to the subunit ($6.5 million in 2006 dollars). These BLM lands will be maintained in their current status (i.e., grazing and public use) and not converted to their highest valued use, usually development.

2. H2b (South Hills): Similar to Subunit H1a above, costs in this subunit are driven by the removal of BLM lands (142 acres in Utah) from disposal status ($3.5 million in 2006 dollars). Major costs in this subunit also include establishing a habitat preserve to offset expected impacts from the proposed Western Corridor project ($0.2 to $0.8 million in 2006 dollars).

   The estimates of economic loss in Subunit H2b are likely understated. Because of the proposed CHD, BLM may withdraw an area larger than the subunit from disposal status. However, the layout of future land disposal sale is uncertain at this time. Absent specific information on how BLM would design the disposal sale to mitigate for impacts to HMV, the economic analysis presents the value derived from potential future development on BLM land within the footprint of Subunit H2b. To the extent that BLM removes an area larger than the footprint of the subunit from disposal status, the estimated impacts are understated.

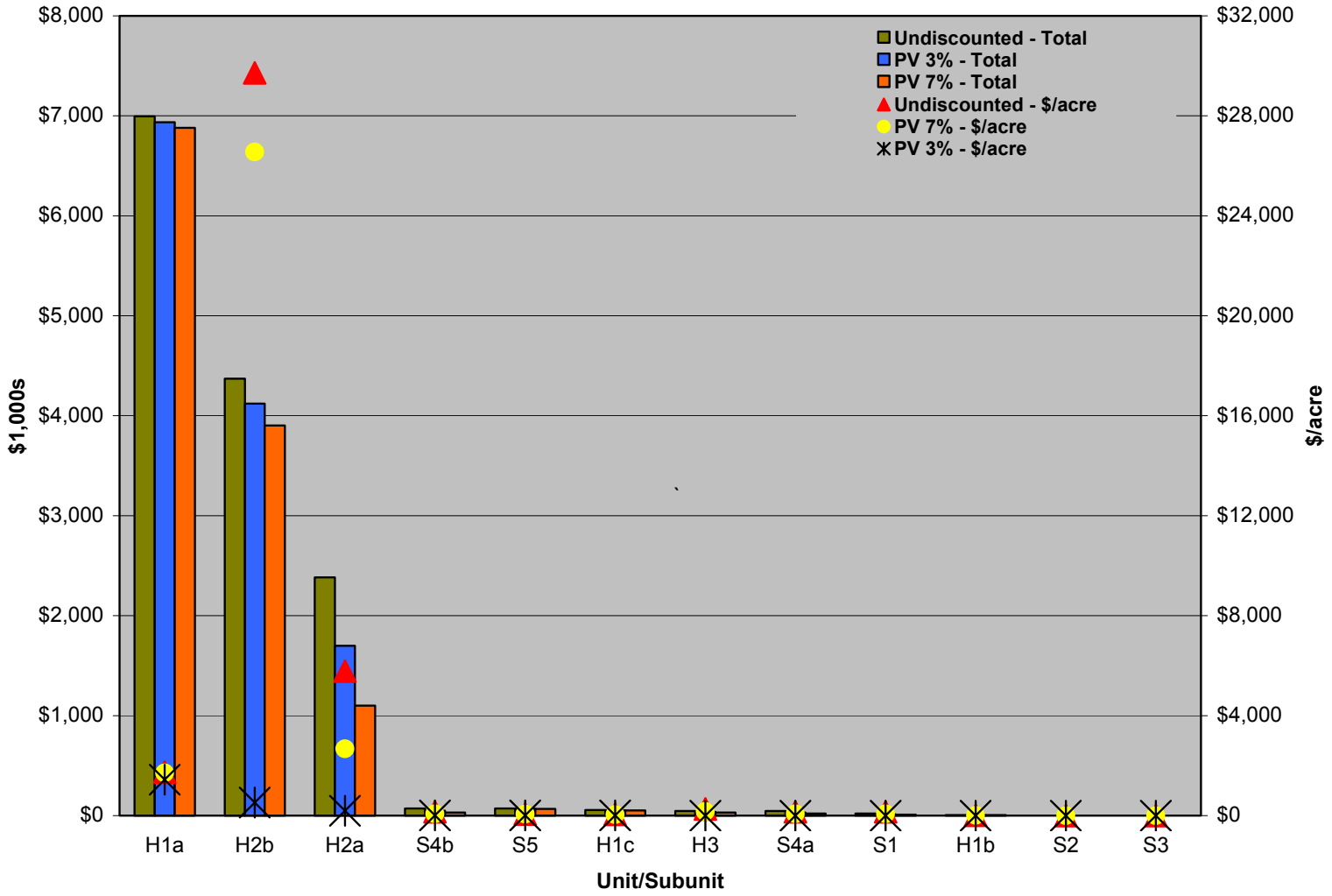
3. H2a (Stucki Springs): Costs in this subunit are driven by the establishment of a habitat preserve to offset expected impacts from the proposed Western Corridor project ($0.6 to $2.3 million in 2006 dollars).

Per Acre Costs

Irrespective of whether future costs are discounted or undiscounted, three of the subunits have higher per-acre costs relative to other subunits (see Figure ES-4). As described above, these subunits are also the three most costly subunits. While Subunit H1a (State Line) dominates future impacts, it is also significantly larger than subunits H2a (Stucki Springs) and H2b (South Hills) and, thus, considerably less costly on a per acre basis.[5] Considering the smaller size of Subunit H2b (relative to H1a and H2a), it is not surprising that it is the most costly subunit on a per-acre basis.

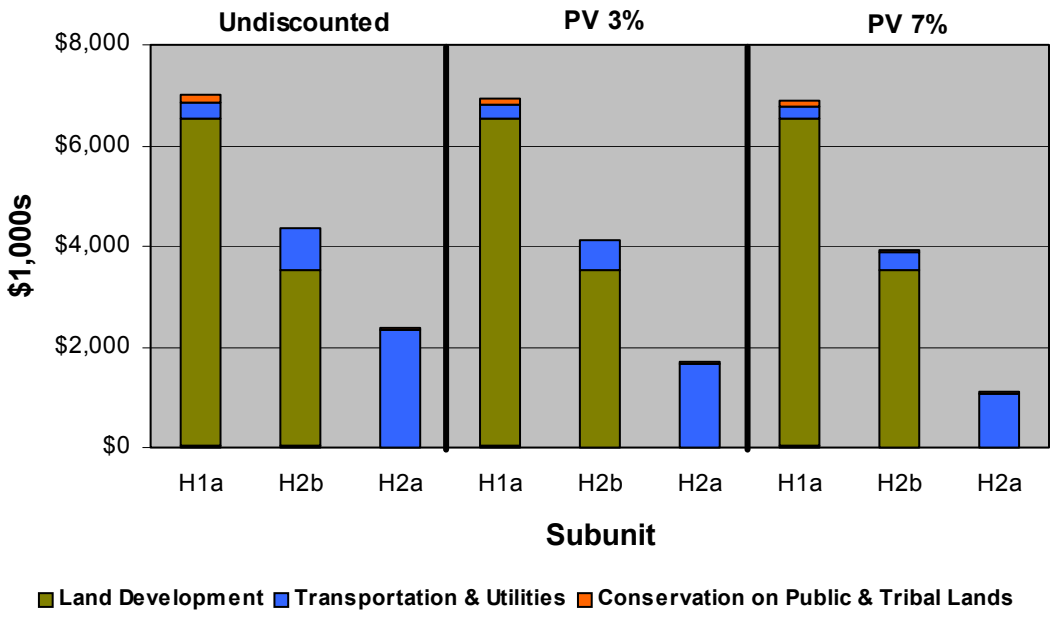
[5] Subunit H1a is 4,027 acres (45 percent of the proposed CHD), Subunit H2a is 412 acres (five percent of the proposed CHD), and Subunit H2b is 147 acres (two percent of the proposed CHD).

Figure ES-4
Economic Impacts by Habitat Unit/Subunit: Total Costs and Dollars per Acre (2006$)
(Total Upper-Bound Conservation Costs)



Tables providing details of cost estimates are provided in Appendix D.

Figure ES-5
Relative Impact by Affected Activity for the Three Most Costly Subunits [a/]
(Total Upper-Bound Conservation Costs)



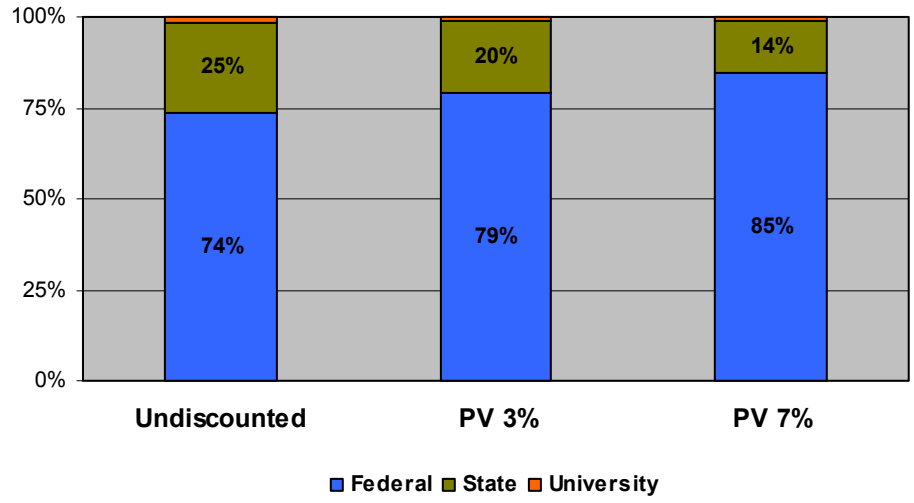
[a/] Section 7 administrative costs account for less than one percent of the economic impact.

DISTRIBUTIONAL IMPACTS

More than 99 percent of the prospective economic costs (based on upper-bound future conservation cost figures) associated with conservation activities for HMV and SMV are expected to be borne by Federal agencies (primarily BLM) and state departments of transportation (see Figure ES-6); approximately 75 to 85 percent Federal agencies and 15 to 25 percent state departments of transportation. Most of the remaining one percent of prospective economic impacts consist of ecological and habitat studies funded by Utah Valley State College or Brigham Young University (approximately $10,000 annually).

This study also analyzes whether a particular group or economic sector bears an undue proportion of the impacts. Specifically, Appendix A describes potential impacts of CHD to small entities and on energy availability.

Figure ES-6
Relative Impact by Affected Party [a/]
(Total Upper-Bound Conservation Costs)



[a/] Costs to private parties account for less than one percent of the economic impact.

1.0
INTRODUCTION AND FRAMEWORK FOR ANALYSIS

The purpose of this report is to estimate the economic impact of actions taken to protect the federally-listed Holmgren milk-vetch (*Astragalus holmgreniorum*) and Shivwits milk-vetch (*Astragalus ampullarioides*) (hereinafter, HMV and SMV individually, respectively, or "species" collectively) and their habitat. It attempts to quantify the economic effects associated with the proposed designation of critical habitat. It does so by taking into account the cost of conservation-related measures that are likely to be associated with future economic activities, which may adversely affect the habitat within the boundaries of the proposed critical habitat designation (CHD). The analysis looks retrospectively at costs incurred since the species were listed, and attempts to predict future costs likely to occur after the proposed CHD is finalized.

The information presented in this report is intended to assist the Secretary in determining whether the economic benefits of excluding particular areas from the designation outweigh the biological benefits of including those areas in the designation.[6] Additionally, this information allows the U.S. Fish and Wildlife Service (hereafter "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).[7] This report also complies with direction from the U.S. Court of Appeals for the Tenth Circuit that "co-extensive" effects should be included in the economic analysis in order to inform decision-makers when considering areas to designate as critical habitat.[8]

This section discusses the framework for the analysis. First, it describes the general analytic approach to estimating economic effects, including a discussion of both efficiency and distributional effects. Next, this section discusses the scope of the analysis, including the link between existing and critical habitat-related protection efforts and economic impacts. This is followed by a presentation of the analytic time frame used in the report. Finally, this section lists the information sources relied upon in the analysis.

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6 16 U.S.C. § 1533(b)(2).

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

8 In 2001, the U.S. 10th Circuit Court of Appeals instructed the Service to conduct a full analysis of all the economic impacts of proposed CHD, regardless of whether those impacts are attributable co-extensively to other causes (*New Mexico Cattle Growers Ass'n vs. U.S.F.W.S.,* 248 F.3d 1277 (10th Cir. 2001)).

1.1 APPROACH TO ESTIMATING ECONOMIC EFFECTS

This economic analysis considers both the economic efficiency and distributional effects that may result from activities to protect the species and their habitat (hereinafter referred to collectively as "species conservation activities"). Economic efficiency effects generally reflect "opportunity costs" associated with the commitment of resources required to accomplish species and habitat conservation. For example, if activities on private lands are limited as a result of the designation or 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 of the Endangered Species Act (Act) represent opportunity costs of species conservation activities, given that resources committed to the consultation process are not available for alternative activities.

The analysis also addresses the distribution of impacts associated with species conservation activities in the areas proposed for critical habitat, including an assessment of any local or regional impacts of species and habitat conservation and the potential effects of species conservation activities on small entities and the energy industry. This information may be used by policymakers to assess whether the effects of species conservation activities unduly burden a particular group or economic sector. For example, while species conservation activities 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. The difference between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

1.1.1 EFFICIENCY EFFECTS

At the guidance of the Office of Management and Budget (OMB), and in compliance with Executive Order 12866 "Regulatory Planning and Review," Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action. In the context of regulations that protect the species and their 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.[9]

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9 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., 1990, *A Guide to Benefit-Cost Analysis (2nd Ed.)*, Prospect Heights, Illinois: Waveland Press, Inc.; and U.S. Environmental Protection Agency, September 2000, *Guidelines for Preparing Economic Analyses*, EPA 240-R-00-003, http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html.

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, such as the Bureau of Land Management (BLM), may enter into a consultation with the Service to ensure that a particular activity will not adversely modify the critical habitat. The effort required for the consultation is an economic opportunity cost because the landowner or manager's time and effort would otherwise have been spent in an alternative activity, had the species not been listed and the parcel not been included in the designation. When compliance activity is not expected to significantly affect markets, i.e., 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 provides a reasonable estimate of the change in economic efficiency.

In cases where species and habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, a designation that precludes 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 real estate market.

This analysis begins by measuring costs associated with measures taken to protect the species and their habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. However, if the cost of conservation activities is expected to significantly impact markets, the analysis will consider changes in consumer and/or producer surplus in affected markets.

1.1.2 Distributional and Regional Economic Effects

Measurements of changes in economic efficiency focus on the net impact of conservation activities across broad aggregates of people (e.g., producers and consumers), without consideration of how certain economic sectors or groups of people (e.g., low income ranchers) are affected. As noted above, these distributional or equity effects regarding how efficiency gains or losses are borne may be important to policymakers. In addition, economic efficiency effects do not address issues related to impacts on local or regional economies. Thus, a discussion of efficiency effects alone may miss important distributional considerations, as well as impacts on local economies. OMB encourages Federal agencies to consider these latter effects separately from efficiency effects.[10] 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 impacts on local economies or sectors are

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

fundamentally different measures of economic costs than efficiency effects and, thus, cannot be added to or compared with estimates of changes in economic efficiency.

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

This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the Regulatory Flexibility Act, might be affected by future species conservation activities.[11] Additionally, 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 activities on the energy industry and its customers[12] (see Appendix A for an analysis of impacts to small entities and the energy industry).

1.1.2.2 Regional Economic Effects

Regional economic impact analysis can provide an assessment of the potential localized effects of conservation activities. Specifically, a 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 mathematically represent the relationship between a change in one sector of the economy (e.g., expenditures by recreationists) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreationists). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy. These additional impacts are referred to as "secondary impacts."

The use of regional input/output models in an analysis of the impacts of species conservation activities 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.

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11 5 U.S.C. § 601 *et seq.*

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

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 secondary impacts 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.

A regional economic analysis was not performed in this study. While the CHD may reduce the total supply of raw developable land in the affected area (if BLM land is removed from disposal status and not sold as raw developable land), it does not imply that CHD affects the economic welfare as measured by consumer and producer surplus. If households relocate to other housing markets in response to CHD and the cost of relocation is low, CHD will have little impact on consumer surplus. Even if relocation is difficult, the proposed CHD is not expected to impact housing markets in the area, as the number of acres of raw developable land that may be removed from disposal status (approximately 579 acres, including 76 acres located adjacent to the proposed critical habitat designation) is small relative to the total quantity of developable land in the region.[13] Thus, the primary cost of species conservation for the units/subunits will be the loss of value of land that can no longer be developed.

1.2 SCOPE OF THE ECONOMIC ANALYSIS

This analysis identifies the economic activities believed to most likely threaten the listed species and their habitat and, where possible, quantifies the economic impact to avoid, mitigate, or compensate for such threats within the boundaries of the proposed CHD. In instances where critical habitat is being proposed after a species is listed, some future impacts may be unavoidable, regardless of the final designation and exclusions under 4(b)(2). However, due to the difficulty in making a credible distinction between listing and critical habitat effects within critical habitat boundaries, this analysis considers all future conservation-related impacts to be co-extensive with the designation.[14, 15]

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13 Washington County is, and will be able to, accommodate all new migrants in the foreseeable future because 91 percent of the potentially developable land in the County is still undeveloped. It is also estimated that by 2050, when population of the County is expected to reach 600,000 (up from a population of 109,924 in 2004), only 44 percent of the developable land will be developed. Source: St. George Area Chamber of Commerce, Demographics Overview, http://www.stgeorgechamber.com/EcDev/demographics.htm, accessed May 1, 2006; and US Census Bureau, 2000 Census data, State and County QuickFacts, http://quickfacts.census.gov/qfd/, accessed May 1, 2006.

14 In 2001, the U.S. Court of Appeals for the Tenth Circuit instructed the Service to conduct a full analysis of all of the economic impacts of proposed CHD, regardless of whether those impacts are attributable co-extensively to other causes (New Mexico Cattle Growers Assn v. U.S.F.W.S., 248 F.3d 1277 (10th Cir. 2001)).

Calculating Present Value and Annualized Impacts

For each land use activity, this analysis compares economic impacts incurred in different time periods in present value (PV) terms. The PV presents the value of a payment, or stream of payments, in common dollar terms. That is, it is the sum of a series of past or future cash flows expressed in today's dollars. Translation of economic impacts of past or future costs to PV terms requires the following: a) past or projected future costs of species conservation activities; and b) the specific years in which these impacts have been, or are expected to be, incurred. With these data, the PV of the past or future stream of impacts (PV_c) of species conservation activities from year t to T is measured in 2006 dollars according to the following standard formula:[a]

$$PV_c = \sum_{t=t_0}^{t=T} \frac{C_t}{(1+r)^{t-2006}}$$

C_t = Cost of species conservation activities in year t

r = Discount rate[b]

Impacts of conservation activities for each activity in each unit are also expressed as annualized values. Annualized values are calculated in order to provide comparison of impacts across activities with varying forecast periods (T). For this analysis, however, all activities employ a forecast period of 20 years, 2007 through 2026. Annualized impacts of future species conservation activities (APV_c) are calculated by the following standard formula:

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

N = Number of years in the forecast period (20 years for this analysis)

[a] To derive the PV of past conservation activities for this analysis, t is 2001 and T is 2006; to derive the PV of future conservation activities, t is 2007 and T is 2026.

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

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15 In 2004, the U.S. Ninth Circuit invalidated the Service's regulation defining destruction or adverse modification of critical habitat (Gifford Pinchot Task Force v. United States Fish and Wildlife Service). The Service is currently reviewing the decision to determine what affect it (and to a limited extent Center for Biological Diversity v. Bureau of Land Management (Case No. C-03-2509-SI, N.D. Cal.)) may have on the outcome of consultations pursuant to section 7 of the Act.

Co-extensive effects may also include impacts associated with overlapping protective measures of other Federal, state, and local laws that aid habitat conservation in the areas proposed for designation. In past instances, some of these measures have been precipitated by the listing of the species and impending designation of critical habitat. Because habitat conservation activities affording protection to a listed species likely contribute to the efficacy of the CHD activities, the impacts of these actions are considered relevant for understanding the full effect of the proposed CHD. Enforcement actions taken in response to violations of the Act, however, are not included.

1.2.1 SECTIONS OF THE ACT RELEVANT TO ECONOMIC ANALYSIS

The analysis focuses on activities that are influenced by the Service through sections 4, 7, 9, and 10 of the Act. Section 4 of the Act focuses on the listing and recovery of endangered and threatened species, as well as the CHD. Pursuant to this section, the Secretary is required to list the species as endangered or threatened "solely on the basis of the best scientific and commercial data available."[16] Section 4 also requires the Secretary to designate critical habitat "on the basis of the best scientific data available and after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat."[17]

The protections afforded to threatened and endangered species and their habitat are described in sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections are the focus of this analysis:

- Section 7 of the Act requires Federal agencies to consult with the Service in order to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of critical habitat. The administrative costs of these consultations, along with the costs of project modifications resulting from these consultations, represent compliance costs associated with the listing of the species and CHD.[18]

- Section 9 defines the actions that are prohibited by the Act and, in particular, prohibits the "take" of endangered wildlife. The term "take" means to "harass, harm, pursue, hunt,

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16 16 U.S.C. § 1533.

17 Ibid.

18 The Service notes, however, that a recent Ninth Circuit judicial opinion, *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, has invalidated the Service's regulation defining destruction or adverse modification of critical habitat. The Service is currently reviewing the decision to determine what affect it (and to a limited extent *Center for Biological Diversity v. Bureau of Land Management* (Case No. C-03-2509-SI, N.D. Cal.)) may have on the outcome of consultations pursuant to section 7 of the Act.

shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[19] The economic impacts associated with this section manifest themselves in sections 7 and 10. While the prohibition against "take" does not apply to plant species such as HMV and SMV (i.e., incidental take permits are not issued for plant species), the Service is obligated to ensure that proposed activities adequately minimize the impact to the species.

- 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 an endangered animal species in order to meet the conditions for issuance of an incidental take permit in connection with the development and management of a property.[20] The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately minimized and mitigated. Although the designation of critical habitat does not require completion of an HCP, it may influence conservation measures provided under HCPs. While HCPs are not developed solely for plant species, if listed plants occur in the area subject to the HCP, the Service must consider whether the proposed activities may adversely affect or jeopardize the continued existence of the plant species and consider whether the action would destroy or adversely modify the critical habitat for any plant. No HCP currently includes HMV and SMV as covered species.[21]

1.2.2 Other Relevant Protection Efforts

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. For example, HMV is protected under Arizona's NPL Arizona Native Plant Law of

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19 16 U.S.C. § 1532.

20 U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," http://endangered.fws.gov/hcp/. Sections 9 and 10 of the Act do not apply to plants.

21 The portion of Subunit S4a west of I-15 is within the boundary of the Washington County HCP, completed in December 1995. However, the SMV was not listed until 2001, and is not addressed by the HCP or the February 22, 1996, biological opinion prepared for the issuance of the section 10 incidental take permit for the desert tortoise (*Gospherus agassizzii*) in Washington County, Utah. Sources: http://ecos.fws.gov/docs/plan_documents/thcp/thcp_355.pdf and http://ecos.fws.gov/docs/plan_documents/bobs/bobs_356.pdf, accessed May 10, 2006.

1993, being "highly safeguarded (with) no collection allowed."[22, 23] However, the State of Utah does not have any plant protection laws.[24] For the purpose of this analysis, such protective efforts are considered to be co-extensive with the protection offered by critical habitat designation, and costs associated with these efforts are included in this report. Additionally, under certain circumstances, the CHD may provide new information to a community regarding the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other state or local laws. In cases where these costs would not have been triggered absent the designation of critical habitat, they are included in this economic analysis.

1.2.3 Additional Analytic Considerations

This analysis also considers the potential for other types of economic impacts that can be related to section 7 consultations in general, and CHD in particular, including time delay, regulatory uncertainty, and stigma impacts.

1.2.3.1 Time Delay and Regulatory Uncertainty

In addition to direct costs of consultation and project modification associated with species conservation actions, the analysis considers potential indirect impacts, such as may result from project delays. Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the section 7 consultation process and/or compliance with other laws associated with the designation. The need to conduct a section 7 consultation will not necessarily delay a project, as often the consultation may be coordinated with the existing regulatory approval process. However, depending on the consultation schedule, a project may experience additional delays, resulting in an unanticipated extension in the time needed to fully realize returns from the planned activity. Delays of this nature were considered in the development of this analysis, and it was determined that these may result in an impact that is not likely to materially change the quantitative results of this analysis.

Regulatory uncertainty costs can occur in anticipation of having to modify project parameters, and might include, for example, project proponents retaining outside experts or legal counsel to better understand their responsibilities with regard to CHD.

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22 Arizona Game and Fish, Special Status Species in the Arizona HDMS, http://www.gf.state.az.us/w_c/edits/documents/sssbytaxon_scientificname.pdf, accessed May 10, 2006.

23 Arizona Game and Fish, Status Definitions, http://www.gf.state.az.us/w_c/edits/hdms_status_definitions.shtml, accessed May 10, 2006.

24 Personal communication with Franklin, M. A. "Ben", Botanist, Utah Natural Heritage Program, May 10, 2006.

1.2.3.2 Stigma Effects

Stigma refers to the change in economic value of a particular project or activity due to negative (or positive) perceptions of the role critical habitat designation will play in developing, implementing, or conducting that project or activity. For example, "stigma effects" could include changes to private property values associated with public attitudes about the limits and costs of implementing a project within critical habitat. Stigma effects are a form of uncertainty that relate more to perceived fluctuations rather than observation, when there is limited information on actual outcomes. There is currently a void of peer-reviewed literature that has successfully identified or attempted to quantify empirical estimates of stigma effects. While stigma impacts are possible in locations where critical habitat is designated, the analysis does not anticipate stigma impacts related to species conservation activities.

1.2.4 BENEFITS

Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.[25] 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.[26]

In the context of CHD, the primary purpose of the rulemaking (i.e., the direct benefit) is the potential to enhance conservation of the species. 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.[27] *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.*

Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the primary constituent elements (PCEs) on which the species depends. To this end, CHD can result in the maintenance of particular

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

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

27 Ibid.

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 taken to conserve a species or its habitat.

It is often difficult to evaluate the ancillary benefits of CHD. To the extent that ancillary benefits of the rulemaking may be captured by the market through an identifiable shift in resource allocation, they are factored into the overall economic impact assessment in this report. For example, if habitat preserves created and/or managed to protect a species lead to an increase in opportunities for wildlife viewing or hiking within the region, the local economy may experience an associated measurable, positive impact. Where data are available, this analysis attempts to capture the net economic impact (i.e., the increased regulatory burden less any discernable offsetting market gains) of species conservation actions imposed on regulated entities and the regional economy.

1.2.5 Amenity Values Associated With Critical Habitat

Conservation activities for HMV and SMV may maintain or generate amenity values to adjacent property owners and residents. Amenity values are defined as beneficial impacts affiliated with recreational opportunities, open space, visual amenities, and an aesthetically pleasing ecosystem, which the lands being proposed as critical habitat may be able to provide in an unaltered state. In general, amenity values will be greater for critical habitat located in urban areas with considerable development densities, as these areas have relatively less open space providing such amenity services. However, the developable land forecast to be affected by CHD, namely, BLM property designated for disposal, is primarily located in rural areas, with an abundance of open space and natural amenities. Due to the presence of close substitutes for the designated area, the designation is unlikely to generate any meaningful amenity benefit within the timeframe of this analysis. Thus, we have not quantified amenity value as a component of economic impacts associated with critical habitat designation for the species.

1.2.6 Geographic Scope of the Analysis

The geographic scope of the analysis includes the areas proposed for CHD. The analysis focuses on activities within or affecting these areas, and presents impacts at the lowest level of resolution feasible, given available data. Impacts are reported for each unit or subunit identified in the proposed rule.

1.2.7 ACCOUNTING FOR THE COST OF SPECIES CONSERVATION ACTIVITIES IN THE PRESENCE OF OTHER LISTED SPECIES

Numerous other federally- or state-listed species may exist within or near the proposed critical habitat designation for the HMV and SMV.[28] To the extent that these other species require the same protective measures as HMV and SMV, costs incurred to protect HMV and SMV habitat may not be solely attributable to the presence of HMV and SMV. This analysis does not attempt to allocate costs among different species. Instead, all costs of conservation within the proposed critical habitat designation for HMV and SMV are assumed to be attributable to the presence of HMV and SMV. Other federally-listed species that may occur within or in the vicinity of the proposed critical habitat designation for HMV and SMV include dwarf bear-poppy (*Arctomecon humilis*), Siler pincushion cactus (*Pediocactus sileri*), Virgin River chub (*Gila seminude*),[29] woundfin (*Plagopterus argentissimus*),[30] desert tortoise (*Gopherus agassizii*),[31] bald eagle (*Haliaeetus leucocephalus*),[32] California condor (*Gymnogyps californianus*),[33] Mexican spotted owl (*Strix occidentalis lucida*),[34] and southwestern willow flycatcher (*Empidonax traillii extimus*).[35]

1.3 ANALYTIC TIME FRAME

The analysis estimates impacts based on activities that are "reasonably foreseeable," including, but not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. The analysis estimates economic impacts to activities from 2001 (the year of the final listing for the species) to 2026 (20 years from the year of final designation). Forecasts of economic conditions and other factors beyond the next 20 years would be speculative.

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28 Personal communication with Service Biologist, Salt Lake City, Utah, May 10, 2006.

29 Critical habitat designated in Washington County, Utah.

30 Critical habitat designated in Washington County, Utah.

31 The critical habitat designated for desert tortoise overlaps with the proposed designation of critical habitat for the SMV (Subunit S4a).

32 Five or six known nesting pairs winter in Utah.

33 Experimental nonessential population.

34 The critical habitat designated for Mexican spotted owl overlaps with the proposed designation of critical habitat for the SMV in Zion National Park (Unit S5).

35 The proposed critical habitat designation for the southwestern willow flycatcher is adjacent to the proposed critical habitat designation for HMV along the Virgin River (Subunit H1a).

1.4 INFORMATION SOURCES

The analysis contained in this report is based on data and information collected from a wide range of sources. Communications with and data provided by the Service personnel include maps and geographical information system (GIS) data, copies of informal and formal species consultation documents, such as Biological Opinions (BOs), and other material directly related to the proposed designation. Other Federal, state, and local agencies, as well as independent or private sector entities and individuals, provided additional information. The specific sources used to address the effects of species conservation actions are identified within each section, and citations are provided where appropriate.

1.5 ORGANIZATION OF THE REPORT

The remainder of this report is divided into six sections. The following section provides background information on the history of the species listing and proposed critical habitat, including detail on land ownership within the proposed CHD, by critical habitat unit or subunit, for each species.

The next section presents potential administrative costs of actions taken under section 7 of the Act associated with the geographic area of critical habitat for the species. First, this section defines the types of administrative costs likely to be associated with the species critical habitat as well as the per-unit costs of section 7 consultation process. Next, the analysis presents costs associated with past species-related section 7 consultation efforts, followed by an estimate of costs related to future consultations likely to result from the designation of critical habitat for the species and/or the listing of the species.

This section is followed by three sections that examine the different categories of economic effects. These sections address the effects to land development activities, transportation and utility activities, and species conservation on public lands (including tribal lands). Included with the report are four appendices; Appendix A addresses the economic effects of species conservation actions on small entities and the nation's energy supply; Appendix B summarizes the section 7 consultation history for the species; Appendix C contains all maps referenced in the text of this report; and Appendix D presents the detailed pre- and post-designation cost information in total, and by activity, on a unit-by-unit basis. The cost estimates are presented in undiscounted 2006 dollars, and in present value and annualized terms using three and seven percent discount rates.

This section provides information on the history of the species listing and proposed critical habitat, including details on land ownership within the proposed CHD, by critical habitat unit/subunit, for each species.

2.1 BACKGROUND OF THE CRITICAL HABITAT DESIGNATION

On September 28, 2001, the Service published a final rule listing HMV and SMV as endangered.[36] On September 27, 2004, a complaint was filed against the Service by the Center of Biological Diversity and Utah Native Plant Society for failure to designate critical habitat for the species. On July 15, 2005, a settlement agreement committed the Service to publish a proposed critical habitat rule to the Federal Register by March 17, 2006, and a final rule by December 16, 2006. Following this, the Service published the proposed critical habitat designation ("proposed rule") for the species in the Federal Register on March 29, 2006.[37]

2.2 PROPOSED CRITICAL HABITAT DESIGNATION[38]

The Service is proposing to designate eight units as critical habitat for the species; three units as critical habitat for HMV (see Table 2-1), and five units for SMV (see Table 2-2). Except for Unit H1, located in both Mohave County, Arizona and Washington County, Utah, all proposed units are located in Washington County, Utah. The proposed designation totals 6,475 acres of critical habitat for HMV and 2,421 acres of critical habitat for SMV. Because none of the critical habitat for the two species overlaps, the total proposed CHD is approximately 8,896 acres.

Tables 2-1 through 2-3 provide summary information describing land ownership within proposed critical habitat.[39] Appendix C provides maps showing the location of each unit/subunit.

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36 U.S. Fish and Wildlife Service, September 28, 2001, "Endangered and Threatened Wildlife and Plants: Determination of Endangered Status for *Astragalus holmgreniorum* (Holmgren milk-vetch) and *Astragalus ampullarioides* (Shivwits milk-vetch), Final Rule," *Federal Register*, Vol. 66, No. 189, pp. 49560-49567.

37 U.S. Fish and Wildlife Service, March 29, 2006, "Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for *Astragalus ampullarioides* (Shivwits Milk-Vetch) and *Astragalus holmgreniorum* (Holmgren Milk-Vetch), Proposed Rule," *Federal Register*, Vol. 71, No. 60, pp. 15966-16002.

38 Information in this section comes from the proposed CHD rule (*Federal Register*, Vol. 71, No. 60, pp. 15966-16002).

Table 2-1
Summary of HMV Proposed Critical Habitat Designation, by Landowner (acres)

Unit	Subunit	Name	County	Landowners (acres)						
				BLM AZ	BLM UT	AZ	UT	County	Private	Total
H 1	A	State Line	Mohave and Washington	360	1,769	933[a/]	802[a/]		164	4,027
	B	Gardner Well	Mohave			564				564
	C	Central Valley	Washington				1,144		4	1,148
H 2	A	Stucki Spring	Washington		412					412
	B	South Hills	Washington		142				4	146
H3		Purgatory Flat	Washington		118			22	36	177
Total				**360**	**2,441**	**1,498**	**1,946**	**22**	**208**	**6,475**
Percent of Total				**5.6%**	**37.7%**	**23.1%**	**30.1%**	**0.3%**	**3.2%**	

[a/] State land includes the I-15 right-of-way; County land includes all other road rights-of-way.
Totals may not sum due to rounding.

2.2.1 SHIVWITS BAND OF THE PAIUTE INDIAN TRIBE OF UTAH

A portion of the proposed CHD (Unit S2) lies within the Reservation of the Shivwits Band of the Paiute Indian Tribe of Utah, located in the western part of Washington County, Utah. The Shivwits Band is one of the five groups comprising the Paiute Indian Tribe of Utah. The other four are Cedar City, Koosharem, Kanosh, and Indian Peaks. The Shivwits Reservation was first established in 1903, but was terminated by the Federal Government in 1954. However, the Reservation was restored in 1980 by the Paiute Indian Tribe of Utah Restoration Act.[40]

The 27,000 acres comprising the Shivwits Reservation represent 84 percent of the total land owned by the Tribe (the other four bands own a total of 5,036 acres). Currently, there are 289 Tribal Members. The main industries on the Reservation are agriculture (five acres are being

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39 The ownership information was derived from landownership data obtained from Washington County, Utah, and the Arizona State Land Department. Private land ownership in Utah (the proposed CHD in Arizona is owned by the State and BLM) was then verified from Washington County's property database using tax parcel numbers obtained from the County.

40 Economic Development Administration, 1996, *American Indian Reservations and Indian Trust Areas Report*, http://www.eda.gov/PDF/40Utah.pdf, accessed May 1, 2006.

used for gardens), livestock (the rangeland on the Shivwits Reservation is being leased by two non-Indian ranchers for grazing), and sand and gravel extraction and mining (a portion of the Reservation is leased for sand and gravel extraction, as well as for mining operations).

Table 2-2
Summary of SMV Proposed Critical Habitat Designation, by Landowner (acres)

Unit	Subunit	Name	County	Landowners (acres)							
				BLM UT	NPS	USFS	Tribal	UT	County	Private	Total
S1		Pahcoon Spring Wash	Washington	134							134
S2		Shivwits	Washington				240				240
S3		Coral Canyon	Washington					74	8[a/]	6	88
S4	A	Harrisburg Bench & Cottonwood	Washington	208				75[a/]		14	297
	B	Silver Reef	Washington	404		7		4[c/]		47[b/]	462
S5		Zion	Washington		1,202						1,202
Total				**744**	**1,202**	**7**	**240**	**153**	**8**	**66**	**2,423**
Percent of Total				**30.7%**	**49.6%**	**0.3%**	**10.0%**	**6.3%**	**0.3%**	**2.7%**	

[a/] State land includes the I-15 right-of-way; County land includes all other road rights-of-way.
[b/] Unknown land owner. This analysis assumes the land is owned by UDOT as it is adjacent to I-15 and other lands owned by UDOT.
[c/] Includes the Emily Jane mine (patented BLM land).
Totals may not sum due to rounding.

In addition, the Tribe holds rights to 1.38 cubic feet per second of water on the Santa Clara River, flowing through the Shivwits Reservation.[41, 42, 43]

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41 Economic Development Administration, 1996, *American Indian Reservations and Indian Trust Areas Report*, http://www.eda.gov/PDF/40Utah.pdf, accessed May 1, 2006.

42 Personal communications with: Glen Rogers, Chairman, Shivwits Band of Paiute Indian Tribe of Utah, Shivwits Indian Reservation, Washington Country, Utah, May 1, 2006; and Lawrence Snow, Councilman, Shivwits Band of Paiute Indian Tribe of Utah, Shivwits Indian Reservation, Washington Country, Utah, May 1, 2006.

43 United States Court of Appeals, Tenth Circuit, November 9, 2005, Shivwits Band of Paiute Indians and Kunz & Co. v The State of Utah, http://www.kscourts.org/CA10/cases/2005/11/03-4274.htm, accessed May 1, 2006.

Table 2-3
Summary of Land Ownership in Proposed Critical Habitat for the Species (acres)

County	BLM AZ	BLM UT	NPS	USFS	Tribal	AZ	UT	County	Private	Total
Washington		3,185	1,202	7	240		2,099	30	274	7,037
Mohave	360					1,498				1,858
Total	360	3,185	1,202	7	240	1,498	2,099	30	274	8,898

Totals may not sum due to rounding.

2.3 DESCRIPTION OF THE SPECIES, HABITAT, AND THREATS [44]

2.3.1 HOLMGREN MILK-VETCH

HMV is a low-growing member of the pea family. It is a stemless perennial with leaves and small, purple-colored flowers. Both the leaves and flowers die at the end of the flowering season, leaving only the root alive. HMV's fruits are three to five centimeter long pods that produce seeds, providing the only method of reproduction for the plant. The plant is found on three sites in Washington County, Utah and Mohave County, Arizona. For a detailed description of HMV, its growing season, and reproduction see the final listing rule.

2.3.2 SHIVWITS MILK-VETCH

SMV is a perennial plant and is a tall member of the pea family. It produces small, cream-colored flowers and its seeds are produced in small pods. Each year, the plant dies back to its root crown at the end of the flowering season. SMV is found on five sites around Washington County, Utah. This plant grows only on purple clay soils derived from the Petrified Forest member of the Chinle geological formation, which drastically limits its possible habitat. For a detailed description of the plant, its growing season, and reproduction see the final listing rule.

2.3.3 HABITAT

The two species are restricted to the immediate vicinity of St. George, Utah, with two subpopulations of HMV occurring on the Mohave County, Arizona side of the Utah-Arizona border. HMV grows only on sparsely vegetated soils that come primarily from the Virgin Limestone member of the Moenkopi Formation. The primary habitat for SMV is purple clay soils derived from the Petrified Forest member of the Chinle geological formation. It is found only in Washington County, Utah, where a narrow band of the Chinle formation is exposed to the outside environment. The total length of this band is around 72 km.

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[44] Information in this section comes from the final listing rule (*Federal Register*, Vol. 66, No. 1189, pp. 49560-49567) and proposed CHD rule (*Federal Register*, Vol. 71, No. 60, pp. 15966-16002).

The Service has identified several primary constituent elements (PCEs) for HMV and SMV. These deal with the soil types necessary for the plants to grow in, the topography that these plants require, and the pollinators needed for the plants' reproduction. Readers interested in details of the PCEs are encouraged to consult the proposed CHD rule.

2.3.4 THREATS

Threats faced by the two plant species are similar because they grow in the same geographic region. Urban expansion (including commercial, industrial, and residential development and development related infrastructure, such as road and power line construction), off-highway vehicle (OHV) use, displacement by exotic weeds, and mineral exploration and development are cited as the major threats to both species. While a patented silver mine exists in the northwest corner of Subunit S4b (the Emily Jane mine) near Leeds, it has not been in operation since the early 1900s.[45] Based on an inspection of the proposed CHD during the week of May 1, 2006, and discussions with BLM staff members, it is clear that active mining (including gypsum mining, as well as oil and gas wells) does not occur within the proposed CHD, and that the mineral value within the boundary of the proposed CHD is limited.[46] Additional threats to SMV come from grazing and trampling by wild and domestic herbivores (HMV is not palatable to livestock) and unauthorized waste disposal.

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45 Personal communication with Jim Crisp (Manager) and Bob Douglas (Biologist), BLM St. George Field Office, Utah, May 3, 2006.

46 Personal communication with Jim Crisp (Manager) and Bob Douglas (Biologist), BLM St. George Field Office, Utah, May 3, 2006; personal communication with Lee Hughes, Biologist, BLM Arizona Strip Field Office, St. George, Utah, April 14, 2006; and personal communication with Andrew Dubrasky, GIS Coordinator, BLM Cedar City Field Office, Cedar City, Utah.

This section presents potential administrative costs of actions taken under section 7 of the Act, associated with the geographic area proposed as critical habitat for HMV and SMV. First, the section defines the types of administrative costs likely to be associated with the critical habitat designation. Next, the analysis presents estimates of the number of technical assistance efforts and consultations expected to result from the designation and/or the listing of the species, as well as the per-unit costs of each of these activities. Based on this analysis, estimates of likely past and future administrative costs are derived.

3.1 CATEGORIES OF ADMINISTRATIVE COSTS

The following section provides an overview of the categories of administrative cost impacts that arise due to the implementation of section 7 in the geographic area proposed as critical habitat.

3.1.1 TECHNICAL ASSISTANCE

The Service frequently responds to requests for technical assistance from state agencies, local municipalities, and private landowners and developers, who may have questions regarding whether specific activities may affect critical habitat. Technical assistance costs represent the estimated economic costs of informational conversations between these entities and the Service regarding the designation of critical habitat for the species. Most likely, such conversations will occur between municipal or private property owners and the Service, regarding lands designated as critical habitat or lands adjacent to critical habitat. The Service's technical assistance activities are voluntary and generally occur in instances where a Federal nexus does not exist.

3.1.2 SECTION 7 CONSULTATIONS

Section 7(a)(2) of the Act requires Federal agencies (Action 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 ACOE. More often, they will also include a third party involved in projects on non-Federal lands with a Federal nexus, such as state agencies and private landowners, or third parties involved in projects on Federal lands (e.g., grazing, oil and gas leasing, special use permits, timber sales, etc.).

During a consultation, the Service, the Action agency, and the landowner or manager applying for Federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or to the 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.

Section 7 consultations with the Service may be either informal or formal. *Informal consultation*s consist of discussions between the Service, the Action agency, and the applicant concerning an action that may affect a listed species or its designated critical habitat, and are designed to identify and resolve potential concerns at an early stage in the planning process. By contrast, a *formal consultation* is required if the Action agency determines that its proposed action may, or will, adversely affect the listed species or designated critical habitat in ways that cannot be resolved through informal consultation. A formal consultation can also include *programmatic level consultation* on an Action agency's proposal to apply specified standards or design criteria to future proposed actions. This streamlines the section 7 consultation process, as much of the effects analysis is completed up front during the section 7 consultation on the program, rather than repeated each time a new action, or batch of actions, is proposed. The formal consultation process results in the Service's determination in a biological opinion of whether the action is likely to jeopardize a species or adversely modify critical habitat, and recommendations to minimize those impacts. The Service also conducts internal formal and informal consultations for beneficial actions that have short-term adverse effects (i.e., Section 10(a)(1)(A) Recovery Permits and Safe Harbor Agreements). Regardless of the type of consultation or proposed project, section 7 consultations can require substantial administrative effort on the part of all participants.

3.2 ESTIMATED COSTS OF CONSULTATIONS AND TECHNICAL ASSISTANCE

Estimates of the cost of an individual consultation and technical assistance request were developed from a review and analysis of historical section 7 files from a number of Service field offices around the country conducted in 2002. These files addressed consultations conducted for both listings and critical habitat designations. Cost figures were based on an average level of effort of low, medium, or high complexity, multiplied by the appropriate labor rates for staff from the Service and other Federal agencies.

The administrative cost estimates presented in this section take into consideration the level of effort of the Service, the Action agency, and the applicant, as well as the varying complexity of the consultation or the technical assistance request. Costs associated with these consultations include the administrative costs related to conducting the consultation, such as the cost of time spent in meetings, preparing letters, and the development of a biological opinion. Table 3-1 provides a summary of the estimated administrative cost per consultation or technical assistance request.

Table 3-1
Estimated Administrative Cost per Consultation or Technical Assistance Request (2006$)[a/]

Consultation Type	Service	Action Agency	Third Party	Biological Assessment
Technical Assistance	$520	N/A	$1,050	N/A
Informal Consultation	$2,250	$2,900	$2,050	$2,000
Formal Consultation	$5,050	$5,750	$3,500	$4,800
Programmatic Consultation	$15,250	$12,750	N/A	$5,600

[a/] Industrial Economics, Inc., analysis based on data from the Federal Government General Schedule Rates, Office of Personnel Management, 2006, and a review of consultation records from several Service field offices across the country, 2002.

3.3 SUMMARY OF PRE-DESIGNATION SECTION 7 CONSULTATIONS

Since the listing of HMV and SMV in 2001, five formal, four informal, and nine technical assistance consultations have been completed on the species (see Appendix B). Of the eighteen consultations, two covered restoration actions and research activities that benefit the species (one of those relating to the Section 10(a)(1)(A) Recovery Permit), five involved programmatic consultations, or consultations on broader programs or terms and conditions for programs rather than consultations on specific projects, including two programmatic consultations on the Zion National Park Fire Management Plan and BLM-AZ Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management, three involved specific assessments of two construction projects on I-15 and one airport relocation project, one involved an emergency consultation on the effects of a fire and fire suppression actions on endangered species in the vicinity of the fire, and seven involved technical assistance requests. Since the plants were listed in 2001, no section 7 consultation has taken place regarding development.

Project-specific consultations included the following three projects: Two formal consultations and five technical assistance efforts on the Southern Corridor Highway project (I-15 near St. George), one informal consultation on an I-15 improvement project (including repaving, guardrail upgrading, sign refurbishing, and installation of rumble strips between the Arizona state line and reference post (RP) 10.31 in Utah), and one technical assistance effort on the St. George airport relocation project.

3.4 PROJECTED FUTURE SECTION 7 CONSULTATIONS

In addition to the five formal, four informal, and nine technical assistance consultations completed on the species since listing in 2001 (see Section 3.3), five consultations are anticipated between 2007 and 2026.

- Western Corridor Project: The Federal Highway Administration is expected to enter into a formal consultation with the Service on the Western Corridor project. The formal consultation on the Southern Corridor Project occurred in 2004, two years prior to commencement of construction. Based on this schedule, the formal consultation on the Western Corridor is assigned an equal probability of occurring between the years 2013 and 2018 (see Section 5.2.1.2).

- Resource Management Plan (RMP)/Environmental Impact Statement (EIS) for the Arizona Strip Field Office: The BLM is expected to enter into a programmatic formal consultation on the Arizona Strip RMP/EIS. Public comment on the Draft RMP/EIS ended February 2006, and the economic analysis assumes the programmatic formal consultation will occur in 2007.

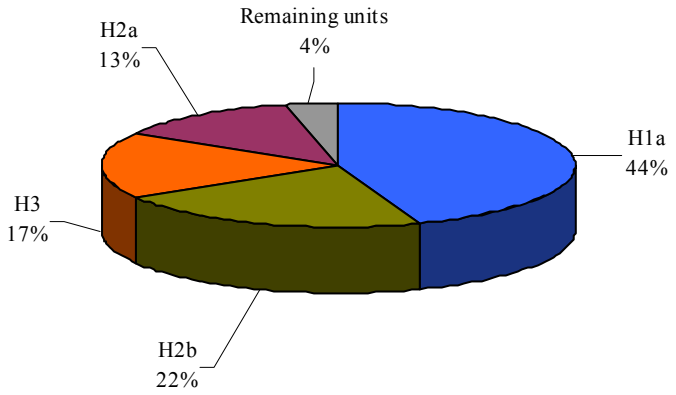
- Southern Utah Shooting Sports Park: The BLM is expected to enter into formal consultation with the Service on the privatization of 513 acres of BLM land leased by Washington County for a public shooting range. The shooting range is expected to be completed by mid 2007, and the economic analysis assumes the formal consultation will occur during that year (see Section 6.2.4).

- BLM Land Disposals: The BLM is expected to enter into formal consultation with the Service on the disposal of BLM lands in Arizona and Utah. Since the timeframe of the disposals are not known, the economic analysis assigns an equal probability of two formal consultations occurring between the years 2007 and 2026.

3.5 SUMMARY OF FINDINGS

Table D-2 in Appendix D provides a summary of administrative costs that have occurred (pre-designation), or are anticipated to occur (post-designation), associated with section 7 consultations and CHD. Since 2001, pre-designation administrative costs are estimated at $176,000 (in 2006 dollars). Pre-designation costs for associated project modifications, if any, are discussed in the relevant activity chapters that follow. After designation, approximately $110,000 in post-designation administrative costs are forecast in undiscounted 2006 dollars, or $95,000 and $80,000 in present value terms at discount rates of three and seven percent. More than 90 percent of the post-designation administrative costs are forecast to occur in subunits H1a, H2a, and H2b, and in Unit H3 (see Figure 3-1). Annualized impacts are estimated at $6,000 (at three percent) and $8,000 (at seven percent).

Figure 3-1
Relative Economic Impacts Related to Administrative Costs, by Unit/Subunit
(Total Upper-Bound Undiscounted Impacts)



The value of undeveloped land, such as rangeland, is not only derived from current use, but from potential use as well. For land designated as critical habitat for the HMV and SMV in Utah and Arizona, almost all the value is derived from potential use – residential, commercial, and industrial development. This is because, as discussed later in this section, the value of grazing, the current use, is nominal compared to the market value of raw developable land. Thus, if development is precluded on a parcel of land designated as critical habitat, most of its value will be lost. In addition, if a large area of land is restricted from development, the overall housing market may be impacted, leading to a decrease in the supply of housing. This decline in housing supply, in turn, reduces the amount of consumer and producer surplus in the housing market.

Development is the primary activity impacting the HMV and SMV (see Figure 4-1 for a description of the demographics and land use trends in Washington County, Utah). Development has extended into the proposed critical habitat on private- and state-owned lands.[47] This development is unimpeded by the presence of the plants and their habitat, as the prohibition against "take" does not apply to plant species and no Federal nexus exists for the development activity and, thus, no section 7 consultation occurs (see Section 1.2.1). In fact, since the plants were listed in 2001, no section 7 consultation has taken place regarding development, but development has occurred in the vicinity of the plants since listing.

An example of this is the recent development in the northern portion of Subunit H1a. A review of a 2004 aerial photo revealed no houses in the northern portion of this subunit, only the initial grading of roads and housing lots by SunRiver Development (SunRiver). Since 2004, SunRiver has built on many of these lots, roads have been paved, sidewalks poured, and other development infrastructure put in place. All this activity is occurring within the boundaries of the northern portion of Subunit H1a, and without a section 7 consultation (see Map 5 in Appendix C). SunRiver continues to develop the land it owns or leases from the State. It has more than a hundred housing units in construction on a given day, and sells more than thirty finished units each month. Based on the current pace, the developer believes it will reach complete build out of the land it owns or leases from the State within five years.[48] Development is also occurring

47 The State of Utah School and Institutional Trust Lands Administration (SITLA) and Arizona State Land Department (ASLD).

48 Personal communications with Darcy Stewart (Managing Partner), Michael Green (Marketing Director), and Scott McCall (Land Design Manager), SunRiver Development, St. George, Utah, May 1, 2006.

Figure 4-1

Washington County, Utah Demographics

Washington County is located in the southwestern corner of the State of Utah. It borders the State of Nevada to the west and Arizona to the south. Washington County presents not only one of the highest population growth rates among counties in the State of Utah, but it is among the fastest growing counties in the United States, with an average increase of 1,000 residents per month.[a/] Infact, according to the United States Census Bureau, the population growth rate experienced by Washington County from 2000 to 2004 is 21.7 percent, whereas population in the State of Utah as a whole grew at seven percent, and that in the United States grew at 4.3 percent.[b/] In addition, the 2004 population growth rate reached 8.4 percent in the County, while the State of Utah's growth rate totaled 3.2 percent.[c/] Furthermore, the City of St. George was the fastest-growing Metropolitan Statistical Area in the United States for the period between 1990 and 2000.[d/] Finally, the projections on the future population growth rates remain high for Washington County. The Governor's Office of Planning and Budget reports a 2000-2050 forecasted annual growth rate of 3.9 percent for the County, compared to a forecast of 1.8 percent for Utah as a whole for the same period.[e/]

The County has also experienced fast job growth in recent years. As the Census Bureau reports, the non-farm employment in the County increased by 5.3 percent between 2000 and 2004, compared to the state's rate of -0.2 percent, and the United States' rate of 0.9 percent.[f/] At the same time, the unemployment rate in the County, equal to 3.8 percent in 2004, is below Utah's, which equaled 4.7 percent in that year.[g/]

The fast population growth, coupled with a high rate of employment, has had a big impact on the housing market in the County. In fact, average home prices have gone up 30.2 percent in 2004 alone.[h/] Washington County is, and will be able to, accommodate all new migrants in the foreseeable future, since 91 percent of the potentially developable land in the County is still undeveloped.[i/] It is also estimated that by 2050, when the population of the County will reach 600,000 (up 446 percent from a population of 109,924 in 2004, which equates to a CAGR (compound annual growth rate) of 3.76 percent), only 44 percent of the developable land will be developed.[j,k/] This increase in the rate of development will be spurred on by, among other factors, the construction of a regional airport that will support jet engine aircrafts, providing better access to the County, thereby bringing more migrants from other counties and states.

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a/ St. George Area Chamber of Commerce, Demographics Overview, http://www.stgeorgechamber.com/EcDev/demographics.htm, accessed May 1, 2006.

b/ US Census Bureau, 2000 Census data, State and County QuickFacts, http://quickfacts.census.gov/qfd/.

c/ Governor's Office of Planning and Budget (Utah), 2006 Economic Summary, http://governor.utah.gov/dea/.

d/ St. George Area Chamber of Commerce, Demographics Overview, http://www.stgeorgechamber.com/EcDev/demographics.htm, accessed May 1, 2006.

e/ Governor's Office of Planning and Budget (Utah), 2006 Economic Summary, http://governor.utah.gov/dea/.

f/ US Census Bureau, 2000 Census data, State and County QuickFacts, http://quickfacts.census.gov/qfd/.

g/ Governor's Office of Planning and Budget (Utah), 2006 Economic Summary, http://governor.utah.gov/dea/.

h/ St. George Area Chamber of Commerce, Demographics Overview, http://www.stgeorgechamber.com/EcDev/demographics.htm, accessed May 1, 2006.

i/ Ibid.

j/ Ibid.

k/ US Census Bureau, 2000 Census data, State and County QuickFacts, http://quickfacts.census.gov/qfd/.

(will begin in July 2006[49]) on State lands leased by the Coral Canyon Development (Coral Canyon) in Unit S3 (see Map 7 in Appendix C). Further, based on city general plans and discussions with landowners,[50] development is expected to occur in the future on private- and state-owned lands in units/subunits S4a, H3, and H1a, b, and c (see Maps 4, 6, 8, and 9 in Appendix C). This analysis assumes development on these lands occurs unconstrained because of the currently available data and information. As a result, impacts to development on private- and state-owned lands are not estimated.

However, the potential disposal of BLM lands to state and local governments for future development is expected to be impacted by the proposed CHD. [51] In Utah, BLM is planning to dispose of its lands south of the City of Santa Clara (see Map 3 in Appendix C). But the proposed CHD will likely lead BLM to remove the 142 acres of Subunit H2b from disposal status.[52] In fact, given the location and size of Subunit H2b, BLM may remove an area larger than the subunit from disposal status in order to provide habitat connectivity. However, the layout of future land disposal sale is uncertain at this time, and the total number of acres BLM would remove from disposal status is not known.[53]

BLM land disposals in Arizona may also be impacted by the proposed CHD. BLM has plans to dispose of a large area of Federal land along the I-15 corridor immediately south of the Arizona-Utah border. However, to protect the species and the proposed CHD, 437 acres will be removed from disposal status in the preferred alternative (alternative E) of the Draft Resource Management Plan (RMP). These include 76 acres adjacent to the proposed critical habitat in Subunit H1a (see Map 4 of Appendix C).[54] In these two instances, BLM lands within, and immediately adjacent to,

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49 Personal communications with: Guy L. Steele (Development Manager) and Mike Gardner (General Manager), Coral Canyon Development, Washington City, Utah, May 1, 2006; and Michael Bradshaw (Principal Engineer), Alliance Consulting, Washington City, Utah, May 1, 2006.

50 City of St. George, GIS Department, Land Use Plan, http://www.sgcity.org/gis/; personal communication with Todd Edwards, P.E., Bush & Gudgell, Inc., St. George, Utah (City of Santa Clara General Plan), April 19, 2006; personal communication with Lester Dalton, City of Washington, Utah, April 20, 2006; personal communication with Jan Weaver, GIS Analyst, Planning Section, Arizona State Land Department, April 19, 2006; personal communication with Toni Foran, City of Hurricane, April 24, 2006; personal communication with Michael Hall, landowner, Washington County, Utah, May 3, 2006.

51 Land disposal is the sale or exchange of BLM administered public lands for private or State lands of equal value.

52 Personal communications with Jim Crisp (Manager) and Bob Douglas (Biologist), BLM St. George Field Office, St. George, Utah, May 3, 2006.

53 Personal communications with Jim Crisp (Manager) and Bob Douglas (Biologist), BLM St. George Field Office, St. George, Utah, May 3, 2006.

54 Personal communication with Richard Spotts (Environmental Coordinator) and Laurie Ford (Lands/Realty/Minerals), BLM Arizona Strip Field Office, St. George, Utah, May 3, 2006.

the proposed CHD will be maintained in their current status (i.e., grazing and public use) and not converted to their highest and best use, i.e., commercial, industrial, and residential development.

Based on the above analysis, potential development impacts of critical habitat designation for the HMV and SMV are evaluated in the following way:

1. For BLM lands that would be disposed, but future development will be excluded from the proposed CHD for the species and their habitat, the economic impact is the total estimated value of the foregone future development opportunity.

2. While development of private- and state-owned lands is not impacted by species conservation activities, the economic analysis will present the economic value of future development within the areas being proposed for critical habitat, so that decision makers understand the location of expected development activities relative to the proposed critical habitat units/subunits. However, the economic value of development on private- and state-owned lands within the boundaries of the proposed CHD is presented for information purposes only, and will not be incorporated into the overall impacts.

The remainder of this section is organized as follows. First, the method for modeling development impacts is presented. This method is then applied to estimate a) the impact of development restrictions on BLM lands that will be removed from the disposal status, and b) the economic value of future development on private- and state-owned lands that are not impacted by species conservation activities. Finally, the estimation results are presented and discussed.

4.1 METHOD FOR EVALUATING DEVELOPMENT IMPACTS

Species conservation efforts may impose two kinds of costs to society if development is prohibited on the designated land. These two costs are: 1) Cost to the housing market and consumer surplus, and 2) Loss of value of land that can no longer be developed. The first cost is nominal, since only 579 acres of developable land will be precluded from development. These acres represent only a small percentage of developable land in the region.[55] Thus, the primary cost of species conservation for the HMV and SMV will be the loss of value of land that can no longer be developed.

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[55] The County has estimated that only about nine percent of the potentially developable private land (225,000 acres) in the County has been developed. "If there are about 120,000 residents on 20,000 acres of land now (about six people per acre), a rough calculation indicates that about 600,000 people would be on approximately 100,000 acres. That would only represent about 44 percent of the County's available land. Even with the County reaching the projected population growth by 2040, with the large amount of private land still undeveloped, the population increase should not cause overcrowding. The County will be able to accommodate many future residents." Source: St. George Area Chamber of Commerce, Demographics Overview, http://www.stgeorgechamber.com/EcDev/demographics.htm, accessed May 22, 2006.

The framework for estimating the loss of value of land that can no longer be developed is based on the theoretical models developed by Capossa and Li (1994),[56] and Capozza and Helsley (1990).[57] The price of agricultural land at a given location equals the present value of all future rents: the present value of agricultural rents up to the time of conversion plus the present value of urban rents from the time of conversion onward. Assuming that landowners choose the conversion time to maximize the expected value of land, Capozza and Helsley (1990) show that the price of agricultural land has three components: 1) the value of agricultural rents (*VA*), 2) the growth premium (*GP*), and 3) the option value of potential development (*OV*). Formally, the price of agriculture land can be written as:

$$P_a = VA + GP + OV \tag{1}$$

The value of agricultural rents reflects the current use of the land, while growth premium and option value reflect the potential use. Specifically, the value of agricultural rents represents the value of land as an agricultural input, and equals the present value of all future rents to the land. Formally, it can be calculated as the ratio of the annual rent, R^a, to the discount rate, *r*:

$$VA = \frac{R^a}{r} \tag{2}$$

The growth premium equals the present value of expected increases in land rents after being converted to development, and the option value is the value of land derived from the option of future development.

The majority of land included in the proposed critical habitat designation is rangeland (BLM, state, and tribal), leased for open-range grazing. In order to legally graze, the rangeland requires a grazing permit. The permit is a property right that gives the permit holder (permittee) the right to use the land, allowing the permittee to graze a specified number of animal unit months (AUM)[58] within the grazing allotment for a specified period of time during the term of the permit (typically ten years). If the land is grazed, the permittee pays a lease fee (R^a in equation 2

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56 Capozza, D.R. and Yuming Li, 1994, "The Intensity and Timing of Investment: The Case of Land," *The American Economic Review*, Vol.84, No. 4 (Sep., 1994):889:904.

57 Capozza, D. R. and R.W. Helsley, 1990, "The Stochastic City," *Journal of Urban Economics 2*8(1990):187-203.

58 An AUM is the amount of forage required by one animal unit (a mature, 1,000-pound cow with calf, or its equivalent) for one month. This is equivalent to an average daily forage consumption of 26 pounds of dry matter.

above), which ranges from $1.56 per AUM on Federal lands[59] to approximately $5 to $15 per AUM on private rangeland (in 2006 dollars).[60] While the Federal grazing fee is less expensive, the permittee is responsible for additional management activities (e.g., fence repair and maintenance) that are typically assigned to the landowner under a private lease.

The value of a grazing permit varies, depending upon such variables as water availability, distance from town, etc. The value of a Federal grazing permit is estimated to range from $60 to $100 per AUM (in 2006 dollars).[61] Considering stocking rates on rangeland in the region average approximately 12 acres per AUM, the Federal grazing permit value is estimated to range from approximately $5 to $9 per acre.[62] With a private grazing lease ranging from $5 to $15 per AUM (R^a in equation 2 above), a stocking density of 12 acres per AUM, and discount rate of three and seven percent, the value of a private lease (VA in equation 1 above) is estimated to range from approximately $6 to $42 per acre (in 2006 dollars).[63] Compared to the market value of raw developable land, which ranges from $10,000, to $150,000 per acre (in 2006 dollars) (see Figure 4-2), the value of private grazing lease is nominal. Thus, in estimating the development impact, this analysis assumes all land value will be lost if development is precluded.

4.2 SUMMARY OF FINDINGS

The development impacts of critical habitat designation for the HMV and SMV are estimated using the method described in Section 4.1. In this section, we first report results on the impact of restricting development from BLM lands. The economic value of future development on private- and state-owned lands that are not impacted by species conservation activities is presented in Figure 4-4 for information purposes, and will not be incorporated into the overall impacts.

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59 News Release, USDA Forest Service, Washington, D.C., Release No. FS-0614, "Forest Service and BLM Announce 2006 Federal Grazing Fee, http://www.fs.fed.us/news/2006/releases/02/grazing-fee.shtml, accessed May 19, 2006.

60 Personal communication with Dennis Iverson, Washington County President, Utah Farm Bureau Federation, May 9, 2006.

61 Grazing permits have also been acquired in the region during the past decade to protect species. In November, 2001, Grand Canyon Trust (GCT) purchased the grazing permit to permanently retire 150 AUMs in subunits H2a (Stucki Springs) and H2b (South Hills) to protect HMV at a total cost of $16,250, or approximately $108 per AUM. Grazing permits were also acquired to protect the Mojave desert tortoise (Washington County Habitat Conservation Plan, December 1995). The HCP budgeted $75/AUM to acquire more than 2,400 AUMs, or approximately $175,000 in total. Personal communication with Vernon Parent, Agriculture Extension Agent, Utah State Agriculture Extension, St. George, Washington County, Utah, May 15, 2006.

62 Personal communication with Vernon Parent, Agriculture Extension Agent, Utah State Agriculture Extension, St. George, Washington County, Utah, May 15, 2006.

63 $VA_{\text{lower-bound}}$ = ($5 annual lease per AUM ÷ 12 acres per AUM) ÷ 7% discount rate = $5.95 per acre.

$VA_{\text{upper-bound}}$ = ($15 annual lease per AUM ÷ 12 acres per AUM) ÷ 3% discount rate = $41.67 per acre.

Figure 4-2

Land Values in the Vicinity of the Proposed Critical Habitat Designation

Unit	State	Note	Land Value Low	Land Value High	Source
H1a	AZ		$10,000	$15,000	a
H1a	UT	SITLA lands SE of I-15	$10,000	$25,000	b
H1a	UT	SunRiver Development	$100,000	$150,000	c
H1b	AZ		$10,000	$15,000	a
H1c	UT		$10,000	$25,000	b
H2b	UT		$15,000	$25,000	e
H3	UT		$10,000	$75,000	f
S3	UT	Coral Canyon Development	$100,000	$150,000	d
S4a	UT		$10,000	$75,000	f
S4b	UT	Undevelopable (slope)	$0	$0	g

Source:

a Range of value of recent sales of State owned rural lands with limited water resources. Sandra L. St. Arnauld, Review Appraiser, Arizona State Land Department

b UDOT is going to pay approximately $350,000 to purchase 17 acres in Unit H1a as mitigation for the Southern Corridor Project. The purchase price is expected to range from $15,000 to $25,000 per acre (the appraisal will not be completed until the end of May 2006).

c Range of value for undeveloped raw ground near infastructure. Darcy Stewart (Managing Partner), Michael Green (Marketing Director), and Scott McCall (Land Design Manager) of SunRiver, and Stanford S. McConkie (Appraiser) of Morley & McConkie, L.C.

d Range of value for undeveloped raw ground near infastructure. Guy L. Steele (Development Manager) and Mike Gardner (General Manager) of Coral Canyon, Michael Bradshaw (Principal Engineer) of Alliance Consulting, and Stanford S. McConkie (Appraiser) of Morley & McConkie, L.C.

e Physically isolated and blue clay soils (potential soil expansion problem for homes). Stanford S. McConkie (Appraiser) of Morley & McConkie, L.C. Disposal sale for Utah designed three years ago, approximately 1,400 acres and the expected sales value back then ranged from $20 to $30 million for the 1,400 acres, or approximately $14,000 to $21,500 per acre. Jim Crisp (Manager) and Bob Douglas (Biologist), BLM St. George Field Office, Utah, May 3, 2006.

f Range of value for unfinished developable lots. Stanford S. McConkie (Appraiser) of Morley & McConkie, L.C.

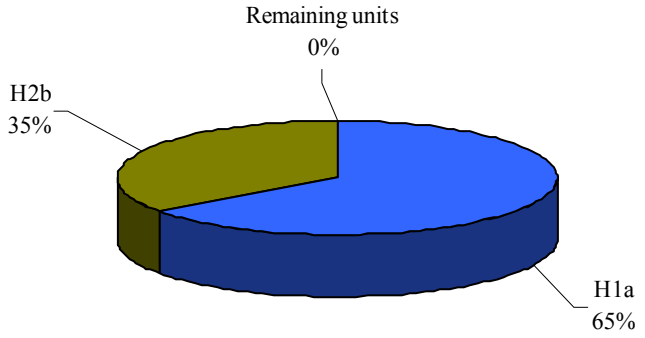
g Limited development value considering cliffs/slope. Stanford S. McConkie (Appraiser) of Morley & McConkie, L.C.

The estimation results are summarized, by unit, in Table D-3 in Appendix D. The table presents the range of estimated impacts resulting from the withdrawal of BLM lands from disposal status due to the proposed CHD. These impacts will occur immediately after the lands are designated (in 2006). Thus, the undiscounted and present value results are the same ($7.2 to $10.0 million in 2006 dollars). The annualized impact ranges from $484,000 to $672,000 at a three percent discount rate, and from $679,000 to $944,000 at a seven percent discount rate (in 2006 dollars).

Approximately 65 percent of the total impact falls in Subunit H1a in Arizona and 35 percent in Subunit H1b in Utah (see Figure 4-3). The estimated impacts in Subunit H1a also include

impacts to 76 acres of BLM land adjacent to the subunit that will also be withdrawn from disposal status because of CHD.

Figure 4-3
Relative Economic Impacts to Land Development, by Unit/Subunit
(Total Upper-Bound Undiscounted Impacts)[1/]



[1/]The relative impacts will not change with discounting and the impacts discounted at three and seven percent are the same as the undiscounted estimates as the impacts (i.e., loss of land value) will occur immediately after the lands are designated in 2006.

The estimates of economic loss in this section are likely understated. As stated in the introduction, BLM will likely withdraw an area larger than Subunit H2b from disposal status due to the proposed CHD. However, the layout of future land disposal sale is uncertain at this time. Absent specific information on how BLM would design the disposal sale to mitigate for impacts to HMV, the economic analysis presents the value derived from potential future development on the BLM land within the footprint of Subunit H2b. To the extent that BLM removes an area larger than the footprint of the subunit from disposal status, the estimated impacts are understated.

Figure 4-4

The Economic Value of Future Development on Private- and State-Owned Lands

The following table shows the economic value of future development on private- and state-owned lands that are not impacted by species conservation activities. These results are presented for information purposes only, and will not be incorporated into the overall impacts. The estimated total economic value of future development on these lands ranges from $52 to $94 million (in 2006 dollars).

				Market Value of Developable Land ($/ac)		Market Value of Developable Land ($, rounded to $100,000)	
Unit	State	Notes	Acres [1]	Low	High	Low	High
S3	UT	Coral Canyon	33	$100,000	$150,000	$3,300,000	$4,900,000
S4a	UT		14	$10,000	$75,000	$100,000	$1,000,000
S4b	UT	Undevelopable (slope)	34	$0	$0	$0	$0
H3	UT		36	$10,000	$75,000	$400,000	$2,700,000
H2b	UT		4	$15,000	$25,000	$100,000	$100,000
H1b	AZ		797	$10,000	$15,000	$8,000,000	$11,900,000
H1c	UT		1,029	$10,000	$25,000	$10,300,000	$25,700,000
H1a	UT	SITLA lands SE of I-15	332	$10,000	$25,000	$3,300,000	$8,300,000
H1a	UT	SunRiver	263	$100,000	$150,000	$26,300,000	$39,400,000
Estimated value of private- & state-owned developable land						$51,800,000	$94,000,000

[1] Acres of developable land does not include land classified as open space in a General Plan.

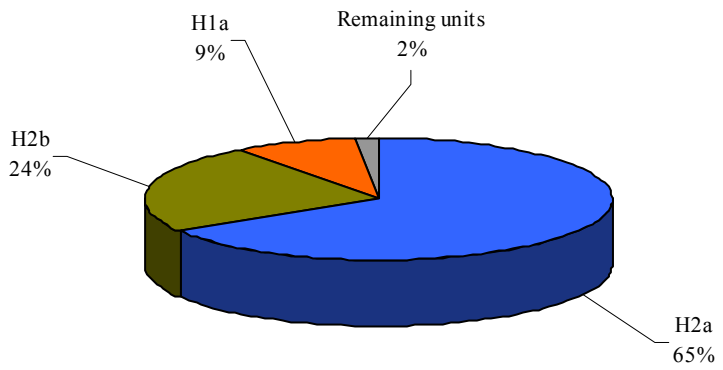
The analysis of economic effects of HMV and SMV conservation on activities related to transportation and utilities focuses on the cost of species conservation activities incurred by state transportation departments and affected local governments and utilities in implementing transportation and utility projects and conducting ongoing maintenance activities. Each entity was contacted in order to obtain information regarding the manner in which the presence of the species and/or the proposed CHD had affected, or may affect, past, current, and future projects, as well as ongoing maintenance activities. Related estimates of costs, where provided, are included in this analysis.

The section presents a synopsis of the major impacts, followed by a discussion of the conservation activities occurring by activity (i.e., transportation and utilities) within the proposed CHD.

5.1 SUMMARY OF FINDINGS

The following sections outline the economic effects associated with transportation (Section 5.1) and utility (Section 5.2) projects. Table D-4 in Appendix D summarizes the estimation results by unit/subunit. The table presents the range of estimated impacts to larger transportation projects and road maintenance, and power line construction and maintenance, resulting from the species conservation activities. Total pre-designation (2001-2006) costs are estimated to range between $0.5 and $0.7 million (in 2006 dollars). Potential post-designation (2007-2026) costs are estimated to range between $1.0 and $3.5 million in undiscounted 2006 dollars. In discounted terms, potential economic costs are estimated to range from $0.8 to $2.5 million (using a three percent discount rate) and $0.6 to $1.7 million (using a seven percent discount rate). In annualized terms, potential costs are expected to range from $53,000 to $171,000 annually (annualized at three percent) and $57,000 to $164,000 annually (annualized at seven percent). Approximately 65 percent of the total impact falls in Subunit H2a and 24 percent in Subunit H2b (see Figure 5-1).

Figure 5-1
Relative Economic Impacts to Transportation and Utilities, by Unit/Subunit
(Total Upper-Bound Undiscounted Impacts)



5.2 TRANSPORTATION

Potential economic effects of HMV and SMV conservation on transportation related activities, at the state level, are incurred by the Utah Department of Transportation (UDOT) and the Arizona Department of Transportation (ADOT). At the local government level, these effects are borne by the various county and city public works departments that implement local road projects and maintain road right-of-way (ROW). Local governments considered in the analysis include: Mohave County, Arizona; City of Santa Clara, Utah; City of Washington, Utah; and BLM St. George Field Office, Washington County, Utah.

Over 95 percent of costs related to the protection of HMV and SMV are associated with two large corridor projects by UDOT, the Southern and Western Corridors. These projects, along with their allied costs, are described in Sub-section 5.2.1. Sub-section 5.2.2 discusses the economic effects of species conservation activities on maintenance activities.

5.2.1 LARGE TRANSPORTATION PROJECTS

5.2.1.1 Southern Corridor

The Southern Corridor is a proposed four-lane, limited-access highway initiating at Interstate-15 (I-15) near the southwest corner of St. George. It begins about two miles from Utah's border with Arizona at the proposed Atkinville interchange, and connects with State Route 9 (SR9) near Hurricane. HMV is found at two locations within the original ROW alignment at Atkinville Wash, near CHD subunits H1a and H1c (see Maps 4, 5, and 6 in Appendix C). During the initial development of the Southern Corridor alignments, 10.75 acres of milk-vetch habitat was avoided by relocating the ROW 100 feet south of the existing plant populations. The associated increase in cost of highway construction, based on the alignment shift, is estimated to be $500,000 (in

2006 dollars). Construction of this project is expected to take place between years 2006 and 2007. For the purpose of this analysis, these costs per unit area are allocated proportionally to subunits H1a and H1c across years 2006 and 2007.[64]

In addition to revising the ROW alignment, UDOT is purchasing 17.15 acres of HMV habitat to create a habitat preserve, as mitigation for approximately 2.3 acres directly impacted within the ROW at Atkinville Wash (3:1 mitigation ratio), and approximately two acres of indirect impact near the Atkinville interchange (5:1 mitigation ratio).[65] The indirect impact is associated with development-related impacts that are expected to result because of the Southern Corridor Project. FHWA conducted a comparative analysis to determine how the SITLA property (i.e., South Block) would develop with and without the Southern Corridor and concluded that two acres of habitat near the first interchange would likely develop more densely because of the highway (see Figure 5-2). The estimated cost of this 17.15 acre mitigation is $265,000 to $435,000 (in 2006 dollars).[66] Prior to the end of 2006, pre-construction surveys, estimated to cost $5,000 (in 2006 dollars), will be conducted in order to verify HMV occurrence.[67] Further, UDOT will spend about $1,000 (in 2006 dollars) on road signs that will be posted in habitat areas within the ROW in 2007 to notify UDOT maintenance crews to contact the UDOT regional environmental coordinator before performing any activity.

5.2.1.3 Western Corridor

The Dixie Metropolitan Planning Organization (MPO) has planned a Western Corridor that will follow the path of Sun River Parkway along the west side of St. George, and eventually connect with Ivins. The project is in the early planning stages and is not expected to commence for another 10 to 15 years. However, when initiated, it may impact subunits H2a and H2b (see Map 3 in Appendix C). Based on current mitigation for the Southern Corridor, Dixie MPO estimates the costs for establishing a habitat preserve to offset impacts will range from $0.8 to $3.1 million

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64 The increase in cost, based on the alignment shift, corresponds to the construction of an additional half mile of freeway. Personal communication with Vincent Izzo, Consultant for UDOT, HDR One Company, April 21, 2006.

65 U.S. Fish and Wildlife Service, January 19, 2005, Section 7 Consultation for the Southern Corridor Project, Washington County, Utah (ES-6-UT-02-F-008), p. 4.

66 3:1 preservation of habitat for direct impact in the primary effect zone corresponds to 7 acres of total mitigation; 5:1 preservation of habitat for indirect impact in the primary effect zone corresponds to 10 acres of mitigation. Cost of land: 17 acres x $15,000 to $25,000/acre = $255,000 to $425,000; Cost of fencing: 4,400 ft. x $2.08/ft. = $10,000. Personal communication with Vincent Izzo, Consultant for UDOT, HDR One Company, April 21, 2006.

67 Estimated cost of surveys includes 80 hours for a botanist, leading to a total of $5,000. Personal communication with Vincent Izzo, Consultant for UDOT, HDR One Company, April 21, 2006.

Figure 5-2

Southern Corridor Project, Indirect Impacts

HDR Engineering, Inc. conducted a comparative analysis for FHWA and UDOT to determine how the South Block property owned by SITLA would develop with and without the Southern Corridor. According to the Southern Corridor Indirect Development Analysis (July 12, 2004), the current South Block Framework Plan (with the Southern Corridor) could impact up to 158 acres of HMV habitat (two acres would develop to institutional and commercial, 153 acres would develop to residential and three acres would develop at the Fort Pearce Business Park) while the Alternative Plan (without the Southern Corridor) could impact up to 174 acres of HMV habitat (171 acres would develop to residential and three acres would develop at the Fort Pearce Business Park). The Alternative Plan is expected to impact 16 more acres of HMV habitat than the South Block Framework Plan. However, because of the Southern Corridor, two acres of HMV habitat northeast of the interchange with I-15 will develop differently. The two acres are expected to develop as institutional and commercial with the Southern Corridor and as residential without the Southern Corridor.[a/]

The Service was asked to review HDR Engineering's Analysis. As communicated to FHWA in its November 2004 response, the Service believes the Alternative Plan is based on a "high level" of assumptions, "[i]t is almost impossible to comprise a quantitative acreage measurement of Southern Corridor Build vs. No-Build development scenarios due to speculative assumptions associated with available analyses." SITLA, FHWA, and UDOT assume that smart growth will occur with the development of the Southern Corridor and reduce development pressure on HMV; however, the Service believes this is not guaranteed and that "FHWA should consider that construction of the Southern Corridor would therefore result in the complete loss of this population area to associated residential and commercial development." In its comments, the Service recommends that FHWA should purchase lands (170 to 220 acres) necessary in the Southern Block to ensure the continued existence of HMV in perpetuity.[b/]

FHWA then revised its BA (October 15, 2004) on the Southern Corridor to incorporate results from more recent plant surveys and the analysis of indirect effects associated with highway-induced development. In its January 2005 BO on the October 2004 BA, the Service opined "…the Southern Corridor, as proposed, is not likely to jeopardize the continued existence of…Holmgren milk-vetch" acknowledging that "[w]hile the Southern Corridor will incur indirect effects to the plant species associated with highway-induced development, not all development on the adjacent South Block lands can be directly attributed to completion of the highway." In its Conservation Recommendations, the Service suggests that FHWA should ensure full compensation (i.e., purchase of HMV habitat in the Southern Block lands proximal to the Southern Corridor) for all direct and indirect effects associated with the Southern Corridor.[c/]

Considering the October 2004 BA addresses mitigation for direct and indirect effects of the Southern Corridor and that the Service did not recommend additional mitigation acreage in its January 2005 BO, this analysis assumes that the 17 acres of planned mitigation for the project is sufficient.

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a/ HDR Engineering, Inc., July 12, 2004, Southern Corridor Indirect Development Analysis.

b/ Service, November 2004, Review and Field Observations of Holmgren Milk-vetch (Astragalus holmgreniorum) and Dwarf Bear-Poppy (Arctomecon humilis) Associated with the Proposed Development of the Southern Corridor, Washington County, Utah.

c/ Service, January 19, 2005, Section 7 Consultation for the Southern Corridor Project, Washington County, Utah (ES-6-UT-02-F-008), pp 31 and 36.

(in 2006 dollars).[68] For the purposes of this analysis, the project is assigned an equal probability of occurring between years 2015 and 2020. Additionally, the associated costs are allocated proportionally to subunits H2a and H2b.

5.2.2 MAINTENANCE ACTIVITIES

ADOT has jurisdiction over the one mile long southern-most section of I-15 within the proposed CHD. While no major projects are planned for this area in the next five years,[69] maintenance activities are expected to be impacted by the designation of critical habitat for HMV and SMV. These include signing and pavement rehabilitation projects, Best Management Practices (BMP) determination, and vegetation control.

Signing for rehabilitation projects on this stretch of I-15 are performed every fifteen years, and pavement rehabilitation projects are carried out every ten years. To date, no species conservation costs were incurred either in the signing rehabilitation project completed in 2005, or in the ongoing pavement rehabilitation project.[70] However, the critical habitat designation would result in additional plant surveys that will be conducted prior to each project. The total cost of each survey, in 2006 dollars, is expected to be approximately $1,600,[71] while the initial plant surveys are estimated to cost about $12,200.[72]

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68 Ten to 25 acres potentially impacted, with a 5:1 ratio, corresponding to the purchase of 50 to 125 acres, at $15,000 to $25,000/acre. Personal communications with: Lowell Elmer, Director, Dixie MPO, May 12, 2006; Thomas McMurtry, GIS Specialist, InterPlan, Consultant for Dixie MPO, May 12, 2006; and Vincent Izzo, HDR One Company, Consultant for Dixie MPO, May 12, 2006.

69 The department dedicated project horizon is five years. Personal communication with Walter (Kent) Link, Flagstaff District Maintenance Engineer, ADOT, April 18, 2006.

70 The listing of the SMV did not affect ADOT as no plant was found in their jurisdiction. Personal communications with: Walter (Kent) Link, Maintenance Engineer, ADOT, April 18, 2006; Pat Cusey, Project Supervisor, ADOT, April 24, 2006; and Justin White, UDOT Environmental & Enhancement Group, April 26, 2006.

71 The cost for each survey is based on the following: 20 hours at $50/hour, hotel and per diem cost of $100, travel cost from Phoenix of $500. Personal communication with Justin White, UDOT Environmental & Enhancement Group, April 26, 2006.

72 The cost of the initial surveys is based on the following: 80 hours for a botanist at $50/hour, hotel cost of $800, per diem cost of $300, travel cost from Phoenix of $1,000, and 200 percent overhead. Personal communication with Justin White, UDOT Environmental & Enhancement Group, April 26, 2006.

The determination of BMP[73] is expected to cost another $920 in 2006, and their application would require annual employee training, estimated to cost $200 (in 2006 dollars). Further, the proposed CHD will lead to an increase in vegetation control costs, including additional planning ($1,840 the year of implementation in 2006 dollars) and routine surveys ($1,200 every other year in 2006 dollars). Periodic, routine vegetation management activities such as herbicide applications will also be impacted, increasing costs by $2,000 to $4,000 in 2006 (in 2006 dollars). In subsequent years, these costs are estimated to increase by $400 to $4,000 (in 2006 dollars), depending upon the amount of weeds present.[74]

Unlike ADOT, UDOT does not expect any maintenance activities or new projects on I-15 to be impacted by conservation related to the species.[75, 76] Also, discussions with staff members from other potentially affected jurisdictions reveal that no past, present, or future road projects are located within the area of the proposed CHD, and maintenance activities are not expected to impact the species. Therefore, no costs are expected to be incurred by these jurisdictions from species conservation activities.[77, 78, 79, 80]

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73 The determination of BMPs would require 40 hours for a planner, at $23/hour. Their implementation would take an additional 2 hours of training for a crew of 8 people, at $12/hour/year. Personal communication with Justin White, UDOT Environmental & Enhancement Group, April 26, 2006.

74 The vegetation control costs are broken down as follows - Increased project planning: 80 Hours for one planner, at $23/hour. Routine surveys: 20 Hours for 2 staff members at $16/hour. Per Diem and hotels: $100. Mileage: $450 Every other year, starting in 2008. Periodic activities: Prescribed burning, mowing, and seeding will be directly impacted, but will not involve additional costs. Herbicide applications: Use of a more expensive herbicide, that will not harm the species, will cost an additional $50 to $100 per acre for 40 acres in 2006, and 8 to 40 acres in the following years depending on the amount of weeds present each year (every year from 2007). Personal communication with Thomas Eckler, UDOT Natural Resources Manager, April 26, 2006.

75 The ongoing rotomill and overlay project, "State Line to Bluff Street" (mile post (MP) 0 to 6), will not affect the species and: a fence, installed for other purposes, will protect them from the construction activities. A similar project is planned for 2009 in the vicinity of Subunit S4a, "Washington to Cottonwood Creek" (MP 10 to 19.3). The rotomill and overlay project will only affect the roadway and median strip, and not areas adjacent to the road. Therefore, the project will not impact the SMV or its habitat. Personal communications with: Tamera Maxwell, Project Manager, UDOT, April 18, 2006; Susan Miller, Environmental Group, UDOT, April 18, 2006; and Paul West, Biologist, UDOT, April 26, 2006.

76 No other projects are expected to impact the milk-vetches. Personal communications with: Gregory S. Punske, Environmental Program Manager, Federal Highway Administration, Utah Division, April 24, 2006; and Shane Marshall, Environmental Program Manager, UDOT, April 25, 2006.

77 Maintenance is performed on roads in the vicinity of Subunit H1b by BLM's St. George Field Office. These projects, which include a guardrail contract completed in 2001, maintenance on Quail Hill (BLM road 1069) completed in 2004, and a current dust abatement program, have not impacted the HMV. Personal communication with Dan Stone, Road Engineer, St. George BLM, April 18, 2006.

5.3 UTILITIES

Entities involved in power line projects within the CHD area include PacifiCorp, Dixie Escalante Rural Electric Association (DEREA), and the City of Washington. Relevant personnel from these entities were contacted in order to determine whether the presence of the species, and/or the proposed CHD, can potentially affect power line construction and maintenance activities. The costs associated with power lines as a result of species conservation activities is expected to be minimal, with total pre-designation (2001-2006) costs estimated around $3,000 (in 2006 dollars). No post-designation costs (2007-2026) are anticipated, since no foreseeable project is located within the proposed area.[81] Further, 90 percent of the pre-designation impact falls in Unit S5 and the remaining 10 percent in Subunit S4a. The following paragraphs provide details of these costs.

Several units/subunits within the proposed critical habitat for HMV and SMV are located along power lines constructed and maintained by PacifiCorp.[82] Prior to the construction of a power line in Zion National Park, a survey for SMV was conducted in 2002 in the vicinity of the project in Unit S5. No presence of the species was documented at the project site and, thus, no changes or modifications to the project were deemed necessary. The survey was conducted at a cost of $2,500 (in 2006 dollars). Additionally, since motorized vehicles are not authorized in the park, no impacts due to maintenance activities are expected on the SMV.

Another SMV survey, costing approximately $300 (in 2006 dollars), was carried out around Subunit S4a in spring of 2006, before the commencement of a currently ongoing PacifiCorp project near Harrisburg Junction/I-15. The survey results determined that the project would not impact the species. No additional costs associated with the proposed CHD are expected to be incurred by PacifiCorp for this project.

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78 Maintenance of Mount Trumbull road in conjunction with BLM field office, including grading the road every 6 to 8 weeks, has not impacted HMV. Personal communication with Dave Adams, Engineer Technician, County of Mohave Public Works, April 14, 2006.

79 The City of Washington is not affected by the species on any of its present or future planned roads. Personal communication with Mike Shaw, Director of Public Works, City of Washington, April 19, 2006.

80 No foreseeable changes in the routine maintenance performed on Stucki Springs road due to the presence of the HMV. Personal communication with Jack Taylor, Director of Public Works, City of Santa Clara.

81 Personal communications with: Russell Condie, Engineer Technician, DEREA, April 25, 2006; Kelly Carlson, Director, Power Department, City of Washington, April 26, 2006; Bill Butler, Sr. Project Sponsor, PacifiCorp, May 22, 2006; and Eric Holt, Wildlife Biologist, JBR Environmental Consultants, Consultant for PacifiCorp and DEREA, May 26, 2006.

82 PacifiCorp maintains an existing line in the Shivwits Indian Reservation, but maintenance activities are not expected to impact the species. Personal communications with Eric Holt, Wildlife Biologist, JBR Environmental Consultants, Consultant for PacifiCorp, May 25 and 26, 2006.

Both DEREA and the City of Washington have not incurred, and are not expected to incur, any species conservation costs. DEREA performs occasional maintenance on an existing line in Subunit H1a that does not impact the species. Extensions to this line are ongoing in the vicinity of the subunit, but these are also not expected to impact the species.[83] As for the City of Washington, a substation and a transmission line serving the Coral Canyon area are being constructed in Unit S3, but the project does not impact the species.[84]

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83 A line extension was built in 2005 on the south end of Subunit H1a, while another is currently under consideration on the north end, near I-15. Personal communications with Russell Condie, Engineer Technician, DEREA, April 25, 2006, and Eric Holt, Wildlife Biologist, JBR Environmental Consultants, Consultant for PacifiCorp, May 26, 2006.

84 Personal communication with Kelly Carlson, Director, Power Department, City of Washington, April 26, 2006.

This section discusses the efforts made by public agencies, non-governmental organizations, private parties, and an Indian tribe, for the conservation of HMV and SMV on public and tribal lands. Cost estimates in the analysis generally seek to measure (1) the loss in social welfare from excluding public lands from use, and (2) monies spent specifically for species conservation.

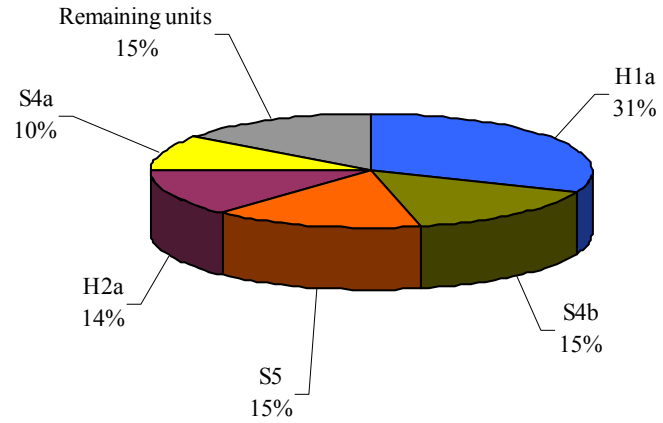
By restricting access to public lands, society tends to lose the opportunity to use or benefit from these terrains. In case of the proposed CHD, excluding lands through installing protective fences will potentially impede cattle grazing and off-highway vehicle (OHV) use. The second objective of this study is to account for all monies spent specifically for the conservation of HMV and SMV. These monies fund such species conservation activities as ecological studies and title purchases.

The section presents a synopsis of the major impacts, followed by a discussion of the conservation activities occurring within the proposed CHD.

6.1 SUMMARY OF FINDINGS

The following sections outline the economic effects associated with species conservation and land management projects. Table D-5 in Appendix D summarizes the estimation results by unit/subunit. Total pre-designation (2001-2006) costs are estimated to range between $8.6 and $12.8 million (in 2006 dollars). Over 95 percent of the total pre-designation costs are attributed to Subunit H1a. Within this proposed subunit, BLM intends to purchase a 166-acre parcel from the State of Utah School and Institutional Trust Lands Administration (SITLA) for $8.3 to $12.5 million by the end of 2006, in order to create a preserve for the species. Potential post-designation (2007-2026) costs are estimated to be $479,000 (in undiscounted 2006 dollars). In discounted terms, likely economic costs of activities related to conservation initiatives are estimated to be $374,000 (using a three percent discount rate) and $285,000 (using a seven percent discount rate). In annualized terms, potential costs are expected to be nearly $25,000 annually (annualized at three percent) and $27,000 annually (annualized at seven percent). More than 95 percent of post-designation undiscounted high costs are attributed to a series of ecological monitoring studies. Figure 6-1 presents future spending estimates on a per unit/subunit basis.

Figure 6-1
Relative Economic Impacts to Federal and Tribal Lands, by Unit/Subunit
(Total Upper-Bound Undiscounted Impacts)



In 2004, The Nature Conservancy (TNC) and BLM entered into a "Challenge Cost Share Agreement" for constructing three protective fences for the SMV.[85,86] The two entities have budgeted approximately $22,000 for installment of these structures by the conclusion of 2006.[87] The purpose of the fencing and signs is to prevent disturbance caused by grazing, trampling from recreation users, and to provide general awareness to the public. However, excluding public lands from use results in a cost to society.

Excluding SMV lands, through installing fences, is expected to result in nominal grazing losses. Total lost grazing potential from excluding lands is equal to approximately 1.13 Animal Unit Months (AUMs). The study employs a market rate to appraise the value of an AUM, instead of a federally subsidized measurement. For example, BLM leases an AUM at $1.56, while private

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85 U.S. Department of the Interior, Bureau of Land Management, March 21, 2006, *Environmental Assessment (UT-100-06-EA-03) on Shivwits Milkvetch Protective Fences*, Washington D.C.

86 "*Astragalus ampullarioides* [SMV] is extremely palatable to both wildlife and domestic livestock, but *A. holmgreniorum* [HMV] is not." U.S. Fish and Wildlife Service, September 28, 2001, "Endangered and Threatened Wildlife and Plants: Determination of Endangered Status for *Astragalus holmgreniorum* (Holmgren milk-vetch) and *Astragalus ampullarioides* (Shivwits milk-vetch), Final Rule" *Federal Register*, Vol. 66, No. 189, pp. 49560-49567.

87 The Nature Conservancy and Bureau of Land Management, November 2004, *Challenge Cost Share Proposal*. Personal communication with Elaine York, Director, West Desert Operations, The Nature Conservancy, May 8, 2006.

rangeland leases for $5 to $15 per AUM.[88] The total cost attributed to losses in annual grazing rents is $5.63 to $17.05 (in 2006 dollars).

Excluding public lands may also adversely affect off-highway vehicle (OHV) use. OHV recreation is a burgeoning industry in the region; between 1997 and 2003, the number of registered OHV users in Utah increased by 200 percent, from roughly 40,000 users in 1997 to 125,000 users in 2003.[89] This trend is not isolated to local OHV enthusiasts, as people from other areas tend to visit St. George for recreation outings. Increased ridership is anticipated to lead to a greater likelihood of illegal off-trail use, thus elevating the risk of disturbing the species.

Installation of a series of fences is intended to reduce illegal off-trail, or "open-country", OHV use. OHV use is permitted on existing roads and trails on BLM managed lands in each of the proposed critical habitat units/subunits. Fencing will not reduce this use, but merely redirect it to roads and trails outside the fenced areas. Subunit S4b (Silver Reef habitat) is the only proposed habitat where OHV trails presently exist within a proposed fencing area. This area is rectangular in shape with a few jeep roads and OHV trails running the length of the subunit. The fence will reduce little, if any, use of trails within the habitat. Therefore, no loss in social welfare is anticipated.

The final category of conservation efforts includes ecological studies and habitat monitoring. BLM contracts a biologist from Utah Valley State College (UVSC) to monitor all habitats on BLM lands on an annual basis. The contract has remained active for the past 15 years, with an annual grant of $10,000 that is matched in-kind by either Brigham Young University and/or UVSC. The biologist expects to receive these grants as long as the species are listed as endangered, which this analysis considers the next 20 years. The same biologist received $45,000 over the past three years from SITLA, with an additional $14,000 in various other grants for genetic research on the species.[90]

The US Geological Survey (USGS) is also sponsoring a study in Zion National Park, Unit S5 within the proposed CHD. The research is investigating the ecology of SMV, as it relates to soil types and invasive exotic species. The study has a budget of $143,000 over its two year duration.

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88 While the Federal grazing fee is less expensive, the permittee is responsible for additional management activities (e.g., fence repair and maintenance) that are typically assigned to the landowner under a private lease. Personal communication with Kim Laney, Director of Rangelands, BLM St. George Office, May 2, 2006.

89 Congressional deposition delivered by David Morrow, Deputy Director, Utah State Parks, April 16, 2002, http://resourcescommittee.house.gov/archives/107cong/parks/2002apr16/morrow.htm; and Fred Hayes, OHV Coordinator, Utah Division of Parks and Recreation, *Off-Highway Vehicle Programs*, http://extension.usu.edu/cooperative/iort/files/PDF/OHV.pdf.

90 Personal communications with Dr. Renee Van Buren, Professor of Biology, Utah Valley State College, May 29 and June 1, 2006.

En masse, monitoring and research post-designation efforts add up to $472,500 (in 2006 dollars), which constitutes over 95 percent of total post-designation costs. Pre-designation costs attributed to monitoring efforts sum $258,350 (in 2006 dollars), and comprise, at most, three percent of total pre-designation spending.

The remainder of this section elaborates upon these conservation activities and associated costs occurring in each proposed habitat unit/subunit.

6.2 CONSERVATION ACTIVITIES FOR HMV

6.2.1 SUBUNIT H1A (STATELINE)

More than 95 percent of the total cost of species conservation activities on Federal and tribal lands (pre- and post designation cost in 2006 dollars) is attributed to activities that have occurred, or are expected to occur, within Subunit H1a. Costs associated with reduced cattle grazing and OHV recreation in this area only represent a nominal portion of the subunit's total costs. The most significant conservation effort is BLM's intent to purchase a 166-acre parcel from SITLA for an estimated $8.3 to $12.5 million (in 2006 dollars), or $50,000 to $75,000 per acre.[91] This transaction is considered a pre-designation cost as all administrative efforts pertaining to the acquisition occurred between 2001 and 2006, and BLM is expecting to acquire title by the end of 2006.[92]

In addition to land acquisition, installation of a protective fence is planned for the northern boundary of the preserve (see Maps 4 and 5 in Appendix C). The fence will span 3,150 feet and cost approximately $6,550 (in 2006 dollars).[93] The structure will act as a border to the SunRiver Development project to the north, and is intended to minimize foot traffic in the habitat. Grazing will also be prohibited in the preserve, but this loss is captured in the purchase price (i.e., market value) of the land.

Approximately 2,550 acres of Subunit H1a fall within the 28,055-acre Curly Hollow grazing allotment. Curly Hollow provides 1,230 AUMs for 206 cattle between November 1 and February

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91 Personal communication with Stan McConkie, Realtor with Morely & McConkie, Washington County, St. George, Utah, May 2,2006.

92 Personal communications with Jim Crisp, Director of BLM's St. George Field Office, Washington County, St. George, Utah, May 2,2006.

93 The cost is based on a per foot rate of $2.08. Cost of fence per foot was derived from TNC and BLM's *Challenge Cost Share Proposal*, November 2004, and personal communication with Elaine York, Director of West Desert Operations, The Nature Conservancy, May 08, 2006. The total cost for the three fences in the Challenge Cost Share agreement was roughly $22,000 (in 2006 dollars).

15 each year, and is leased to five ranchers.[94] Considering HMV is not palatable to cattle,[95] the designation of critical habitat would not result in a loss of AUMs.[96] Furthermore, since grazing activities on the allotment cease by mid-February, cattle would not be present during the period when HMV is flowering or seeding (typically March through May).[97] Therefore, trampling impacts to HMV by cattle during grazing are expected to be minimal.

OHV recreation is prevalent in the area proposed for critical habitat designation of HMV and SMV. BLM has this area zoned for OHV use on existing roads and trails.[98] The planned fence will not inhibit OHV use in the area and, thus, no loss to legal access or use is expected to occur.

6.2.2 SUBUNIT H2A (STUCKI SPRINGS)

Grazing and OHV use are the only activities occurring in Subunit H2a, and fences have not been proposed to restrict either activity. The only conservation effort in this subunit is a non-governmental organization's (NGO) purchase of grazing rights in 2001 to protect HMV.

The subunit straddles two grazing allotments, with 147 acres in Boomer Hill and 265 acres in Curly Hollow. An unpaved county road, Stucki Springs Road, partitions these grazing allotments (see Map 3 in Appendix C). However, the only grazing occurring in the subunit is west of this road (Boomer Hill grazing allotment). While HMV is not palatable to cattle, grazing rights east of Stucki Springs Road (Curly Hollow grazing allotment) were purchased by the Grand Canyon Trust (GCT) in November 2001, specifically to protect HMV from trampling and inadvertent grazing.[99] GCT paid $17,920 (in 2006 dollars) for rights to 150 AUMs. This purchase also retired grazing rights in Subunit H2b, and the cost is equally attributed to both subunits.

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94 Department of the Interior, Bureau of Land Management, St. George Field Office, September 1998, *Dixie Resource Area Proposed Resource Management Plan and Final Environmental Impact Statement* - Appendix 5: Grazing Summary Table, St. George, Utah.

95 "*Astragalus ampullarioides* [SMV] is extremely palatable to both wildlife and domestic livestock, but *A. holmgreniorum* [HMV] is not." U.S. Fish and Wildlife Service, September 28, 2001, "Endangered and Threatened Wildlife and Plants: Determination of Endangered Status for *Astragalus holmgreniorum* (Holmgren milk-vetch) and *Astragalus ampullarioides* (Shivwits milk-vetch), Final Rule" *Federal Register*, Vol. 66, No. 189, pp. 49560-49567.

96 Personal communications with: Bob Douglas, Biologist, Bureau of Land Management, May 2, 2006; and Jim Crisp, Office Manager, St. George Field Office, Washington Country, Utah, May 2, 2006.

97 Biological information obtained from U.S. Fish and Wildlife Service's milk-vetch webpage, http://mountain-prairie.fws.gov/species/plants/milkvetche/index.htm.

98 Department of the Interior, Bureau of Land Management, St. George Field Office, March 1999, *Record of Decision and Resource Management Plan - Map 2.13: Off-Highway Vehicle Designations*, St. George, Utah.

99 Personal communication with Bill Hedden, Executive Director, Grand Canyon Trust, May 8, 2006.

Minimal grazing also occurs west of the county road. BLM leases the 25,000-acre Boomer Hill allotment to two allottees for grazing of 155 AUMs, but presently only one allottee actively uses it for this purpose.[100] Fencing is not proposed in this subunit, so no land exclusion is anticipated. Therefore, grazing activities will continue as they do presently, and no losses are expected.

The resource management plan for the Santa Clara River Reserve designates all areas west of Stucki Springs Road as Zone 2, or an area allowing motorized recreation on existing roads and trails. Fencing has not been proposed in this area, so no loss of legal OHV use is anticipated. BLM also zoned the area east of Stucki Springs Road for OHV use on existing roads and trails. Since no fencing is proposed in this area either, no loss to legal OHV use is expected.

6.2.3 SUBUNIT H2B (SOUTH HILLS)

Grazing and OHV use are the primary activities occurring in the proximity of Subunit H2b. Similar to Subunit H2a, installation of fences restricting either grazing or recreation has not been proposed for this area. The only conservation effort in this subunit is the Grand Canyon Trust's purchase of grazing rights in 2001 to protect HMV.

Grazing only occurs west of Stucki Springs Road in the Boomer Hill grazing allotment, and the subunit occupies 31 of the allotment's approximate 28,000 acres. However, half of GCT's $17,920 (in 2006 dollars) purchase price of grazing rights in this area (Curly Hollow grazing allotment), to protect HMV from trampling and inadvertent grazing even though HMV is not palatable to cattle, is attributed to this subunit.

Subunit H2b experiences light recreational use, with several trails east of Stucki Springs Road. BLM permits OHV use on these existing roads and trails, and with no fences proposed for installation, no loss to legal OHV use is expected. Furthermore, the resource management plan for Santa Clara River Reserve designated a strip of land within the proposed habitat that follows a wash, as restricted to motorized vehicles (see Map 3 in Appendix C). This non-motorized area will not interfere with society's ability to utilize existing roads and trails for OHV recreation within the proposed habitat, so no loss to legal OHV use is expected.

6.2.4 UNIT H3 (PURGATORY FLAT)

Washington County entered into a 25-year lease agreement with BLM in 1998 for the use of 513 acres of land, including the BLM managed portion of Unit H3. The County sought to counter the trend of widespread, unregulated use of firearms in the more primitive areas by providing public facilities designated for shooting and archery exercises on this leased land. Representatives of the

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[100] Personal communications with: Bob Douglas, Biologist, Bureau of Land Management, May 2, 2006; and Jim Crisp, Manager, St. George Field Office, St. George, Washington County, Utah, May 2, 2006.

Southern Utah Shooting Sports Park (hereinafter "Park") anticipate public use of around 1,155 shooters per month, or about 13,850 shooters annually.[101] Table 6-2 below presents a breakdown of use by shooting venue.

Thus far, the Park has invested $267,000 with donations of labor, professional services, materials, and heavy equipment.[102] Park representatives anticipate the final development cost will range from $1.5 to $2.5 million (in 2006 dollars), and expect all facilities to be completed by mid-2007.[103] The developers wish to eventually privatize, or "patent", the land, and the proposed CHD will potentially influence the extent of land likely to be patented. Currently, all 513 acres are zoned for lease and conveyance.

Table 6-2
Expected User Levels at the Southern Utah Shooting Sports Park

Shooting Venue	Shooter Days/Use Per Month	Annual Shooter Days/Use
Archery	50	600
Shotgun	300	3,600
Pistol	90	1,080
Rifle	200*	2,400
Cowboy Action	300*	3,600
Boy Scouts	50	600
Hunter Education Students	65	780
4-H Clubs	50	600
Other	50	600
Total	**1,155**	**13,860**

*User levels are estimated based on current use levels at alternative sites. These shooters are expected to relocate to the Park when development is completed.

The likelihood of BLM awarding a patent to the shooting range depends upon the condition of the habitat at the time of decision-making. Presently, an archery range exists within the proposed CHD (see Map 8 and picture insert in Appendix C). The archery range is limited to foot-traffic,

101 User level estimates provided in a facsimile from Brent Jensen, Director, Southern Utah Shooting Sports Park, Washington County, St. George, Utah, May 8, 2006.

102 Capital donations as of May 2006 by party and amount: Utah Division of Wildlife Resources ($205,000), National Rifleman's Association ($51,267), Bar 10 Ranch ($850), and Dixie Wildlife Federation ($10,000).

103 Personal communications with Brent Jensen and Steve Bradbury, Directors, Southern Utah Shooting Sports Park, St. George, Washington County, Utah, May 3, 2005.

where sportsmen can either perform target practice in a small mowed field, or walk a path that simulates bow hunting with stationary targets situated throughout the course. This is the only Park activity occurring within the unit. In comparison to the capital needed to develop facilities outside of the unit, the archery range required minimal investment. In other words, capital costs incurred to develop the Park are wholly concentrated in areas outside of the proposed CHD.

BLM may decide to award a patent on (1) all 513 acres, (2) all lands except proposed CHD, or (3) no lands at all. Interviews with BLM officials and shooting range representatives indicate that a verbal agreement stipulates the land will only be patentable when it is fully developed. Due to the ambiguity related to not knowing the conditions of development and habitat at the time of decision-making, the economic impact of designating critical habitat in this area is uncertain. Yet, considering the public activities permitted in the other HMV habitat units/subunits (e.g., grazing, hiking, OHV use, etc.), this analysis assumes that current archery use, which is limited to light foot traffic (an estimated 50 archers per month), within the proposed habitat is compatible with species conservation. Thus, when the land is up for patent in the future, this analysis assumes that all BLM lands outside of the proposed CHD will be privatized. This alternative is consistent with BLM excluding subunits H1a and H2b from proposed disposal status. It is further anticipated that the Park will be able to continue to lease Unit H3 for future archery use, which would result in no loss to the public's opportunity to utilize the archery course, or to capital invested in the course's development. Should BLM decide not to patent the 513 acre lease for the Park, the estimated $1.5 to $2.5 million in development costs could be at risk and the estimated impacts understated.

Additionally, a protective fence for the species was installed in 1999. Since this was prior to the listing of HMV as an endangered species, no costs are attributed to this conservation effort.

6.3 CONSERVATION ACTIVITIES FOR SMV

6.3.1 UNIT S1 (PAHCOON SPRING WASH)

The first of the three fences to be installed by TNC and BLM, as part of their cost-share agreement, will span a half-mile and exclude 20 acres of land on Unit S1 from other uses. The fence is scheduled for installation in 2006, and is planned to form a semi-circle that will use the existing fence on the north side of the Shivwits Indian Reservation to complete the enclosure (see Map 2 in Appendix C). At the rate of $2.08 per foot of fence, the total expected cost for fencing is $5,500 (in 2006 dollars).[104] Construction of the fence will occur in 2006.

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[104] Cost of fence per foot was derived from TNC and BLM's *Challenge Cost Share Proposal*, November 2004, and personal communication with Elaine York, Director of West Desert Operations, TNC, May 08, 2006. The total cost for the three fences in the Challenge Cost Share agreement is approximately $22,000 (in 2006 dollars).

Unit S1 is located in the Jackson Wash grazing allotment. Of the allotment's 33,395 total acres, the unit occupies 134 acres, with 20 acres to be excluded by fencing. BLM annually leases the allotment's 1,519 AUMs to four ranchers.[105] Grazing activities will continue on the remaining unfenced 114 acres of the unit. This analysis estimates the resulting loss at approximately 0.9 AUMs. With private lease rates ranging from $5 to $15 per AUM, the annual loss is equivalent to $4.55 to $13.65 (in 2006 dollars).

OHV use also occurs in the unit, but no existing roads or trails are present in the area scheduled for fencing. Therefore, the fence will not restrict OHV use or result in a loss of social welfare.

6.3.2 UNIT S2 (SHIVWITS)

In response to the species being listed as endangered in 2001, the Shivwits Band of Paiute Indians installed a fence to prevent grazing and trampling within the SMV habitat (see Map 2 in Appendix C). The Service provided approximately $5,500 in fencing materials and the Tribe contributed an in-kind donation of $5,500 in labor (in 2006 dollars).[106]

The fence excludes roughly three acres from grazing, but the Tribe asserts this will have a negligible impact to grazing activities. Representatives of the Tribe contend that grazing can be easily adjusted to other pastures when SMV is flowering/seeding from March to May.[107] However, with private grazing lease rates ranging from $5 to $15 per AUM, and stocking densities in the neighboring BLM grazing allotments ranging from 20.33 acres per AUM (Curly Hollow) to 21.98 acres per AUM (Jackson Wash), the grazing value of the three acres of rangeland is equivalent to approximately 0.14 to 0.15 AUMs, or $0.68 to $2.22 (in 2006 dollars) in annual revenues if the AUMs cannot be replaced.

6.3.3 UNIT S3 (CORAL CANYON)

At the time of species listing in 2001, a golf course neighboring the proposed habitat was entering construction phase. The developers of the golf course and surrounding properties moved a tee-

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105 Department of the Interior, Bureau of Land Management, St. George Field Office, September 1998, *Dixie Resource Area Proposed Resource Management Plan and Final Environmental Impact Statement* - Appendix 5: Grazing Summary Table, St. George, Utah.

106 Personal communications with: Glen Rogers, Chairman, Shivwits Band of Paiute Indian Tribe of Utah, Shivwits Indian Reservation, Washington Country, Utah., May 1, 2006; and Lawrence Snow, Councilman, Shivwits Band of Paiute Indian Tribe of Utah, Shivwits Indian Reservation, Washington Country, Utah., May 1, 2006.

107 Personal communications with: Glen Rogers, Chairman, Shivwits Band of Paiute Indian Tribe of Utah, Shivwits Indian Reservation, Washington Country, Utah., May 1, 2006; and Lawrence Snow, Councilman, Shivwits Band of Paiute Indian Tribe of Utah, Shivwits Indian Reservation, Washington Country, Utah., May 1, 2006.

box roughly 20 feet from its planned position in order to avoid disturbing the habitat. This adjustment did not require any additional cost.[108]

6.3.4 SUBUNIT S4A (HARRISBURG BENCH AND COTTONWOOD)

As part of the cost share agreement, BLM and TNC intend to install a fence within Subunit S4a to minimize disturbance caused by human presence. The fence will form a rectangular enclosure and exclude 18 acres of land from other uses (see Map 9 in Appendix C). The circumference of the fence will be about one-half mile, and at a rate of $2.08 per foot of fence, the estimated cost is approximately $5,500 (in 2006 dollars). Construction of the fence will occur in 2006.

This area experiences light recreational use, with no trails/roads existing within the proposed critical habitat. Thus, no impact to recreational use is expected to occur.

Subunit S4a is located within the 10,000-acre Red Cliffs grazing allotment. Grazing rights west of I-15 were retired in 1995 by Washington County in order to provide habitat for *Gopherus agassizii* (the desert tortoise).[109] BLM presently does not lease land east of I-15 for grazing. However, a fence is planned for installation that will exclude 18 acres of rangeland. Since the Red Cliffs allotment yields 20 AUMs at a stocking density of 510 acres per AUM, removing 18 acres will result in the loss of about 0.035 AUMs. With private grazing lease rates ranging from $5 to $15 per AUM, the annual loss is equivalent to $0.18 to $0.53 (in 2006 dollars).

6.3.5 SUBUNIT S4B (SILVER REEF)

The third proponent of the BLM and TNC cost share agreement is to install a series of fences in the Silver Reef habitat. Two of these fences will form small enclosures, while the third will parallel a ridge that will provide a natural barrier and act as the backside of the enclosure (see Map 9 in Appendix C). The total combined length of the fences is approximately one mile, and at a rate of $2.08, the total expected cost of the fencing is about $11,000 (in 2006 dollars). Construction of the fence will occur in 2006.

OHV use is prevalent in this area, with some existing trails traversing the habitat. The fences will not significantly restrict OHV use, but redirect it. The structures will abut an existing road and will allow OHV travel to continue freely. Furthermore, these existing roads are considered rights-of-way and are administrated by Washington County. Federal agencies, such as BLM, are

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[108] Personal communication with Guy L. Steele (Development Manager) and Mike Gardner (General Manager) of Coral Canyon Development, and Michael Bradshaw (Principal Engineer) of Alliance Consulting, Washington City, Utah, May 1, 2006.

[109] Washington County Commission, December 1995, *Habitat Conservation Plan,* Washington County, Utah.

legally prohibited from interfering with travel on county roads, since this action is outside of their jurisdictional authority.[110] These trails are mostly used by residents of Leeds to access other recreational activities (i.e. hunting). Even though this fence will prohibit OHV use within the habitat (the two small enclosures will fence off 22 acres), ample outlets for OHV users exist for utilizing alternative paths. Thus, no impact to recreational use is expected to occur.

Subunit S4b is within the Red Cliffs grazing allotment, and the fences are expected to exclude 22 acres from grazing. BLM does not currently lease this property. However, fencing is anticipated to preclude grazing in perpetuity, which represents a loss of opportunity to society. The Red Cliffs allotment is roughly 10,000 acres in size, and yields 20 AUMs at a stocking density of 510 acres per AUM. Removing 22 acres will result in the loss of approximately 0.043 AUMs. With private grazing lease rates ranging from $5 to $15 per AUM, the annual loss is equivalent to $0.22 to $0.65 (in 2006 dollars).

6.3.6 UNIT S5 (ZION)

This habitat resides in the southern portion of Zion National Park (hereinafter "Zion"). Presently, no management activities are occurring in this unit, but the National Park Service (NPS) is collaborating with the US Geological Survey (USGS) for a study to "…describe the distribution and abundance of *A. ampullarioides* and associated invasive exotic plants in relation to soil properties, geomorphic setting, and plant community composition."[111] The study commenced in May 2006, and is expected to conclude in January 2008. NPS, in cooperation with the Service, intends to develop management and recovery plans that draw from the results of this research. NPS provides Zion facilities and other assistance, while USGS funds the study through a research grant for $143,000 it received to be spent over the course of the two year study.

The only other relevant activity occurring in the area relates to fire management in Zion. Zion's fire management plan stipulates that no fire management activities may occur within a three-quarter mile buffer zone.[112] The area containing the species is not likely to experience fire, and the plant would be protected during any fire response.[113] Although accounted for in Zion's fire

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110 *Southern Utah Wilderness Alliance v. Bureau of Land Management*. (2005) 2 UT.App.10th. And, *Memorandum Decision* of October 8, 1997, 19 Aplt.App. 136.

111 Miller, Mark, US Geological Survey, 2005, "Project Proposal to Evaluate the Effects of Invasive Exotic Plants on Habitat Conditions and Performance of the Federally Endangered *Astragalus ampullarioides* in Zion National Park."

112 Proposed Rule for Designation of Critical Habitat for *Astragalus ampullarioides* and *Astragalus holmgreniorum,* Federal Register, Vol. 70, No. 60, March 29, 2006.

113 Department of the Interior, U.S. Fish and Wildlife Service, November 2004, *Environmental Assessment of Zion National Park's Fire Management Plan*, Washington D.C.

management plan, no actions have been taken towards the conservation of the species, so no costs are assigned in this case.

This appendix contains an examination of the extent to which the analytic results presented in the main report reflect impacts to small entities. The analysis of the effect on small entities is conducted pursuant to the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996. The appendix also includes an analysis of the effects of the rulemaking on energy markets, as required by Executive Order No. 13211.

POTENTIAL EFFECTS ON SMALL ENTITIES

Under the RFA (as amended by SBREFA), whenever a Federal agency is required to publish a notice of rulemaking for a proposed or final rule, it must prepare, and make available for public comment, a regulatory flexibility analysis that describes the effect of the rule on small entities. However, no regulatory flexibility analysis is necessary if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities.[114] SBREFA amended the RFA to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities. To assist in this process, the following represents a screening level analysis of potential effects of species conservation activities on small entities due to the rulemaking. This analysis is intended to facilitate determination of (1) whether this CHD potentially affects a "substantial number" of small entities in counties and/or supporting critical habitat areas; and (2) the probable number of small entities that are likely to experience a "significant effect."

DEFINITION OF SMALL ENTITIES

Small entities include small businesses, small governments, or small organizations, as defined by the U.S. Small Business Administration (SBA) size standards for small businesses that are established for different types of economic activity or industry within the North American Industry Classification System (NAICS), and are commonly expressed in terms of the number of employees or annual receipts. For most industries, the size standard is based on annual revenue for the business. The SBA publishes a table of current small business size standards on their

[114] Thus, for a regulatory flexibility analysis to be required, impacts must exceed a threshold for "significant impact" *and* a threshold for a "substantial number of small entities." See 5 U.S.C. § 605(b).

website (www.sba.gov/size).[115] These size standards were most recently published by the SBA in "Table of Small Business Size Standards Matched to North American Industry Classification System Codes," effective January 5, 2006. Small organizations are defined as "any non-profit enterprise … which is independently owned and operated and not dominant in its field."[116] These may include organizations such as irrigation districts, water associations, public utilities, or agricultural co-ops. A small government is defined as any government serving populations of 50,000 or less, and might include county, city, town, or school district governments.

Federal courts have held that an RFA analysis should be limited to impacts on entities subject to the requirements of the regulation (i.e., participants in the section 7 consultation process).[117] These entities include participants in the section 7 consultation process, but not the ones suffering the downstream effects of consultation outcomes. In spite of these rulings, in its guidance to Federal agencies on conducting screening analysis, the SBA recommends considering impacts to entities that may be indirectly affected by the proposed regulation.[118]

IDENTIFICATION OF ACTIVITIES THAT MAY INVOLVE SMALL ENTITIES

More than 98 percent of the prospective economic costs (based on upper-bound future undiscounted cost figures) associated with conservation activities for HMV and SMV are expected to be borne by Federal agencies (primarily BLM) and state departments of transportation. Thus, impacts to land development (i.e., BLM land disposal),[119] and transportation and utilities operations (i.e., Western and Southern Corridor projects) are not expected to affect small entities.

The following discussion is provided simply to provide context on the small entity environment surrounding the BLM lands proposed for designation for the species.

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115 U.S. Small Business Administration, "Small Business Size Standards Matched to North American Industry Classification System," effective January 5, 2006, http://www.sba.gov/size/sizetable2002.html, accessed May 16, 2006.

116 5 U.S.C. § 601 *et seq*.

117 U.S. Small Business Administration, Office of Advocacy, May 2003, "A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act," pp. 69-70.

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

119 Development is the primary activity impacting HMV and SMV, with both recently completed projects (post-listing) and projects currently under construction extending into the proposed critical habitat on private- and state-owned lands. This development occurs unimpeded by the presence of the plants and their habitat as no Federal nexus exists for the development activity and, thus, no section 7 consultation occurs. Because this development is expected to occur unconstrained by the section 7 consultation process, no small business impacts are expected to occur on the development of private- and state-owned lands.

1. Land use activities taking place on BLM lands within, or surrounding, the proposed CHD that may involve small businesses include OHV use. However, this analysis does not anticipate significant constraints on this activity, since vehicles on BLM lands are currently restricted to existing roads and trails within the habitat area, and may still continue to use the proposed critical habitat area adhering to that stipulation. While fencing will be used by BLM to exclude 60 acres from use and direct OHV traffic to roads and trails outside the fenced areas, thus protecting the species from illegal "open-country" travel, the fencing is minimal and legal OHV use in the region is not expected to be impacted.

2. While mining could take place on BLM lands within or surrounding the proposed CHD, no mining currently exists within the proposed designation and BLM does not expect mining activities to result in impacts to the species because the mineral value within the boundary of the proposed CHD is limited.

3. Washington County is developing the Southern Utah Shooting Sports Park, a public shooting range, on land leased from BLM. While the proposed CHD may influence the extent of leased land likely to be patented (i.e., privatized) to the County, the use of the proposed critical habitat area of the Park as an archery range is consistent with other public activities allowed on BLM lands in the remaining units/subunits (e.g., grazing, hiking, hunting, shooting, OHV use on existing roads and trials, etc.), and no loss to the public's opportunity to utilize the archery course, or other venues, is anticipated.

Accordingly, economic impacts to small businesses are not likely as conservation measures associated with the HMV and SMV are not expected to result in appreciable reduction of either OHV, mining, or recreational shooting activities in the region.

Most of the remaining one percent of prospective economic impacts consist of ecological and habitat studies funded by Utah Valley State College (public institution) or Brigham Young University (private institution). Since the costs of these ecological and habitat studies (approximately $10,000 annually) are expected to be borne by either the state or a large private university,[120] this category of impacts is not expected to affect small entities. However, the analysis in the main report determined that species conservation activities would be incurred by lessors and lessees of rangeland. This section considers the extent to which the costs presented in the main report reflect impacts to small entities.

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[120] More than 33,000 students attend Brigham Young University, Graduate Catalog, Brigham Young University Bulletin, 2006-2007, http://www.byu.edu/gradstudies/.

Agriculture

Based on the results reported in the economic analysis (i.e., loss of AUMs on rangeland leased from BLM and the Shivwits Band of the Paiute Indian Tribe of Utah), small businesses potentially affected by conservation measures to protect HMV and SMV and/or their habitat include ranching operations. SBA's small business size standard for farming and ranching is annual sales of $750,000.[121] Recent county-level farm sales data from the NASS 2002 Agriculture Census is used to determine the number of small agri-businesses operating within the proposed CHD.[122] Unfortunately, the largest reported category of sales information reported in the 2002 Agriculture Census data is for the number of operations with annual farm sales greater than $500,000, which is $250,000 less than the SBA small business threshold. Nevertheless, the 2002 Agriculture Census data does indicate that almost 99 percent of farmers and ranchers (i.e., 710 individuals) operating within the two counties that encompass the proposed CHD have annual sales less than $500,000, or approximately $12,000 per operation on average; the remaining one percent (i.e., 10 individuals) account for an estimated 53 percent of the annual farm sales in the two counties, or approximately $1.4 million per operation on average.[123] These data indicate that farming and ranching businesses in the area surrounding the proposed CHD tend to be small. For the purpose of this small business analysis, considering a high percentage of farming and ranching operations in the area surrounding the proposed CHD have annual sales below $500,000, all agriculture operations forecast to be impacted by conservation efforts for HMV and SMV are considered small.

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121 U.S. Small Business Administration, "Small Business Size Standards matched to North American Industry Classification System," effective January 5, 2006, http://www.sba.gov/size/sizetable2002.html, accessed May 26, 2006.

122 Quick Stats: Agricultural Statistics Data Base, 2002 Census of Agriculture - Volume 1, Geographic Area Series Census, State - County Data, Table 2. Market Value of Agricultural Products Sold Including Direct and Organic: 2002 and 1997, http://151.121.3.33:8080/QuickStats/, accessed May 26, 2006.

123 Nine farms/ranches in Mohave County (Arizona) had sales greater than $500,000 in 2002 (2002 sales for these nine businesses totaled $12,859,000 in 2006$), and only one farm/ranch in Washington County (Utah) had sales exceeding $500,000 in 2002. While the Census of Agriculture data on this one business was withheld in 2002 to avoid disclosing data for an individual farm/ranch, the previous Census of Agriculture (1997) reported that three farms/ranches in Washington County generated more than $500,000 in sales in 1997 (1997 sales for the three businesses totaled $2,180,000, or approximately $725,000 on average. For the purpose of this analysis, the 1997 average sales for these three businesses is used as a proxy of the sales for the one farm/ranch with sales greater than $500,000 in the County in 2002.

Fourteen small ranching operations lease rangeland encompassed by the proposed CHD,[124] six of which could be impacted by species conservation activities (i.e., the exclusion of 20 acres of BLM rangeland and three acres of Shivwits Reservation rangeland from livestock grazing).[125] These six small agriculture operations represent less than one percent of the total number of small farms and ranches operating within the two counties that encompass the proposed CHD.[126] However, species conservation activities are not expected to impact the annual profitability of these six small ranching operations (less than $5 per lessee out of $12,000 in annual sales, on average).[127]

Small Governments

The boundaries of five city governments encompass, or are adjacent to, the proposed CHD: Hurricane (estimated population in 2005 of 11,376), Washington (estimated population in 2005 of 12,601), St. George (estimated population in 2005 of 67,680), Santa Clara (estimated

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124 The following grazing allotments occur within the boundary of the proposed CHD: Curly Hollow (5 permittees), Boomer Hill (2 permittees), Red Cliffs (no permittees, as most of the allotment was retired in 1995 to protect the Desert Tortoise), Harrisburg (no permittees, as most of the allotment was retired in 1995 to protect the Desert Tortoise), Jackson Wash (4 permittees), Gyp Hills (1 permittee), and the Shivwits Indian Reservation (2 permittees). Sources: United States Department of the Interior, Bureau of Land Management, Cedar City District Office, "Dixie Resource Area Proposed Resource Management Plan and Final Environmental Impact Statement (September 1998);" and personal communication with Glenn Rogers (Chairman) and Lawrence Snow (Councilman), Shivwits Band of the Paiute Indian Tribe of Utah, May 1, 2006.

125 Fencing to protect plant populations from livestock grazing is expected to impact lessees of rangeland within the bounds of the proposed SMV critical habitat in units S1 (Jackson Wash grazing allotment) and S2 (Shivwits Indian Reservation). While fencing will also exclude areas of subunits S4a and S4b (Red Cliffs allotment) from grazing, this allotment has not been leased since 1995, when a portion of the grazing allotment was purchased and retired to protect the desert tortoise, and the allotment that remains is considered too small to be grazed economically. Ranchers leasing rangeland within the bounds of the proposed HMV critical habitat units/subunits are not expected to be impacted, as HMV is not palatable to livestock and, thus, protective fencing is not a likely conservation action.

126 In 2002, 720 farm businesses operated in Washington (481) and Mohave (239) counties. Quick Stats: Agricultural Statistics Data Base, 2002 Census of Agriculture - Volume 1 Geographic Area Series Census, State - County Data, Table 2. Market Value of Agricultural Products Sold Including Direct and Organic: 2002 and 1997, http://151.121.3.33:8080/QuickStats/, accessed May 26, 2006.

127 With private grazing leases ranging from $5 to $15 per AUM and a stocking density in the Jackson Wash allotment of 21.98 acres per AUM, the annual cost to replace the 20 acres of rangeland fenced and lost to grazing in Unit S1 is equivalent to $4.55 to $13.65, or $1.14 to $3.41 per lessee, on average. While stocking densities are not known for the rangeland on the Shivwits Reservation (Unit S2), stocking densities in the neighboring BLM grazing allotments range from 20.33 acres per AUM (Curly Hollow) to 21.98 acres per AUM (Jackson Wash). Thus, the annual cost to replace the three acres of rangeland fenced and lost to grazing is equivalent to $0.68 to $2.22, or $0.34 to $1.11 per lessee, on average.

population in 2005 of 6,438), and Springdale (estimated population in 2005 of 613).[128] Only St. George exceeds the criteria (service population of 50,000 or less) for "small entity." However, there is no record of consultations between the Service and these cities since the listing of HMV and SMV in 2001. Although a city may be involved in land use planning or permitting, and may play a role as an interested party in infrastructure projects, it is indeed unlikely that these cities would be involved in a land development project requiring a section 7 consultation. Any cost associated with this activity/involvement is anticipated to be a very small portion of the city's budget.

Small Organizations

Two non-profit organizations, The Nature Conservancy (TNC)[129] and Grand Canyon Land Trust (GCT),[130] are involved in species conservation activities. Considering the missions of these organizations is to preserve, restore, and protect natural resources, including the species and their habitats, the impact of species conservation activities on these organizations is not considered in this small business impacts analysis.

POTENTIAL EFFECTS ON ENERGY SUPPLY

Executive Order No. 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," issued May 18, 2001, requires Federal agencies to submit a "Statement of Energy Effects" for all "significant energy actions" in order to present consideration of the impacts of a regulation on the supply, distribution, and use of energy.[131] Significant adverse effects are defined in the EO by the OMB according to the following criteria:

1. Reductions in crude oil supply in excess of 10,000 barrels per day;

2. Reductions in fuel production in excess of 4,000 barrels per day;

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128 St. George Chamber of Commerce, Economic Development, Population, http://www.stgeorgechamber.com/EcDev/demographics_population.htm, accessed May 16, 2006.

129 The mission of TNC "…is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive," http://nature.org/aboutus/, accessed May 16, 2006.

130 The mission of the GCT "…is to protect and restore the Colorado Plateau – its spectacular landscapes, flowing rivers, clean air, diversity of plants and animals, and areas of beauty and solitude," http://grandcanyontrust.org/about/default.php, accessed May 16, 2006.

131 Daniels, Mitchel E., July 13, 2001, "Memorandum for Heads of Executive Departments and Agencies, and Independent Regulatory Agencies," M-01-27, http://www.whitehouse.gov/omb/memoranda/m01-27.html.

3. Reductions in coal production in excess of five million tons per year;

4. Reductions in natural gas production in excess of 25 million mcf (one thousand cubic feet) per year;

5. Reductions in electricity production in excess of one billion kilowatt-hours (kWh) per year or in excess of 500 megawatts (MW) of installed capacity;

6. Increases in energy use required by the regulatory action that exceed any of the thresholds above;

7. Increases in the cost of energy production in excess of one percent;

8. Increases in the cost of energy distribution in excess of one percent; or

9. Other similarly adverse outcomes.

As none of these criteria is relevant to this analysis, energy-related impacts associated with species conservation activities within the proposed CHD are not expected.

Table B-1
Section 7 Consultation History for Holmgren Milk-Vetch and Shivwits Milk-Vetch

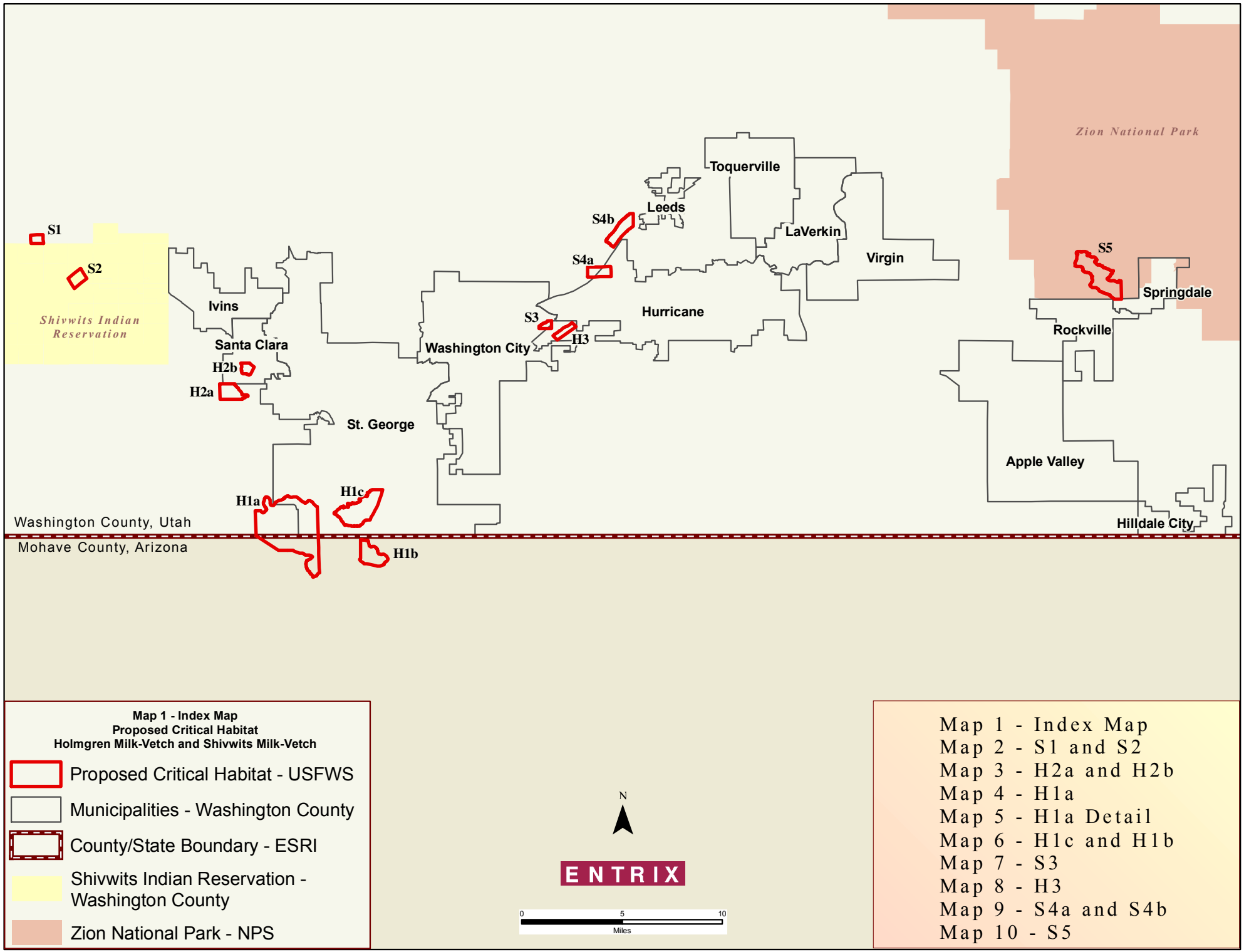
Service Log #	Date	Action Agency	Critical Habitat Unit #	Project Description	Species and Habitat Conservation
Formal Consultations					
04-1227	08/04/04	FHWA	H1a, H1c	Request for review of the Draft Final EIS for the Southern Corridor Highway project (I-15 near St. George to SR-9 near Hurricane).	The Service's formal comments include (formalization of comments from TA 04-0511 for record): The construction of the Southern Corridor would induce land development around it. At the same time, both of the proposed locations for the interchange are near the most stable known population of HMV. Therefore, this project will have a negative indirect effect on HMV, mainly from land development, facilitated by the better access to the area through the use of the Southern Corridor. The recommendation is to purchase, fence, and designate as a HMV conservation area the 170 acres of land near Southern Corridor, containing HMV.
02-21-03-F-0210	09/03/04	BLM (AZ)	H1a	The formal consultation on the Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management.	The finding is that the proposed action "is not likely to jeopardize the continued existence of [HMV]." The Service's findings are based on the following assumptions: (1) The majority of plant populations show stable population trends, (2) Cumulative effects affecting plant populations located on non-BLM land are land development, unrestricted off-road vehicle use, mining, and sand and gravel operations, (3) BLM will avoid all known populations of HMV when fire suppression activities are undertaken, and (4) BLM will not use wildland fire or prescribed fire in HMV habitats and it will not use any mechanical or chemical treatments there. The Service's recommendations are: (1) Monitoring the suppression activities effects on all HMV populations, (2) Monitoring the suppression activities effects on the spread of non-native species in the action area, (3) Participating in the recovery actions and in the recovery plan revisions for HMV, (4) Funding, aiding, or establishing research or study projects concentrating on fire ecology and conservation of HMV, and (5) Educating BLM's employees and public users about HMV.

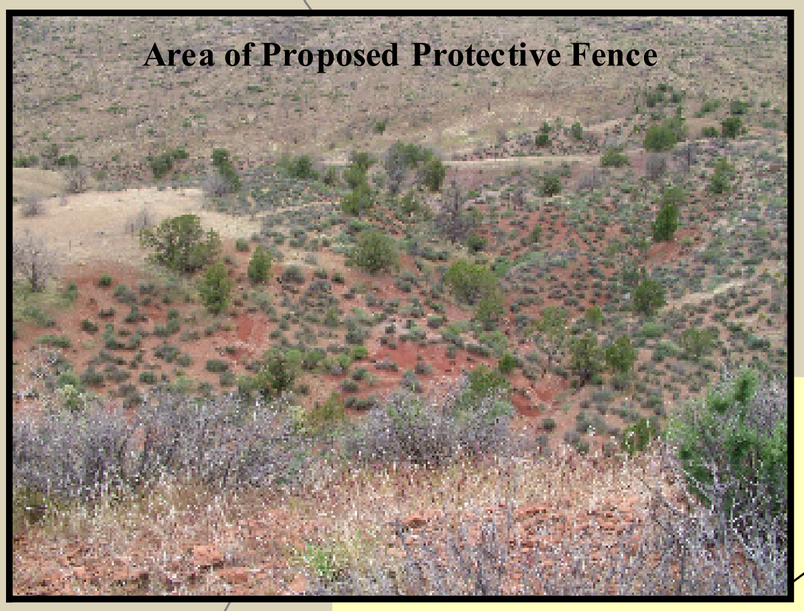
Service Log #	Date	Action Agency	Critical Habitat Unit #	Project Description	Species and Habitat Conservation
05-0435	01/19/05	FHWA	H1a, H1c	The submission of a supplemental biological assessment (dated October 15, 2004), containing new information on the HMV, Desert Tortoise, and Dwarf Bearclaw Poppy for the Southern Corridor highway project.	HMV conservation measures committed to by the FHWA include: (1) The right-of-way alignment near Atkinville Wash to avoid 10.75 acres of HMV habitat, (2) The mitigation of impacts on HMV at a rate of 3-for-1 for direct impacts (2.3 acres) and a rate of 5-for 1 for indirect impacts (2 acres) (total mitigation of 16.9 acres), (3) The fencing of right-of-way to provide protection for HMV growing in the immediate vicinity of the highway, (4) Conducting pre-construction surveys to verify HMV locations, (5) Ensuring the construction site is minimally disturbed, (6) Implementing a weed management program, and (7) Limiting the natural vegetation disturbance to maintain the native plant species composition. The Service concluded that the Southern Corridor project "is not likely to jeopardize the continued existence of the…Holmgren milk-vetch." Furthermore, the Service concluded that "[w]hile the Southern Corridor will incur indirect effects to the plant species associated with highway-induced development, not all development on the adjacent South Block lands can be directly attributed to completion of the highway." The Service gave the following conservation recommendations: (1) FHWA should ensure comprehensive evaluations of the indirect effects to HMV, particularly associated with highway-induced development on South Block lands proximal to the Southern Corridor, (2) FHWA should ensure full compensation for the direct and indirect effects on HMV and should consider the protection or purchase of HMV-inhabited land in the area of influence of the proposed action, (3) Prior to the construction of the highway, a plant survey should be conducted, (4) FHWA should pay for a portion of the fencing around the western sides of the White Dome to minimize recreational use effects, and (5) FHWA should include underpasses along the length of the highway to accommodate local wildlife.

Service Log #	Date	Action Agency	Critical Habitat Unit #	Project Description	Species and Habitat Conservation
05-0384	02/25/05	NPS	S5	The Environmental Assessment for the Zion National Park Fire Management Plan.	The Service's conclusion is that this Plan "is not likely to jeopardize the continued existence of the…Shivwits milkvetch." The SMV conservation measures in the Plan include: (1) Creating a ¾-mile buffer around the SMV population in the park, (2) Forgoing any fire management actions within this buffer zone without prior consultation with the Park Resource Advisor and the Service, (3) Informing the fire management staff of the buffer zone location, as well as educating them about the SMV, and (4) Evaluating restoration actions to maintain genetic integrity of the native plants growing in the buffer zone, in the event of a wildfire. The Service also outlined the following assumptions about the SMV habitat management, upon which its conclusion was based: (1) The site-specific projects that fall under the current Plan would be consulted on under Section 7 of the ESA, (2) All project designs under this Plan will utilize threatened and endangered species recovery and management plans, along with pertinent scientific literature, in their designs, (3) A threatened and endangered species education program will be conducted for all fire management personnel prior to the beginning of each fire season, and (4) Each wildfire occurring in or threatening the endangered or threatened species habitat will be assigned a Resource Advisor, whose duties will include providing relevant information on the occurrence of the listed species in the area to the "incident commander."
05-0875	06/24/05	BLM (UT)	S4b	The emergency consultation on the Red Cliffs Fire and the effects both the fire and the fire suppression actions had on the endangered species in the area.	The main conclusion regarding the SMV is that the soil in the burn area is capable of supporting the SMV, but there are no known SMV populations there. The Service's conclusion is that the fire suppression measures did not happen on the possible SMV locations. The recommendations are: (1) The burn area reseeding actions need to avoid the Chinle formation (possible SMV habitat) to lessen the possible competition with SMV, (2) None of the suppression activities rehabilitation actions need to be performed within the Chinle formation, (3) An unseeded buffer needs to be left around the Chinle formation to avoid creating more competition with SMV, and (4) Monitoring should be included in the ESR to ensure the success of the prescribed treatments.
Informal Consultations					
05-0505	03/04/05	BLM (UT)	S1, H1a, H2a, H2b	The BLM's informal consultation request on its St. George Field Office Resource Management Plan amendment project.	The Service agreed with the BLM's list of endangered species located in the area, which included both SMV & HMV.
05-1027	07/21/05	FHWA	H1a	This is the informal consultation request for the I-15 improvement project to affect the freeway beginning at the Arizona State line to R.P. 10.31. The main purpose for this project is pavement rehabilitation, with the secondary objectives being guardrail upgrading, sign refurbishing, rumble strips installing, et cetera.	The FHWA's original conclusion was that this project may affect, but is not likely to affect HMV, growing in the immediate vicinity of the project. However, Service did not concur with that finding and ruled that the project may be a "likely to adversely affect" HMV. Formal consultation and further surveys were required.

Service Log #	Date	Action Agency	Critical Habitat Unit #	Project Description	Species and Habitat Conservation
05-1322	08/31/05	NPS	S5	The informal consultation/endangered species list request from the National Park Service for their EA for the Backcountry Management Plan for the Zion National Park. This plan addressed all aspects of the park use, including group size limits, campsites, and trail maintenance.	The list was provided.
I-0131	02/03/06	BLM (UT)	H2a, H2b	BLM's Santa Clara River Reserve Recreation and Open Space Management Plan involved the planning of new bike, ORV, and horse trails and the elimination of non-designated trails through the reserve to minimize the visitors' effects on the wildlife.	SMV is not found in the area so it was judged that the project will have no effect on it. On the other hand, HMV is found in the Santa Clara River Reserve and it was determined that the project "may affect, but not likely to adversely affect" its populations. The Service concurred and outlined the following additional requirements: (1) Population inventories must be completed for each specific project, (2) All actions must be coordinated with the Service and the Native Plant Recovery Team to determine the possible impacts on the species located in the area, (3) The well-being of existing species must be assured through avoiding the direct and indirect impacts of project implementation, and (4) The desert tortoises must be surveyed prior to the construction of trails.
Technical Assistance/Information Requests					
03-0714	04/28/03	FHWA	H1a, H1c	The FHWA present the Draft EIS CDs for review to the Service, in place of the previously sent blank CDs, regarding the Southern Corridor Highway project (I-15 near St. George to SR-9 near Hurricane).	The Service received the new set of CDs.
03-1081 (TE-057485)	06/24/03	NPS	S5	Request to add a subpermittee to a 10(a)(1)(A) Recovery Permit for recovery and scientific research of SMV and HMV in Zion National Park.	Conditions include: (1) A maximum of two specimens to be collected from a population of at least 100, (2) A maximum of one specimen is allowed to be collected from a population of less than 100, (3) No specimens to be collected from a population of less than 20, and (4) Collected specimens must be itemized in the annual report.
03-0453	07/11/03	FHWA	H1a, H1c	Request for comments on the Draft EIS for the Southern Corridor Highway project (I-15 near St. George to SR-9 near Hurricane).	In their comments, the Service recommended the 4300 West Alternative, as opposed to the 2800 West Alternative, as the one that would have the least impact on the wildlife. Specifically, the alignment of the highway north of Atkinville Wash is said to have the least impact on HMV. Overall, the 4300 West Alternative is recommended because of its shorter length, which directly translates into lesser impact on the wildlife.

Service Log #	Date	Action Agency	Critical Habitat Unit #	Project Description	Species and Habitat Conservation
04-0511	03/02/04	FHWA	H1a, H1c	Request for review of the Draft Final EIS for the Southern Corridor Highway project (I-15 near St. George to SR-9 near Hurricane).	The Service's initial informal comments include: (1) The project would have an indirect impact on the wildlife because its development will facilitate faster land development in the area, due to the better access there, (2) Both the FHWA and the Service will bear a partial responsibility for the increased indirect adverse effects on the wildlife, resulting from the construction of the Southern Corridor, and not just the private developers, and (3) Both Interchanges 1 and 2 are planned in the immediate vicinity of the HMV populations, so a recommendation is put forth to purchase the 170 acres containing the densest populations of HMV and to build a fence around this area.
04-0434	06/07/04	BIA	S2	Request for the endangered species list that may occur in the project area. The Southern Paiute Agency, together with BIA, prepared a Fire Management Plan and Environmental Assessment on tribal lands in five UT counties, including Washington County.	The list was provided.
04-1150	11/12/04	FHWA	H1a, H1c	Request for review of the Secondary Impact Analysis (dated July 12, 2004) for Holmgren Milk-vetch and Dwarf Bear-Poppy Associated with the Proposed Development of the Southern Corridor, Washington County, Utah.	The Southern Corridor Indirect Impact Analysis concluded that the project would result in indirect impacts to 2 acres of HMV habitat, compared to the "no build" alternative. However, the Service believes that both FHWA and UDOT are responsible for assessing and compensating for the indirect impacts to HMV associated with induced growth. The Service believes that FHWA should reinitiate section 7 consultation on the project to consider the indirect effects of the project and induced development to HMV. The Service also believes that FHWA should purchase lands necessary in the South Block to ensure the continued existence of HMV in perpetuity, and estimates this area at between 170 and 220 acres.
05-0194	12/08/04	FAA	H1c	Request for a second list of endangered species that will possibly be affected by the airport relocation project in St. George, UT.	The list was provided.
05-1129	07/22/05	Service	S2	This is a letter from the Service to the Chairman Glen Rogers of the Shivwits Band Paiutes regarding their cooperation with the Service on the matter of the SMV, growing on the Shivwits Indian Reservation.	The Service acknowledges the tribe's conservation efforts concerning SMV. Specifically, this acknowledgment applies to: (1) The construction of the fence around the area where SMV is found, (2) The maintaining of efforts to minimize potential habitat impacts from the nearby utility corridor, and (3) The shared desire to minimize the illegal collection of SMV. The main area of concern identified in the letter is the invasive plant species threat to SMV.
05-1226	08/10/05	FHWA	H1a, H1c	Request for the endangered species list potentially being affected by the Hurricane SR-9 and 600 North Expansion Project.	The Service's list identified both SMV and HMV as potentially being located in the area of the project's influence.


Zion National Park
Toquerville
Leeds
S4b
LaVerkin
S4a
Virgin
S5
Springdale
S1
S2
Shivwits Indian Reservation
Ivins
Hurricane
S3
H3
Rockville
Santa Clara
Washington City
H2b
H2a
St. George
Apple Valley
H1a
H1c
Hildale City
Washington County, Utah
Mohave County, Arizona
H1b
Map 1 - Index Map
Proposed Critical Habitat
Holmgren Milk-Vetch and Shivwits Milk-Vetch
Proposed Critical Habitat - USFWS
Municipalities - Washington County
County/State Boundary - ESRI
Shivwits Indian Reservation - Washington County
Zion National Park - NPS
N
ENTRIX
0
5
10
Miles
Map 1 - Index Map
Map 2 - S1 and S2
Map 3 - H2a and H2b
Map 4 - H1a
Map 5 - H1a Detail
Map 6 - H1c and H1b
Map 7 - S3
Map 8 - H3
Map 9 - S4a and S4b
Map 10 - S5



Pahcoon Spring Wash
Unit S1

Shivwits Indian Reservation

Shivwits
Unit S2

Santa Clara River

Map 2
Proposed Critical Habitat
Holmgren Milk-Vetch and Shivwits Milk-Vetch

Proposed Critical Habitat - USFWS

Proposed Protective Fence - BLM

Land Ownership - Washington County

Private

BLM

Shivwits Indian Reservation

N

ENTRIX

0 0.5 1

Miles

Source of roads and rivers: ESRI

Santa Clara

HAFEN STEVEN B ETAL

South Hills
Unit H2b

Stucki Spring
Unit H2a

St.
George

Proposed Critical Habitat - USFWS
Potential Land Disposal - BLM
Excluded from Potential Land Disposal - BLM
City Boundary - Washington County GIS
Western Corridor (potential route) - Washington County GIS
Roads - AGRC

Santa Clara River Reserve
Zone 2 - Rural Motorized
Zone 3 - Urban Protection
Zone 4 - Backcountry Recreation
Zone 5 - Backcountry Protection

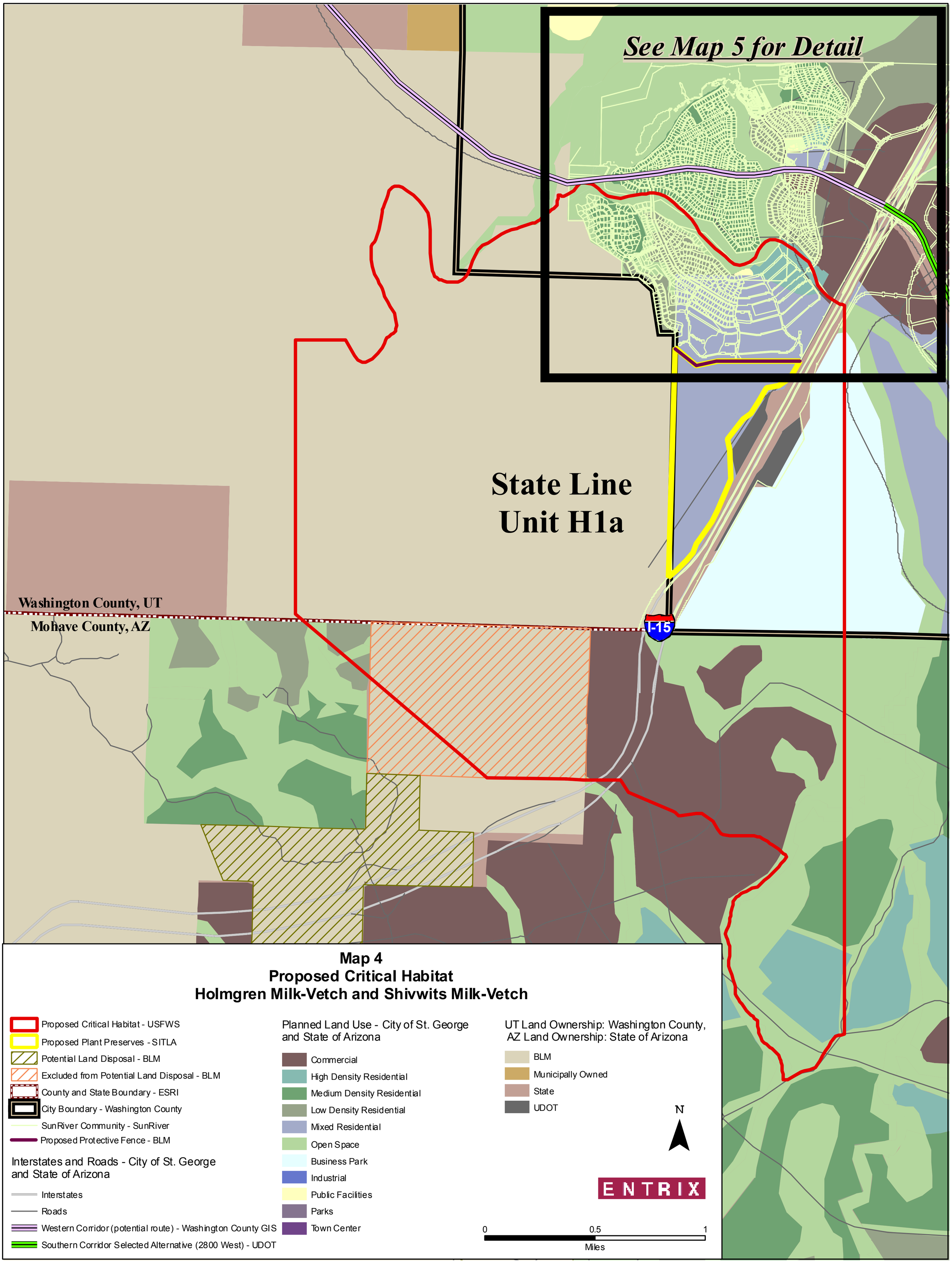
Land Ownership - Washington County
Municipally Owned
State
Private
BLM

Map 3
Proposed Critical Habitat
Holmgen Milk-Vetch and
Shivwits Milk-Vetch

N

ENTRIX

0 0.5
Miles



Map 4
Proposed Critical Habitat
Holmgren Milk-Vetch and Shivwits Milk-Vetch

- Proposed Critical Habitat - USFWS
- Proposed Plant Preserves - SITLA
- Potential Land Disposal - BLM
- Excluded from Potential Land Disposal - BLM
- County and State Boundary - ESRI
- City Boundary - Washington County
- SunRiver Community - SunRiver
- Proposed Protective Fence - BLM

Interstates and Roads - City of St. George and State of Arizona

- Interstates
- Roads
- Western Corridor (potential route) - Washington County GIS
- Southern Corridor Selected Alternative (2800 West) - UDOT

Planned Land Use - City of St. George and State of Arizona

- Commercial
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Mixed Residential
- Open Space
- Business Park
- Industrial
- Public Facilities
- Parks
- Town Center

UT Land Ownership: Washington County, AZ Land Ownership: State of Arizona

- BLM
- Municipally Owned
- State
- UDOT

N

ENTRIX

0 0.5 1
Miles

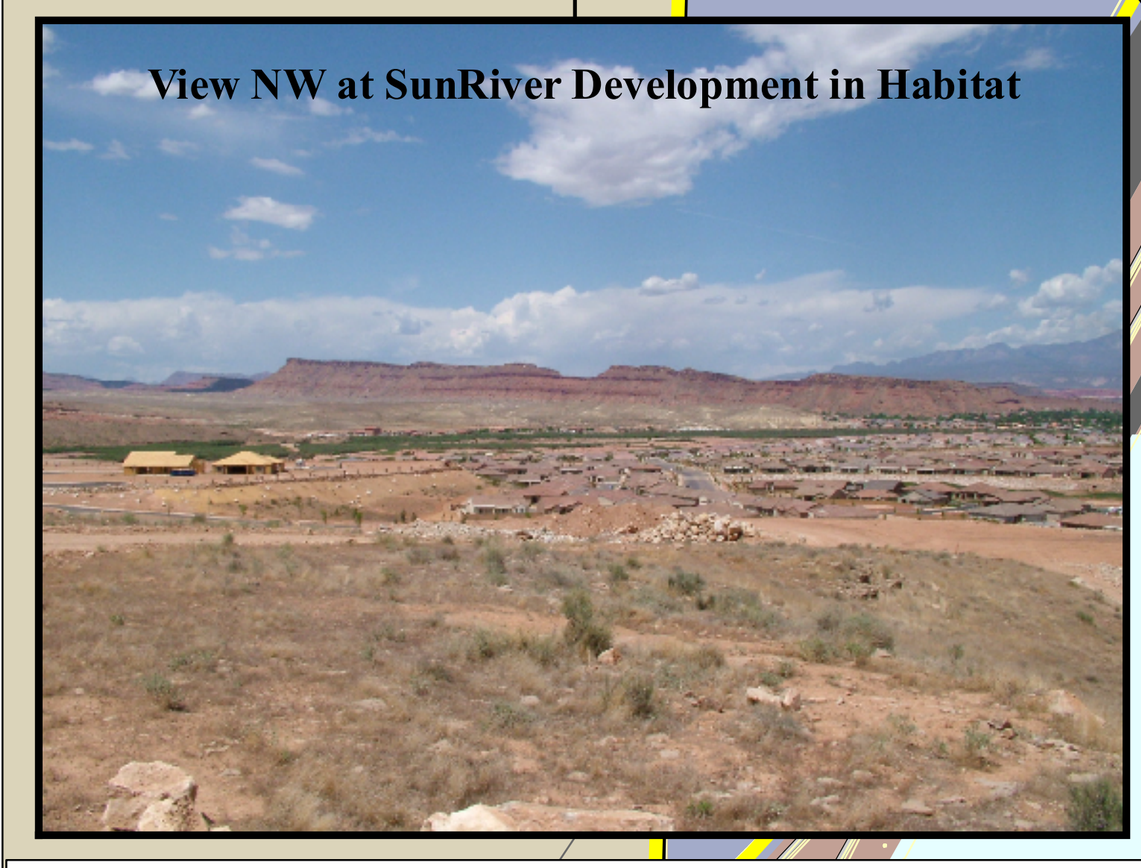
SunRiver Development

St. George

I-15

View E at SunRiver Development in Habitat

View NW at SunRiver Development in Habitat



View NE at SunRiver Development in Habitat

Proposed Critical Habitat - USFWS

Proposed Plant Preserves - SITLA

City Boundary - Washington County

Proposed Protective Fence - BLM

Roads and Interstates - City of St. George

Interstates

Roads

Western Corridor (potential route) - Washington County GIS

Southern Corridor Selected Alternative (2800 West) - UDOT

Planned Land Use - City of St George

Commercial

High Density Residential

Medium Density Residential

Low Density Residential

Mixed Residential

Open Space

Business Park

Public Facilities

Land Ownership - Washington County

BLM

State

UDOT

Map 5 - H1a Detail of SunRiver Development Proposed Critical Habitat Holmgren Milk-Vetch and Shivwits Milk-Vetch

N

ENTRIX

0 0.25 0.5

Miles

I-15

Central Valley
Unit H1c

St. George

Washington County, UT

Mohave County, AZ

Gardner Well
Unit H1b

View West at Industrial Development
(Just North of Unit)

View South into Unit H1b

Map 6
Proposed Critical Habitat
Holmgren Milk-Vetch and Shivwits Milk-Vetch

- Proposed Critical Habitat - USFWS
- City Boundary - Washington County
- Proposed Plant Preserves - SITLA
- Proposed Protective Fence - BLM
- 2800 West - Southern Corridor Selected Alternative - Washington County GIS
- Roads - City of St. George and State of Arizona

Planned Land Use - State of Arizona and City of St. George

- Open Space
- Commercial
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Rural Residential
- Mixed Residential
- Business Park
- Industrial
- Town Center

UT Land Ownership: Washington County,
Arizona Land Ownership: State of Arizona

- BLM
- State

N

ENTRIX

0 0.5
Miles

Hurricane

SR-9

Washington

SUNCOR DEVELOPMENT CO LEASEHOLDER
(CORAL CANYON DEVELOPMENT)

Coral Canyon
Unit S3

Telegraph Road

View SW into Habitat

Map 7
Proposed Critical Habitat
Holmgren Milk-Vetch and Shivwits Milk-Vetch

Proposed Critical Habitat - USFWS
City Boundary - Washington County

Roads - Washington County
Interstates
Roads

Land Use - Washington City
High Density Residential
Low Density Residential
Commercial
Civic/Institutional
Open Space
Industrial
Park

Land Ownership - Washington County
BLM
Municipally Owned
Private
State
Washington County

N

ENTRIX

0 0.25
Miles

View SW into Archery Range

Future Expansion Area

Parking

Paint Ball Complex

Action Pistol Range

Future Expansion Area

HALL MICHAEL J & PENNY

ADAMS FAMILY INV L C

6-H RIVER TURF FARM L C

MARKET STREET INVESTMENTS GROUP L C

600 Yd. High Power Rifle Range

300 Yd. Competition Range

200 Yd. General Purpose Range

Parking

Parking

Parking

Parking

Parking

Parking

Parking

Parking

Parking

Future Expansion Area

Purgatory Flat
H3

Archery Complex

Shotgun Complex

Parking

Washington County Land Disposal

Map 8
Proposed Critical Habitat
Holmgren Milk-Vetch and Shivwits Milk-Vetch

Proposed Critical Habitat - USFWS

Southern Utah Shooting Sports Park - Washington County

Planned Land Use and Ownership - Washington County

Planned Industrial Land Use

BLM

Private

Municipally Owned

Washington County

State

N

ENTRIX

0 0.25
Miles

View NE into Habitat

White Reef
Unit S4b

Harrisburg Bench
and Cottonwood
Unit S4a

EMILY JANE

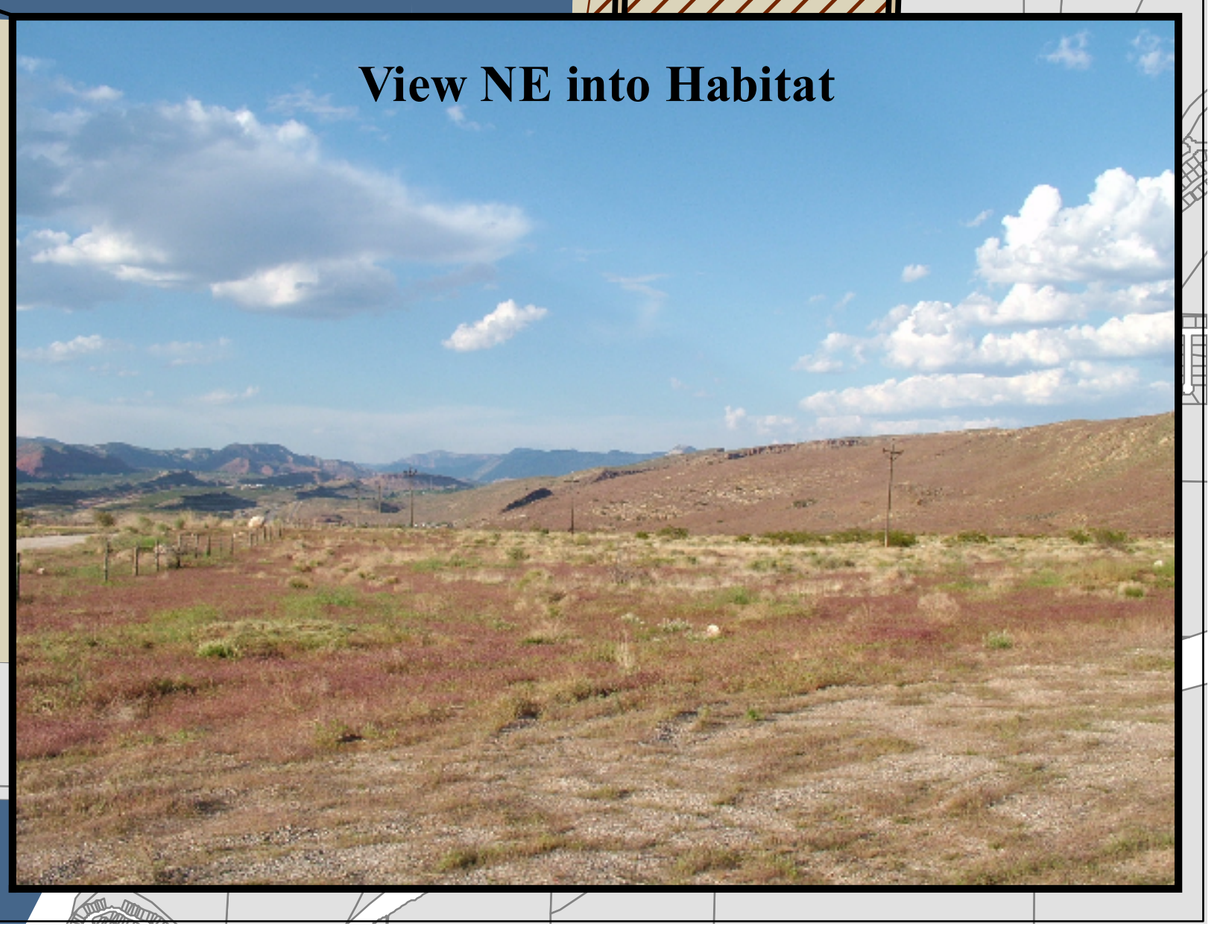
FURROW
HAROLD H &
DOROTHY TRS

WINDING RIVER
ASSOC L C

Leeds

Hurricane

I-15



View NE into Habitat

Map 9
Proposed Critical Habitat
Holmgren Milk-Vetch and Shivwits Milk-Vetch

Proposed Critical Habitat - USFWS
Tortoise HCP - Washington City
City/Town Boundary - Washington County
Proposed Protective Fence - BLM
Interstate - Washington County

Land Use - City of Hurricane
Medium Density Residential

Land Ownership - Washington County
Private
BLM
Mining Claim
State
UDOT
USFS
Washington County
Water Conservancy

N

ENTRIX

0 0.5 1
Miles

Zion National Park

Zion
Unit S5

Grafton

Rockville

Virgin River

Map 10
Proposed Critical Habitat
Holmgren Milk-Vetch and Shivwits Milk-Vetch

Proposed Critical Habitat - USFWS

Trail - Zion National Park

Powerline - Zion National Park

Land Ownership - Washington County

Washington County

NPS

BLM

State

Private

Municipally Owned

N

ENTRIX

0 0.5 1

Miles

Source of roads and rivers: ESRI
Source of cities: AGRC

Table D-1
Summary of Total Economic Impacts, by Habitat Unit, in $1,000s (2006$)

	Pre-Designation (Total) (2001-2006)		Post-Designation (Total) (2007-2026)									
			Undiscounted		PV 3%		PV 7%		Annualized 3%		Annualized 7%	
Unit/Subunit	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
H1a	$8,949	$13,283	$4,822	$6,994	$4,782	$6,935	$4,741	$6,879	$322	$467	$448	$650
H1b	$0	$0	$4	$4	$4	$4	$4	$4	$0	$0	$0	$0
H1c	$127	$165	$56	$56	$54	$54	$52	$52	$4	$4	$5	$5
H2a	$35	$35	$632	$2,382	$450	$1,698	$291	$1,100	$30	$114	$28	$105
H2b	$13	$13	$3,044	$4,369	$2,975	$4,120	$2,914	$3,903	$199	$276	$275	$368
H3	$6	$6	$47	$47	$38	$38	$30	$30	$2	$2	$3	$3
S1	$10	$10	$21	$21	$14	$14	$9	$9	$1	$1	$1	$1
S2	$8	$13	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S3	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S4a	$15	$15	$47	$47	$32	$32	$20	$20	$2	$2	$2	$2
S4b	$45	$45	$73	$73	$50	$50	$32	$32	$3	$3	$3	$3
S5	$120	$120	$73	$73	$70	$70	$68	$68	$5	$5	$6	$6
Total	$9,328	$13,705	$8,819	$14,066	$8,469	$13,015	$8,161	$12,097	$568	$874	$771	$1,143

Results are shown in $1,000s. Numbers may not sum due to rounding

Table D-2
Summary of Administrative Costs, by Habitat Unit, in $1,000s (2006$)

	Pre-Designation (Total) (2001-2006)		Post-Designation (Total) (2007-2026)									
			Undiscounted		PV 3%		PV 7%		Annualized 3%		Annualized 7%	
Unit/Subunit	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
H1a	$88	$88	$49	$49	$43	$43	$38	$38	$3	$3	$4	$4
H1b	$0	$0	$4	$4	$4	$4	$4	$4	$0	$0	$0	$0
H1c	$12	$12	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
H2a	$8	$8	$14	$14	$11	$11	$7	$7	$1	$1	$1	$1
H2b	$3	$3	$24	$24	$18	$18	$13	$13	$1	$1	$1	$1
H3	$0	$0	$19	$19	$19	$19	$18	$18	$1	$1	$2	$2
S1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S2	$2	$2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S3	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S4a	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S4b	$19	$19	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S5	$44	$44	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	$176	$176	$110	$110	$95	$95	$80	$80	$6	$6	$8	$8

Results are shown in $1,000s. Numbers may not sum due to rounding

Table D-3
Summary of Economic Impacts Related to Land Development, by Habitat Unit, in $1,000s (2006$)

	Pre-Designation (Total) (2001-2006)		Post-Designation (Total) (2007-2026)									
			Undiscounted		PV 3%		PV 7%		Annualized 3%		Annualized 7%	
Unit/Subunit	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
H1a	$0	$0	$4,400	$6,500	$4,400	$6,500	$4,400	$6,500	$296	$437	$415	$614
H1b	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
H1c	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
H2a	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
H2b	$0	$0	$2,800	$3,500	$2,800	$3,500	$2,800	$3,500	$188	$235	$264	$330
H3	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S3	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S4a	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S4b	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	$0	$0	$7,200	$10,000	$7,200	$10,000	$7,200	$10,000	$484	$672	$679	$944

Results are shown in $1,000s. Numbers may not sum due to rounding

Table D-4
Summary of Economic Impacts Related to the Transportation and Utility Activities, by Habitat Unit, in $1,000s (2006$)

	Pre-Designation (Total) (2001-2006)		Post-Designation (Total) (2007-2026)									
			Undiscounted		PV 3%		PV 7%		Annualized 3%		Annualized 7%	
Unit/Subunit	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
H1a	$422	$556	$224	$296	$211	$264	$197	$235	$14	$18	$19	$22
H1b	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
H1c	$115	$153	$56	$56	$54	$54	$52	$52	$4	$4	$5	$5
H2a	$0	$0	$553	$2,303	$394	$1,642	$256	$1,065	$26	$110	$24	$101
H2b	$0	$0	$197	$822	$141	$586	$91	$380	$9	$39	$9	$36
H3	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S3	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S4a	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S4b	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S5	$3	$3	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	$540	$712	$1,030	$3,477	$800	$2,546	$596	$1,732	$53	$171	$57	$164

Results are shown in $1,000s. Numbers may not sum due to rounding

Table D-5
Summary of Conservation Costs on Public and Tribal Lands, by Habitat Unit, in $1,000s (2006$)

	Pre-Designation (Total) (2001-2006)		Post-Designation (Total) (2007-2026)									
			Undiscounted		PV 3%		PV 7%		Annualized 3%		Annualized 7%	
Unit/Subunit	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
H1a	$8,439	$12,639	$149	$149	$128	$128	$106	$106	$9	$9	$10	$10
H1b	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
H1c	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
H2a	$27	$27	$65	$65	$45	$45	$28	$28	$3	$3	$3	$3
H2b	$10	$10	$23	$23	$16	$16	$10	$10	$1	$1	$1	$1
H3	$6	$6	$28	$28	$19	$19	$12	$12	$1	$1	$1	$1
S1	$10	$10	$21	$21	$14	$14	$9	$9	$1	$1	$1	$1
S2	$6	$11	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S3	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
S4a	$15	$15	$47	$47	$32	$32	$20	$20	$2	$2	$2	$2
S4b	$26	$26	$73	$73	$50	$50	$32	$32	$3	$3	$3	$3
S5	$73	$73	$73	$73	$70	$70	$68	$68	$5	$5	$6	$6
Total	$8,612	$12,817	$479	$479	$374	$374	$285	$285	$25	$25	$27	$27

Results are shown in $1,000s. Numbers may not sum due to rounding