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**ECONOMIC EFFECTS OF CRITICAL HABITAT  
DESIGNATION FOR SUISUN THISTLE AND SOFT  
BIRD'S BEAK IN THREE CALIFORNIA COUNTIES**

Prepared For

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# 1. EXECUTIVE SUMMARY

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## A. PURPOSE AND APPROACH

On April 11th, 2006, the U.S. Fish & Wildlife Service (the Service) proposed critical habitat for the Suisun Thistle, *Cirsium hydrophilum* var. *hydrophilum*, and Soft Bird's Beak, *Cordylanthus mollis* ssp. *mollis* (71 FR 18455), pursuant to the Endangered Species Act of 1973 (Act), as amended. For this economic analysis, a total of 2,119 proposed acres in Solano County are examined for Suisun Thistle and 2,313 proposed acres in Contra Costa, Napa, and Solano Counties for Soft Bird's Beak.

This report quantifies the economic effects associated with the proposed critical habitat designation (CHD). It does so by taking into account the cost of conservation-related measures that are likely to be associated with future economic activities that may adversely affect the habitat within the proposed boundaries over a twenty year horizon, from 2006 to 2025. It also considers past costs associated with conservation of the species from time the plants were listed under the Act, January 29, 1997, through to the present.

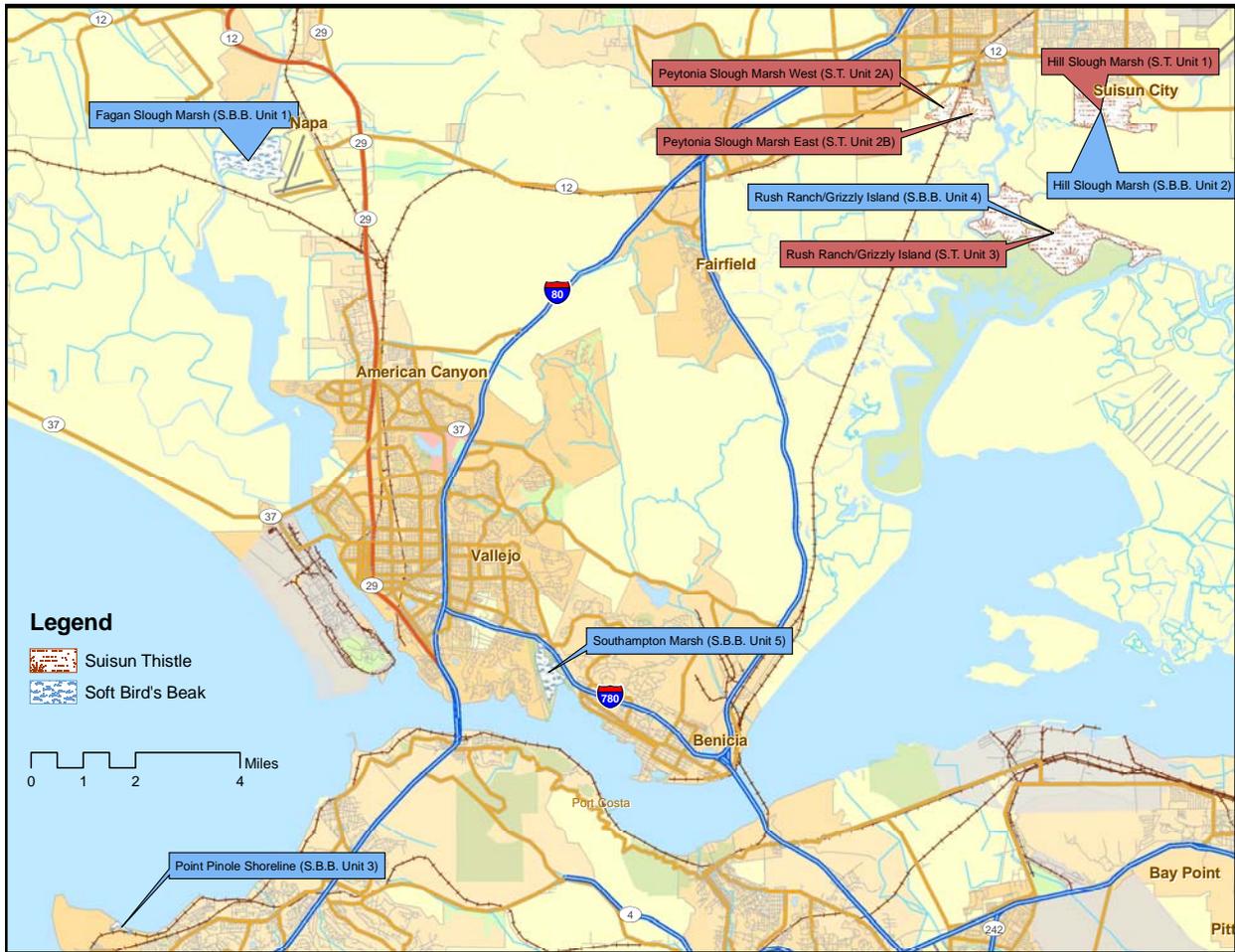
## B. REPORT ORGANIZATION

Following the Executive Summary, Section 2 presents background information regarding the primary constituent elements, threats, the habitat units, consultations and data sources. Section 3 provides an outline of the analytical framework. Section 4 describes the study method only. The economic impacts associated with the proposed CHD organized by identified threat are presented in Section 5. Section 6 presents an evaluation of the impacts to the energy industry and small businesses.

## C. DESCRIPTION OF HABITAT

The primary constituent elements used to determine suitable habitat for the Suisun Thistle and Soft Bird's Beak are generally described as tidally influenced marsh areas bounded on the seaward edge by the mean high water line and on the landward edge by a marsh-upland ecotone; and containing channel networks influenced by fresh and salt water hydrology and exhibiting full natural tidal inundations to allow for channel development and migration. The location of the habitats are shown in Figure 1.

Figure 1: Suisun Thistle and Soft Bird's Beak Critical Habitat Units



#### D. IMPACTS ASSOCIATED WITH CRITICAL HABITAT DESIGNATION

The impacts associated with the proposed CHD are organized by each threat to the species identified in the Proposed Rule. Impacts include past costs from efforts to conserve the species within areas of proposed critical habitat and future costs associated with actions to conserve the species. Future costs are considered by describing a) the potential economic impact of managing the threats identified in the Proposed Rule according to management recommendations made by the Service and b) the present value of the economic surplus generated by activities within the area of critical habitat that may threaten the species. For future costs, a twenty year time period, 2006 to 2025, is considered. As shown in Table 1, total costs are calculated to be \$1.7 million in undiscounted dollars. On a present value basis, costs total between \$1.3 and \$1.5 million depending on the discount rate applied.

Table 1: Summary of Economic Impacts

<b>Threat</b>	<b>Undiscounted Impacts</b>	<b>Present Value (3%)<sup>1</sup></b>	<b>Present Value (7%)<sup>1</sup></b>
Mosquito Abatement Activities	\$0	\$0	\$0
<b>Cattle and Feral Pigs</b>			
Fencing Installation and Repairs <sup>2</sup>	\$702,914	\$693,962	\$686,583
Lost Grazing Revenue <sup>3</sup>	\$361,000	\$268,538	\$191,222
Animal Control Expert <sup>3</sup>	\$406,720	\$302,548	\$215,440
Operation of the Suisun Marsh Salinity Control Gates	\$0	\$0	\$0
Increase in Invasive Plants	\$0	\$0	\$0
Damage to Protected Species During Invasive Plant Removal	\$0	\$0	\$0
Urban or Residential Encroachment	Unknown	Unknown	Unknown
Presence of <i>Rhynocyllus conicus</i>	Negligible	Negligible	Negligible
General Foot and Off-road Vehicle Traffic <sup>4</sup>	\$762,445	\$753,493	\$746,114
Presence of <i>Lipographis fenestrella</i> larvae	Negligible	Negligible	Negligible
Contamination from Bay Oil Spills	\$0	\$0	\$0
Industrial or Commercial Encroachment	\$0	\$0	\$0
<b>Total<sup>5</sup></b>	<b>\$1,682,413</b>	<b>\$1,476,829</b>	<b>\$1,305,024</b>
<b>Annualized Cost</b>	<b>\$84,121</b>	<b>\$96,375</b>	<b>\$115,126</b>

Notes:

1. 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.
2. Includes past fencing installation cost as well as one time fencing costs assumed to occur at time of critical habitat designation.
3. Costs are ongoing and calculated over a twenty year period, from 2006 to 2025.
4. These are one time costs assumed to occur at time of critical habitat designation. Some fencing costs would duplicate costs calculated as part of the cattle and feral pig fencing costs and will not be included in the total. See section 5 for a more complete explanation.
5. The total is not the sum of all the items in the column, as some of the cost of fencing to separately manage the threats of General Foot and Off-road Vehicle Traffic and Cattle and Feral Pigs will overlap when the two threats are managed simultaneously.

The management recommendations made by the Service for many of the threats will have little or no economic impact. Some threats are already being managed with techniques the Service approves of and do not need to be altered. The Service has not identified actions that need to be taken to manage the threat of urban or residential encroachment. Until more specific actions are identified, the cost cannot be accurately estimated. The presence of plant-eating insects is a potential threat which might need management in the future; the cost of any necessary management is expected to be minimal. A significant amount of time and money will continue

to be spent on preventing oil spills in the Bay, but these measures are not sufficiently related to the species in question to be included in this analysis.

Only two threats have measurable economic impacts: Cattle and Feral Pigs, and General Foot and Off-Road Vehicle Traffic. The economic impact of mitigating the threat from cattle and feral pigs represents totals \$1.5 million. The cost of installing fencing around the threatened units totals \$702,914. Restrictions on cattle will result in lost grazing revenues totaling \$361,000. The threat of expansion of the feral pig population may need to be controlled by hiring an animal control expert. The cost of hiring such an expert is \$200,000.

The economic impact of mitigating the threat from foot and off road vehicle traffic results in fencing costs of \$762,445. Fencing in units 2 and 4 of Soft Bird's Beak will overlap fencing to protect against cattle and feral pigs. Consequently, the incremental fencing costs to manage the threat of foot and off road vehicle traffic are \$211,780.

No substantial impacts on energy facilities were identified. No substantial impacts on small business were identified either.

## 2. BACKGROUND

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On April 11th, 2006, the U.S. Fish and Wildlife Service (the Service) proposed critical habitat for the Suisun Thistle, *Cirsium hydrophilum* var. *hydrophilum*, and *Soft Bird's Beak*, *Cordylanthus mollis* ssp. *mollis* (17 FR 18455), pursuant to the Endangered Species Act of 1973 (Act), as amended.<sup>1</sup> For this economic analysis, a total of 2,119 proposed acres in Solano County are examined for Suisun Thistle and 2,313 proposed acres in Contra Costa, Napa, and Solano Counties for Soft Bird's Beak. This report quantifies the economic effects associated with the proposed critical habitat designation (CHD). It does so by taking into account the cost of conservation-related measures that are likely to be associated with future economic activities that may adversely affect the habitat within the proposed boundaries.

This information is intended to assist the Secretary in determining whether the benefits of excluding particular areas from the designation outweigh the biological benefits of including them. In addition, this information allows the Service to address the requirements of Executive Orders 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).<sup>2</sup> This report also complies with direction from the U.S. 10th Circuit Court of Appeals that "co-extensive" effects should be included in the economic analysis to inform decision-makers regarding which areas to designate as critical habitat.<sup>3</sup>

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<sup>1</sup> 16 U.S.C. §1533(b)(2).

<sup>2</sup> Executive Order 12866, "Regulatory Planning and Review," September 30, 1993; Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," May 18, 2001; 5 U.S.C. §§601 *et seq*; and Pub Law No. 104-121.

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

## A. IDENTIFIED HABITAT

The Service identified three habitat units for Suisun Thistle and five units for Soft Bird's Beak. In identifying areas as critical habitat, the Service considered those physical and biological habitat features that are essential to the conservation of the species. These essential features are referred to as the species' primary constituent elements (PCEs). All of the proposed critical habitat areas are within the species' historic geographic range, and contain the PCEs. Areas that do not contain any PCEs at the time of CHD are not considered critical habitat, whether or not they occur within a mapped critical habitat unit. A primary constituent element for both Suisun Thistle and Soft Bird's Beak is:

1. Tidally influenced marsh areas (intertidal emergent estuarine marshes) bounded on the seaward edge by the mean high water line and on the landward edge by a marsh-upland ecotone; and containing channel networks influenced by freshwater and saltwater hydrology and exhibiting full natural tidal inundations to allow for channel development and migration through erosional and depositional processes (such as channel undercutting, bank slumping, and sedimentation) during daily ebb flows and seasonal storm events.

A primary constituent element for Suisun Thistle is:

2. Areas associated with PCE 1 that are: (a) between the bank and high water mark of natural tidal channels; (b) along the banks of tidally influenced canals or ditches; or (c) within tidally influenced floodplains that contain hydric soils that are slightly to moderately saline (4 to 16 dS/m) within the first 3 feet of soil depth.

Primary constituent elements for Soft Bird's Beak are:

3. Areas associated with PCE 1 that are within tidally influenced marsh floodplains that contain hydric soils that are slightly to moderately saline (4 to 16 dS/m) within the first 3 feet of soil depth;
4. Tidal marsh habitats within PCE 1 and 3 that have native halophytic plant communities with an average canopy height equal to or less than 20.5 inches;
5. Areas within PCE 1 and 3 that provide for a sufficient number of suitable host plants, including but not limited to *Distichlis spicata*, *Salicornia virginica*, and *Jaumea carnosa*.

## B. THREATS

1. In the proposed rule, the Service identified eleven threats to either the Suisun Thistle or Soft Bird's Beak or both. Six of these threaten both species. Four threaten Soft Bird's Beak and one threatens the Suisun Thistle. Table 2 summarizes these threats by species.

### C. DESCRIPTION OF UNITS

Each of the habitat units identified by the service is described below with respect to ownership and threat. Table 2 lists the threats to each species. Table 3 identifies the location of the units, by species.

Table 2: Threat Categories by Species

Threats	Suisun Thistle	Soft Bird's Beak
1 Mosquito Abatement Activities	x	x
2 Cattle and Feral Pigs	x	x
3 Operation of the Suisun Marsh Salinity Control Gates	x	x
4 Increase in Invasive Plants	x	x
5 Control and Removal of Invasive Plants	x	x
6 Urban or Residential Encroachment	x	x
7 Presence of <i>Rhynocyllus conicus</i>	x	
8 General Foot and Off-road Vehicle Traffic		x
9 Presence of <i>Lipographis fenestrella</i> larvae		x
10 Contamination from Bay Oil Spills		x
11 Industrial or Commercial Encroachment		x

Table 3: Habitat Units by Location and Species

<b>Unit Location</b>	<b>Suisun Thistle</b>	<b>Soft Bird's Beak</b>
Rush Ranch	Unit 3	Unit 4
Hill Slough	Unit 1	Unit 2
Peytonia Slough	Unit 2	-
Fagan Slough	-	Unit 1
Point Pinole	-	Unit 3
Southampton	-	Unit 5

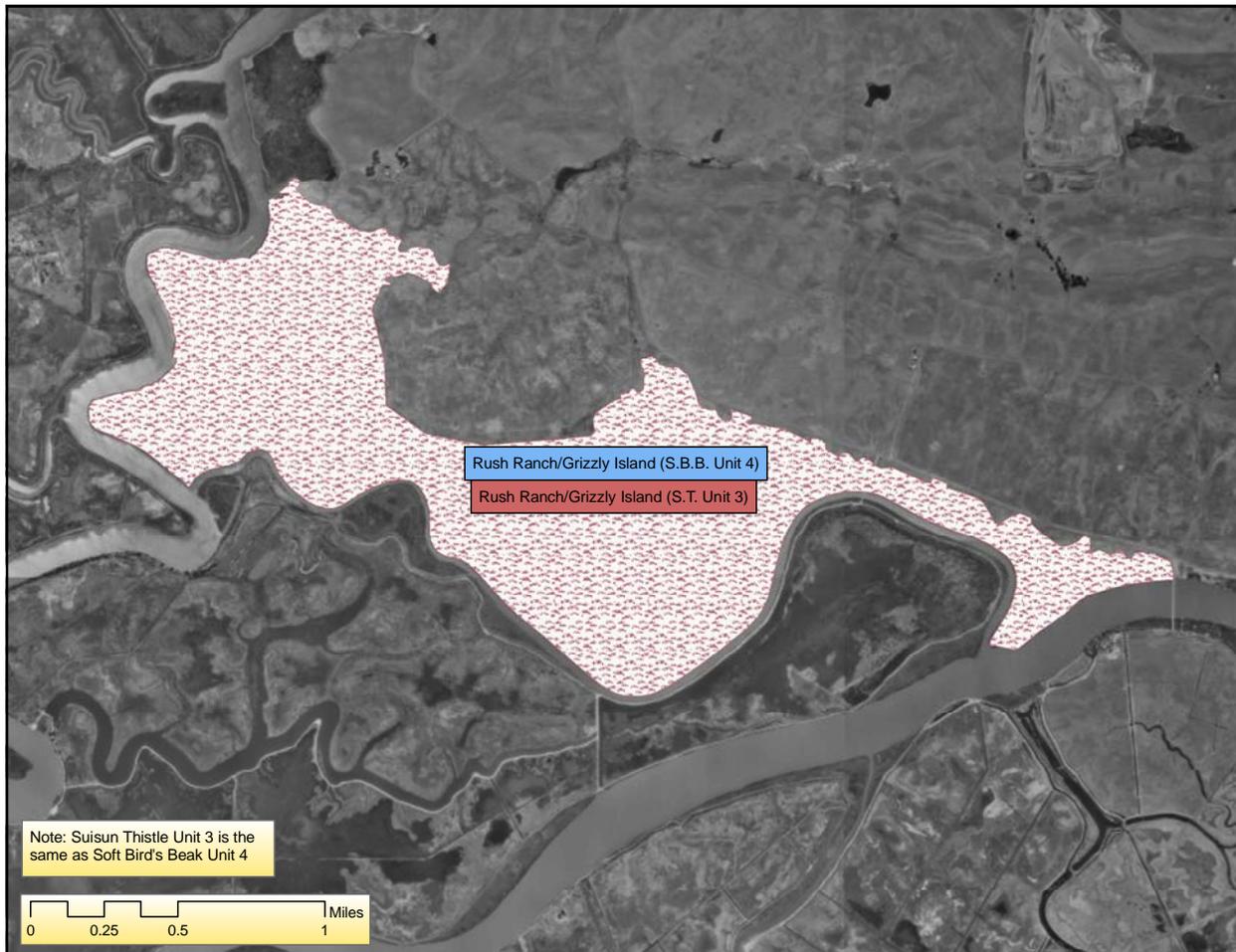
**1. Suisun Marsh**

The three areas within the Suisun March with habitat units are Rush Ranch/ Grizzly Island Wildlife Area, the Hill Slough Marsh and the Peytonia Slough March. There are three units of Suisun Thistle habitat and two units of Soft Bird's Beak habitat within the Suisun Marsh.

**a) Rush Ranch/ Grizzly Island Wildlife Area: Suisun Thistle Unit 3 and Soft Bird's Beak Unit 4**

This unit consists of 231 acres of state-owned land (the Joice Island portion of Grizzly Island Wildlife Area), which is managed by the CDFG, and 950 acres of land owned by the Solano Land Trust (the Rush Ranch portion of the unit). See tables 4 and 5 below for a summary of the critical habitat ownership in these units. See figure 2 for a map of these units. Threats to the Suisun Thistle in this area include: 1) alterations to channel water salinity and tidal regimes from the operation of the Suisun Marsh Salinity Control Gates; 2) mosquito abatement activities; 3) impacts from livestock and feral pigs; 4) proliferation of non-native invasive plants from human-induced soil disturbances leading to invasives out-competing the Suisun Thistle; 5) control or removal of non-native invasive plants, especially perennial pepperweed through injudicious application of herbicides, direct trampling, or accidental transport of invasive plant seeds to new areas; and 6) presence of *Rhinocyllus conicus* (a non-native biological control weevil) or other plant-eating insects that could reduce the reproductive potential of *Cirsium hydrophilum* var. *hydrophilum*. Threats to Soft Bird's Beak in this unit include: 1) mosquito abatement activities; 2) general foot and off-road vehicle traffic; 3) proliferation of non-native invasive plants from human-induced soil disturbances leading to invasives out-competing the Soft Bird's Beak; 4) control or removal of non-native invasive plants, especially perennial pepperweed through injudicious application of herbicides, direct trampling, or accidental transport of invasive plant seeds to new areas; 5) presence of a moth larvae that eats Soft Bird's Beak; 6) alterations to channel water salinity and tidal regimes from the operation of the Suisun Marsh Salinity Control Gates; and 7) impacts from livestock and feral pigs.

Figure 2: Suisun Thistle Unit 3 and Soft Bird's Beak Unit 4

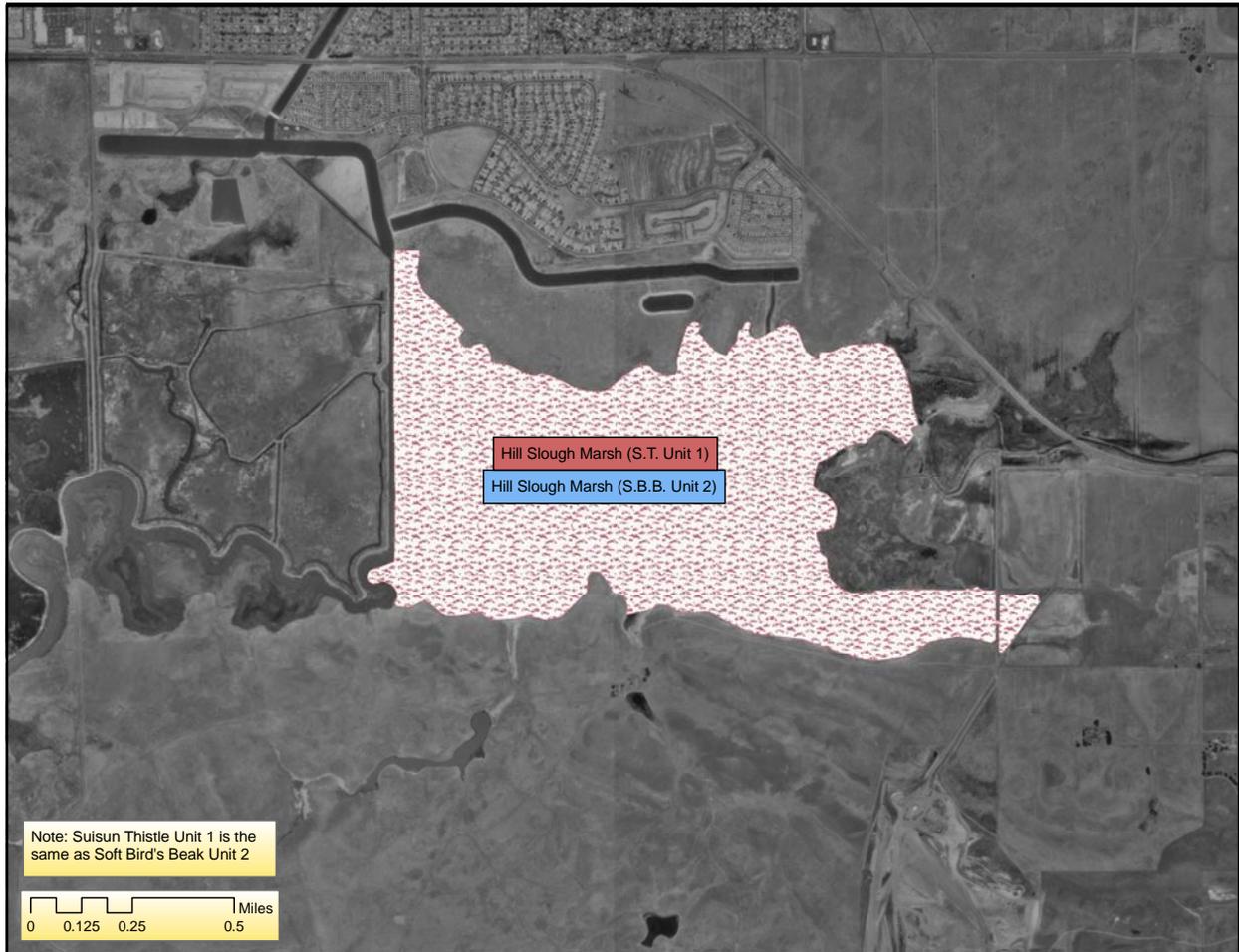


**b) Hill Slough Marsh: Suisun Thistle Unit 1 and Soft Bird's Beak Unit 2**

The unit consists of approximately 440 acres of state-owned land (Hill Slough Wildlife Area), which is managed by the California Department of Fish and Game (CDFG), and 85 acres of privately owned land. See tables 4 and 5 below for a summary of the critical habitat ownership in these units. See figure 3 for a map of the units. Threats in this area to Suisun Thistle include: 1) alterations to channel water salinity and tidal regimes from the operation of the Suisun Marsh Salinity Control Gates; 2) mosquito abatement activities; 3) impacts from livestock and feral pigs; 4) proliferation of non-native invasive plants from human-induced soil disturbances leading to invasives out-competing the Suisun Thistle; 5) control or removal of non-native invasive plants, especially perennial pepperweed through injudicious application of herbicides, direct trampling, or accidental transport of invasive plant seeds to new areas; and 6) urban or residential encroachment from Suisun City to the north that could increase stormwater and wastewater runoff into this unit. Threats to Soft Bird's Beak in this unit include: 1) mosquito abatement activities; 2) general foot and off-road vehicle traffic; 3) proliferation of non-native invasive plants from human-induced soil disturbances leading to invasives out-competing the Soft Bird's Beak; 4) control or removal of non-native invasive plants, especially perennial pepperweed through injudicious application of herbicides, direct trampling, or accidental transport of invasive plant seeds to new areas; 5) presence of a moth larvae that feeds on Soft Bird's Beak; 6)

alterations to channel water salinity and tidal regimes from the operation of the Suisun Marsh Salinity Control Gates; and 7) impacts from livestock and feral pigs. The unit was occupied by Soft Bird's Beak at the time of listing. Although this unit was unoccupied by the Suisun Thistle at the time of listing, it is identified as the, "single best area for establishment of an additional population."

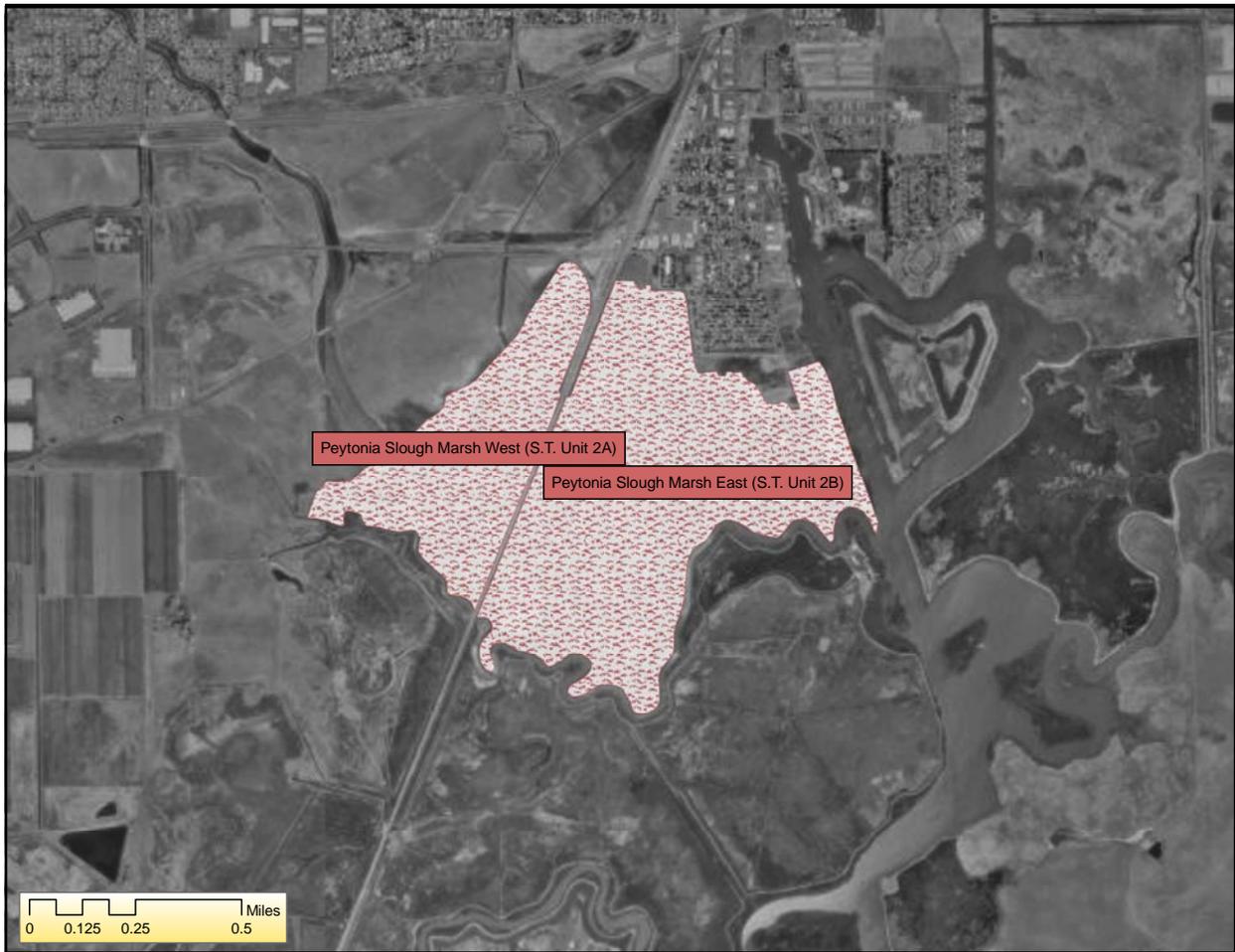
Figure 3: Suisun Thistle Unit 1 and Soft Bird's Beak Unit 2



### c) Peytonia Slough Marsh: Suisun Thistle Unit 2

The unit consists of 243 acres of state-owned land (Peytonia Slough Ecological Reserve), which is managed by the CDFG, and 170 acres of privately owned high tidal marsh. See table 4 and 5 below for a summary of the critical habitat ownership in this unit. See figure 4 for a map of this unit. Threats in this area to Suisun Thistle include: 1) alterations to channel water salinity and tidal regimes from the operation of the Suisun Marsh Salinity Control Gates; 2) mosquito abatement activities; 3) impacts from livestock and feral pigs; 4) proliferation of non-native invasive plants from human-induced soil disturbances leading to invasives out-competing the Suisun Thistle; 5) control or removal of non-native invasive plants, especially perennial pepperweed through injudicious application of herbicides, direct trampling, or accidental transport of invasive plant seeds to new areas; and 6) urban or residential encroachment from Suisun City to the north that could increase stormwater and wastewater runoff into this unit.

Figure 4: Suisun Thistle Unit 2



## 2. Fagan Slough Marsh: Soft Bird's Beak Unit 1

This unit consists of 320 acres of State-owned land (Fagan Slough Ecological Reserve), which is managed by the CDFG, 6 acres of land owned by Napa County, 9 acres of land owned by the City of Napa, and 72 acres of privately owned land. See table 5 below for a summary of the critical habitat ownership in this unit. See figure 5 for a map of this unit. Threats to Soft Bird's Beak in this unit include: 1) mosquito abatement activities; 2) general foot and off-road vehicle traffic; 3) proliferation of non-native invasive plants from human-induced soil disturbances; 4) control or removal of non-native invasive plants, especially perennial pepperweed through injudicious application of herbicides, direct trampling, or accidental transport of invasive plant seeds to new areas; 5) presence of a moth larvae that eats Soft Bird's Beak.

Figure 5: Soft Bird's Beak Unit 1



### 3. Point Pinole Shoreline: Soft Bird's Beak Unit 3

This unit consists of 13 acres of land owned by Contra Costa County (Point Pinole Regional Shoreline Park), which is managed by the East Bay Regional Parks District (EBRPD), and 9 acres of state-owned land. See table 5 below for a summary of the critical habitat ownership in this unit. See figure 6 for a map of the unit. Threats to Soft Bird's Beak in this unit include: 1) mosquito abatement activities; 2) general foot and off-road vehicle traffic; 3) proliferation of non-native invasive plants from human-induced soil disturbances; 4) control or removal of non-native invasive plants, especially perennial pepperweed through injudicious application of herbicides, direct trampling, or accidental transport of invasive plant seeds to new areas; 5) presence of a moth larvae that eats Soft Bird's Beak; 6) contamination from bay oil spills that could directly impact populations and seed banks; and 7) industrial or commercial encroachment from the south that could increase stormwater and wastewater runoff into the unit.

Figure 6: Soft Bird's Beak Unit 3



#### 4. Southampton Marsh: Soft Bird's Beak Unit 5

This unit consists of approximately 178 acres of state-owned land managed by California Department of Parks and Recreation (CDPR) as a wetland natural preserve. The unit is in the Benicia State Recreation area. Approximately 22 acres of bay fill is located in the northwestern section of the unit adjacent to the paved park roadway. This area is associated with ongoing marsh restoration efforts by the CDPR. See table 5 below for a summary of the critical habitat ownership in this unit. See figure 7 for a map of this unit. Threats to Soft Bird's Beak in this unit include: 1) mosquito abatement activities; 2) general foot and off-road vehicle traffic; 3) proliferation of non-native invasive plants from human-induced soil disturbances leading to invasives out-competing the Soft Bird's Beak; 4) control or removal of non-native invasive plants, especially perennial pepperweed through injudicious application of herbicides, direct trampling, or accidental transport of invasive plant seeds to new areas; 5) presence of a moth larvae that eats Soft Bird's Beak; 6) contamination from bay oil spills that could directly impact

populations and seed banks; and 7) urban or residential encroachment from the north that could increase stormwater and wastewater runoff into the unit.<sup>4</sup>

Figure 7: Soft Bird's Beak Unit 5



#### D. HABITAT ACREAGE AND OWNERSHIP

The following tables summarize the ownership within each critical habitat unit. State owned land within the proposed habitat units is managed by either the California Department of Fish and Game or the California Parks and Recreation Department. City or county lands are controlled by East Bay Regional Parks District, Napa County, or the City of Napa. The Solano Land Trust owns 950 acres in the Rush Ranch/Grizzly Island Wildlife Area. Various private land owners makeup the rest of the stakeholders and own a combined 327 acres.

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<sup>4</sup> U.S. Fish & Wildlife Service, "Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the *Cirsium hydrophilum* var. *hydrophilum* (Suisun Thistle) and *Cordylanthus mollis* ssp. *mollis* (Soft Bird's Beak), April 11, 2006, volume 71, number 69, pp. 18466-68.

Table 4: Suisun Thistle Critical Habitat Acreage

<b>Critical Habitat Unit</b>	<b>State</b>	<b>Land Trust</b>	<b>Private</b>	<b>Total</b>
Unit 1: Hill Slough Marsh	440	0	85	525
Unit 2: Peytonia Slough Marsh:				
Subunit 2A	0	0	120	120
Subunit 2B	243	0	50	293
Unit 3: Rush Ranch/Grizzly Island Wildlife Area	231	950	0	1,181
<b>Total</b>	<b>914</b>	<b>950</b>	<b>255</b>	<b>2,119</b>

Table 5: Soft Bird's Beak Critical Habitat Acreage

<b>Critical Habitat Unit</b>	<b>State</b>	<b>County/ City</b>	<b>Land Trust</b>	<b>Private</b>	<b>Total</b>
Unit 1: Fagan Slough Marsh	320	15	0	72	407
Unit 2: Hill Slough Marsh	440	0	0	85	525
Unit 3: Point Pinole Shoreline	9	13	0	0	22
Unit 4: Rush Ranch/Grizzly Island Wildlife Area	231	0	950	0	1,181
Unit 5: Southampton Marsh	178	0	0	0	178
<b>Total</b>	<b>1,178</b>	<b>28</b>	<b>950</b>	<b>157</b>	<b>2,313</b>

## E. PRESERVED OPEN SPACE

Several areas proposed for critical habitat are already designated as open space or parkland. For each open space preserve affected by the proposed rule, management personnel were interviewed to determine potential economic effects of the proposed rule on the threatening activities listed in section 2.B, and to assess whether preservation of the open space could be attributed to conservation of Suisun Thistle and Soft Bird's Beak.

### 1. The California Department of Fish and Game

Portions of units 1, 2, and 3 for Suisun Thistle and portions of units 1, 2, and 4 for Soft Bird's Beak are managed by the California Department of Fish and Game (CDFG). CDFG is the entity in charge of managing state-owned wildlife areas in California. CDFG has managed these lands as publicly accessible wild areas since before the listing of Suisun Thistle and Soft Bird's Beak. CDFG maintains the operation of levees on its land that are integral to the water quality and salinity level of the Suisun Marsh ecosystem.<sup>5</sup>

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<sup>5</sup> Telephone interview with Larry Wyckoff, Senior Wildlife Biologist, CA Dept. of Fish and Game, June 9 and June 21, 2006.

## 2. Solano Land Trust

Portions of unit 3 for Suisun Thistle and unit 4 for Soft Bird's Beak are managed by the Solano Land Trust (SLT). The SLT, founded in 1986, is a, "non-profit, public benefit land trust that seeks to preserve and protect farmlands and open spaces throughout Solano County."<sup>6</sup> Personnel at SLT claimed that the designation of critical habitat on their land would aid them in their efforts to preserve open space and conserve the many native species on their land by increasing their likelihood of receiving grants for tidal marsh restoration and other conservation projects.<sup>7</sup>

## 3. East Bay Regional Parks District

The majority of unit 3 for Soft Bird's Beak is in the Point Pinole Regional Shoreline Park, which is managed by the East Bay Regional Parks District (EBRPD). Point Pinole Regional Shoreline was formerly the site of steel, gunpowder, and dynamite manufacturing, but was acquired for public use in 1973 and has since been used for hiking, biking, horse-riding, bird watching, and fishing. The area that is proposed critical habitat within Point Pinole Regional Shoreline Park is rarely entered into by people except for one or two fishermen each month.<sup>8</sup>

## 4. California Department of Parks and Recreation

Unit 5 for Soft Bird's Beak lies within the Benicia State Recreation Area and is entirely managed by the California Department of Parks and Recreation (CDPR). The CDPR manages this unit, called the Southampton Marsh, as a wetland natural preserve that is closed to the public and seasonally closed to researchers. Researchers are not allowed in the Southampton Marsh during the breeding season of certain threatened and endangered birds, and during the flowering stage of the Soft Bird's Beak. The upper portion of Southampton Marsh was formerly an unregulated dump and is now a superfund site.<sup>9</sup>

## F. CONSULTATION HISTORY

Through the Section 7 process, the Service has consulted with Federal agencies nine times on actions affecting Soft Bird's Beak and Suisun Thistle. Other consultations include one with the San Francisco Bay National Wildlife Refuge Complex. Formal consultations include:

- One consultation with the U.S. Army Corps of Engineers regarding the proposed Mirant Delta LLC Contra Costa and Pittsburg Power Plants project located on the San Joaquin River and on Suisun Bay in Contra Costa County;
- One consultation with the U.S. Army Corps of Engineers regarding the Tosco-Richmond Products Pipeline Maintenance Inspection Project in the City of Richmond, Contra Costa County;

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<sup>6</sup> Solano Land Trust website at: <http://www.solanolandtrust.org/main.html>.

<sup>7</sup> Telephone interview with Ken Poerner, Solano Land Trust, June 28, 2006.

<sup>8</sup> Telephone interview with John Hitchin, Supervisor, Point Pinole Regional Shoreline Park, June 12, 2006.

<sup>9</sup> Telephone interview with Cindy Shafer, Resource Ecologist, Diablo Vista District of the California State Parks, June 22, 2006.

- One consultation with the U.S. Army Corps of Engineers regarding the ChevronTexaco Pipeline Company Repair of Bay Area Product Line Pipeline in Bay Point, Contra Costa County;
- One consultation with the U.S. Bureau of Reclamation regarding the Coordinated Operations of the Central Valley Project and State Water Project and the Operational Criteria and Plan;
- One consultation with the U.S. Army Corps of Engineers regarding and amendment to the Programmatic Consultation on the SFPP, L.P. Pipeline Repair Project, Contra Costa, Solano, and Yolo Counties;
- One consultation with the U.S. Bureau of Reclamation regarding the Freeport Regional Water Project;
- One consultation the U.S. Army Corps of Engineers concerning the proposed vernal pool construction at the Proposed North Suisun Mitigation Bank in Solano County;
- One consultation with the San Francisco Bay NWR Complex in regards to implementing the San Francisco Estuary Invasive Spartina Project: Spartina control program.

Informal consultations concerning actions affecting Soft Bird's Beak and Suisun Thistle include:

- One draft section 7 consultation with the U.S. Army Corps of Engineers concerning the proposed Mirant Delta LLC Contra Costa and Pittsburg Power Plants project located on the San Joaquin River and on Suisun Bay in Contra Costa County.
- One draft environmental assessment/ initial study and proposed negative declaration for the revised Suisun Marsh Preservation Agreement.
- One informal consultation with the U.S. Bureau of Reclamation regarding the revised Suisun Marsh Preservation Agreement, the Revised Suisun Marsh Monitoring Agreement and the Revised Suisun Marsh Mitigation Agreement in Suisun Marsh, Solano County, CA.

## G. INFORMATION SOURCES

The primary sources of information for this report were communications with and data provided by the Service. In addition, the analysis relies on information from the following entities:

- Environmental Systems Research Institute (ESRI), for geographic data
- California Department of Fish and Game, Central Coast Region
- California Department of Parks and Recreation, Diablo Vista District
- East Bay Regional Parks District, Point Pinole Regional Shoreline
- Napa County Conservation, Development & Planning Department
- City of Richmond Planning and Engineering Departments
- City of Benicia Planning and Engineering Departments
- Suisun City Planning and Engineering Departments
- Fairfield-Suisun Sewer District

- West County Wastewater District
- Solano County Mosquito Abatement District
- Napa County Mosquito Abatement District
- Contra Costa County Mosquito and Vector Control District
- Solano Land Trust
- California Department of Water Resources, Suisun Marsh Planning Department
- Suisun Resource Conservation District

### 3. ANALYTICAL FRAMEWORK

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This economic analysis considers both the economic efficiency and distributional effects that may result from species and habitat protection. Economic efficiency effects generally reflect “opportunity costs” associated with the commitment of resources required to accomplish species and habitat conservation. Efficiency losses include reductions in surplus levels resulting from economic activities such as land development. Similarly, the costs incurred by a Federal action agency to consult with the Service under Section 7 represent opportunity costs of habitat conservation.

This analysis also addresses the distribution of impacts associated with conservation efforts in the areas of proposed critical habitat, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation activities on small entities and the energy industry. This information may be used to determine whether the effects of the designation unduly burden a particular group or economic sector. For example, while habitat conservation activities may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience a significant level of impact. The difference between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

#### A. 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 discern the implications of a regulatory action on a societal level. For regulations specific to the conservation of Soft Bird’s Beak and Suisun Thistle, 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 surplus in affected markets.<sup>10</sup>

In some instances, compliance costs may provide a reasonable approximation of the efficiency effects associated with a regulatory action. For example, a lead Federal agency may enter into a consultation with the Service to ensure that a particular activity will not adversely modify critical

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<sup>10</sup> For additional information on the definition of “surplus” and an explanation of consumer and producer surplus in the context of regulatory analysis, see Gramlich, Edward M., *A Guide to Benefit-Cost Analysis* (2nd Ed.), Prospect Heights, Illinois: Waveland Press, Inc., 1990; and U.S. 240-R-00-003, September 2000, available at <http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html>.

habitat. The end result of the consultation may be a small amount of additional mitigation for on-site impacts of the proposed activity. The cost of the additional mitigation would be spent on alternative activities if the proposed project had not been designated critical habitat. In the case that compliance activity is not expected to significantly affect markets – that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price – the measurement of compliance costs provides a reasonable estimate of the change in economic efficiency.

More generally, it may be necessary to estimate changes in producer and consumer surpluses where habitat protection measures are expected to significantly impact a market. 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.

## B. DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

Measurements of changes in economic efficiency focus on the net impact of conservation activities, without consideration of how certain economic sectors or groups of people are affected. Thus, a discussion of efficiency effects alone may miss important distributional considerations. OMB encourages Federal agencies to consider distributional effects separately from efficiency effects.<sup>11</sup> This analysis considers several types of distributional effects, including impacts on small entities and impacts on energy supply, distribution, and use.

## C. SCOPE OF THE ANALYSIS

This analysis identifies those economic activities believed to most likely threaten the listed species and its habitat and, where possible, quantifies the economic impact to avoid, mitigate, or compensate for such threats within the boundaries of the proposed critical habitat. 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.<sup>12,13</sup>

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. We note that in past instances, some of these measures have been precipitated by

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<sup>11</sup> U.S. Office of Management and Budget, “Circular A-4,” September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

<sup>12</sup> In 2001, the U.S. 10th Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed critical habitat designation, 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)).

<sup>13</sup> In 2004, the U.S. 9<sup>th</sup> 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.

the listing of the species and impending designation of critical habitat. Because habitat conservation efforts affording protection to a listed species likely contribute to the efficacy of the critical habitat designation, the impacts of these actions are considered relevant for understanding the full effect of the proposed designation. Enforcement actions taken in response to violations of the Act, however, are not included.

### 1. Sections of the Act Relevant To the 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 CHD. According to section 4, the Secretary is required to list species as endangered or threatened “solely on the basis of the best available scientific and commercial data.”<sup>14</sup>

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 to ensure that any action the agencies authorize, fund, or carry out will not likely jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of the species’ designated 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 the designation of critical habitat.<sup>15</sup>
- Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the “take” of endangered wildlife, where “take” means to “harass, harm, pursue, or collect, or to attempt to engage in any such conduct.”<sup>16</sup> The economic impacts associated with this section manifest themselves in sections 7 and 10. While incidental take permits are not issued for plant species, the Service is obligated to ensure that proposed activities adequately minimize impact to 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.<sup>17</sup> The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately minimized and mitigated. The designation of critical

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<sup>14</sup> 16 U.S.C. §1533.

<sup>15</sup> 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.

<sup>16</sup> 16 U.S.C. §1538 and 16 U.S.C. §1532.

<sup>17</sup> U.S. Fish & Wildlife Service, “Endangered Species and Habitat Conservation Planning,” <http://endangered.fws.gov/hcp/>.

habitat does not require completion of an HCP; however, the designation 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 adversely affect or jeopardize the continued existence of the plant species.

## 2. Other Relevant Protection Efforts

The protection of listed species and habitat is not limited to the Act. Other Federal agencies, such as the U.S. Army Corps of Engineers, as well as state and local governments, may also seek to protect the natural resources under their jurisdiction.

In particular, Soft Bird's Beak was listed as a rare species in 1979 by the state of California under the California Endangered Species Act (CESA).<sup>18</sup> The Suisun Thistle has not been listed under the CESA.<sup>19</sup> Managed by the CDFG, CESA is similar in nature and scope to the Act. It requires state agencies to consult with the CDFG over actions that may jeopardize the continued existence of a state-listed rare, endangered or threatened species, or its habitat. Like the Act, it also allows for take incidental to otherwise lawful development projects.<sup>20</sup> CESA may have resulted in additional protection to Soft Bird's Beak above that provided by the Act.

The Suisun Marsh Protection Plan was created by the San Francisco Bay Conservation and Development Commission and the CDFG per the Nejedly-Bagley-Z'berg Suisun Marsh Preservation Act of 1974 that says "The objectives of the Protection Plan are to preserve and enhance the quality and diversity of the Suisun Marsh aquatic and wildlife habitats and to assure retention of upland areas adjacent to the Marsh in uses compatible with its protection." A few of the policies laid out in the Protection Plan are provided below to show the depth and breadth of the Plan:

- "The diversity of habitats in the Suisun Marsh and surrounding upland areas should be preserved and enhanced wherever possible to maintain the unique wildlife resource."
- "The Marsh waterways, managed wetlands, tidal marshes, seasonal marshes, and lowland grasslands are critical habitats for marsh-related wildlife and are essential to the integrity of the Suisun Marsh. Therefore, these habitats deserve special protection."
- "Recreational activities that could result in adverse impacts on the environmental or aesthetic qualities of the Suisun Marsh should not be permitted. Levels of use should also be monitored to insure that their intensity is compatible with other recreation activities and with protection of the Marsh environment."
- "In order to improve the efficiency of water control management in the Marsh, the Suisun Resource Conservation District should be empowered to develop and enforce regulations

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<sup>18</sup> California Department of Fish and Game, Habitat Conservation Planning Branch website at: [http://www.dfg.ca.gov/hcpb/cgi-bin/more\\_info.asp?idKey=ssc\\_tespp&specy=plants&query=Cordylanthus%20mollis%20ssp.%20mollis](http://www.dfg.ca.gov/hcpb/cgi-bin/more_info.asp?idKey=ssc_tespp&specy=plants&query=Cordylanthus%20mollis%20ssp.%20mollis).

<sup>19</sup> California Department of Fish and Game, Habitat Conservation Planning Branch website at: [http://www.dfg.ca.gov/hcpb/species/t\\_e\\_spp/teplant/teplanta.shtml](http://www.dfg.ca.gov/hcpb/species/t_e_spp/teplant/teplanta.shtml).

<sup>20</sup> California Department of Fish and Game, Habitat Conservation Planning Branch website at: [http://www.dfg.ca.gov/hcpb/ceqacesa/cesa/incidental/cesa\\_policy\\_law.shtml](http://www.dfg.ca.gov/hcpb/ceqacesa/cesa/incidental/cesa_policy_law.shtml)

establishing sound water management practices on all privately owned managed wetlands within the primary management area.”

- “Where feasible, historic marshes should be returned to wetland status...as tidal marshes or managed wetlands.”
- “State and federal agencies and the Solano County Mosquito Abatement District should continue and expand their research efforts on marsh management with the objective of improving wildlife habitat, preserving rare and endangered species, and controlling mosquitoes. These agencies and the Suisun Resource Conservation District should periodically conduct joint reviews of marsh management programs to ensure that they are compatible with one another and consistent with the policies of the Suisun Marsh Protection Plan.”<sup>21</sup>

In general, economic impacts will be evaluated regardless of whether or not species protection measures required by the Act are also required by other federal agencies or state and local governments. The impacts of these protection measures are “co-extensive” with or attributable to the species’ listing and CHD. Examples of the type of regulations that fall into this category include but are not limited to the California Environmental Quality Act (CEQA) and Section 404 of the Clean Water Act.

### 3. Time Frame

The analysis examines activities taking place both within and adjacent to the proposed designation. It 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. Accordingly, the analysis bases estimates on activities that are likely to occur within a 20-year time frame of 2006 to 2025, beginning on the day that the current proposed rule becomes available to the public. In addition, past impacts are measured starting at the listing of the species in 1997.

### 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.<sup>22</sup> OMB’s Circular A-4 distinguishes two types of economic benefits: *direct benefits and ancillary benefits*. Ancillary benefits are defined as favorable impacts of a rulemaking that are typically unrelated, or secondary, to the statutory purpose of the rulemaking.<sup>23</sup>

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. The published economics literature has documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species. In its guidance for implementing Executive Order 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of

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<sup>21</sup> Suisun Marsh Protection Plan at: <http://www.bcdc.ca.gov/index.php?p=79&more=1&page=3>.

<sup>22</sup> Executive Order 12866, *Regulatory Planning and Review*, September 30, 1993.

<sup>23</sup> U.S. Office of Management and Budget, “Circular A-4,” September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

resources on the implementing agency's part to conduct new research.<sup>24</sup> Rather than rely on economic measures, the *Service believes that the direct benefits of the proposed rule are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.*

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

It is often difficult to evaluate the ancillary benefits of critical habitat designation. To the extent that the 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 decreased off-road vehicle use to improve species habitat leads 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 efforts imposed on regulated entities and the regional economy.

## 4. METHODOLOGY

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The methodology of this analysis is twofold. First, past costs that have resulted from efforts to conserve the species within areas of critical habitat are quantified. Second, future costs resulting from efforts to conserve the species are calculated. Future costs are identified by describing a) the potential economic impact of efforts to protect the plants by mitigating the threats identified in the federal listing (section 2.B above) according to mitigation techniques recommended by the Service and b) the present value of the economic surplus generated by activities within the area of critical habitat.

In order to determine which mitigation techniques the Service might require, past consultations with the Service can provide guidance. Most of the consultations that have occurred for these species have been for projects associated with pipeline repair and maintaining state-wide water projects (see Section 2.F). The consultation history does not provide significant guidance for how the Service would recommend mitigating the threats identified in the Proposed Rule.

### A. PAST COSTS

This analysis defines past costs as costs that occurred between when Soft Bird's Beak and Suisun Thistle were listed under the Act (January 29, 1997) and the present. Past costs were calculated by interviewing the affected entities within critical habitat—typically landowners—to determine if any resources had been expended on management, consultation with the Service, or other

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<sup>24</sup> Ibid.

activities intended to conserve the two plants. Past costs also include the value of any lost economic opportunities attributable to listing. For example, a housing development that was reconfigured to avoid development on areas containing Soft Bird's Beak and Suisun Thistle would incur an economic loss if those actions were required to conserve the species or its habitat.

## B. FUTURE COSTS

Future costs are costs attributable to the conservation of Soft Bird's Beak and Suisun Thistle that will occur between the present and 2025. These costs vary based on the reasonably foreseeable highest and best economic uses for each individual designated parcel of land. For example, land owned by a public entity and designated as open space typically has little potential to be used for residential or commercial development purposes over the relevant time frame. In these cases, the future costs of critical habitat designation are calculated as the sum of the management and other burdens imposed on the landowner, discounted to present value. For calculation of present value, both three percent and seven percent discount rates are used. 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.<sup>25</sup>

## 5. ECONOMIC IMPACT OF CONSERVATION EFFORTS IN PROPOSED CRITICAL HABITAT FOR SUISUN THISTLE AND SOFT BIRD'S BEAK

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Impacts associated with efforts to conserve the plant species are correlated by threat mitigation measure by habitat unit. As described in section 2 there are eleven threat mitigation categories and eight habitat units. Some threats apply to both species, some to only one.

### A. THREATS TO SUISUN THISTLE AND SOFT BIRD'S BEAK

#### 1. **Mosquito abatement activities (ditching, dredging, and chemical spray operations), which may damage the plants directly by trampling and soil disturbance, and indirectly by altering hydrologic processes and by providing relatively dry ground for increased foot and vehicular traffic**

Currently, the Solano County Mosquito Abatement District, Napa County Mosquito Abatement District, and the Contra Costa Mosquito and Vector Control District (collectively, the Districts) all control mosquito populations in their respective jurisdictions. Mosquito abatement activities of the Districts have been identified as a threat in all units to Suisun Thistle and Soft Bird's Beak.

Service personnel avoid the Soft Bird's Beak and Suisun Thistle when controlling mosquito populations in the proposed critical habitat areas. The Districts currently monitor the land by foot for mosquito populations and habitats. When the mosquito population reaches a certain threshold, they spray the mosquito habitat with a larvicide from ATVs, or occasionally by

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<sup>25</sup> (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.

helicopter or plane. None of the Districts currently use dredging or ditching techniques within the proposed critical habitat areas.<sup>26</sup> In all efforts, the Districts' staff has been trained to recognize and avoid populations of the endangered species to the best of their ability.

The Service has stated that each Districts current management practice of recognition and avoidance is sufficient to mitigate the threat.<sup>27</sup> The cost to the Districts of this practice is negligible. The cost of continued training to recognize and avoid the Suisun Thistle and Soft Bird's Beak is estimated by the Districts to also be negligible. Accordingly, the Districts will realize no co-extensive costs of CHD.

## **2. Rooting, wallowing, trampling, and grazing impacts from livestock and feral pigs that could result in damage or loss to colonies or soil disturbance and compactions leading to a disruption in natural marsh ecosystem processes**

These impacts from livestock and feral pigs have been identified as a threat to both species in all of the units within Suisun Marsh.

The Service believes this threat could be mitigated by a range of actions from simple policy changes by land holders that would restrict access to the land to entirely fencing off of the habitat unit. The Service could not rule out the potential need to fence off the habitat unit in order to mitigate this threat.<sup>28</sup> Thus, the cost of fencing off each unit within Suisun Marsh that is not already fenced off is calculated as a potential economic impact associated with proposed CHD. Table 6 at the end of this section summarizes the potential economic impacts.

### **a) Unit 3 for Suisun Thistle and Unit 4 for Soft Bird's Beak (Rush Ranch/ Grizzly Island Unit)**

California Department of Fish and Game does not allow cattle to be grazed on its land and issues pig hunting permits to keep the pig population from expanding. Ranchers in the area surrounding this unit have already installed fences to keep their cattle off the CDFG land.<sup>29</sup>

If the Service determines that the fences installed by ranchers are inadequate to protect the species from livestock and required CDFG to install its own fence around the unit to insure livestock are kept out, the total cost of fencing off the unit would be approximately \$281,282, where the cost of fencing is \$4 per foot, the perimeter of the unit is 62,045 feet, there are 24 gates installed every 2,500 feet, each gate costs \$400, and installation takes 20 labor-hours for each mile of fencing at a rate of \$100/labor-hour.<sup>30</sup>

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<sup>26</sup> While none of the districts currently use ditching techniques in the habitat, each district stated they would maintain their prerogative to do so in the future if such actions were deemed necessary to control the mosquito population.

<sup>27</sup> Telephone interview with Arnold Roessler, Listing Branch Chief, U.S. Fish & Wildlife Service, Sacramento Office, July 25, 2006.

<sup>28</sup> Telephone interview with Arnold Roessler, Listing Branch Chief, U.S. Fish & Wildlife Service, Sacramento Office, July 25, 2006.

<sup>29</sup> Telephone interview with Larry Wyckoff, Senior Wildlife Biologist, CA Dept. of Fish and Game, June 21 and 27, 2006.

<sup>30</sup> Cost of fencing estimates provided by Ken Poerner, Solano Land Trust, June 28 and June 30, 2006.

The Service believes the current population of feral pigs is acceptable and that mitigation of the threat entails keeping the feral pig population from growing.<sup>31</sup> The CDFG currently sells 20 pig hunting permits per year, which keeps the feral pig population from growing, according to senior staff at CDFG.<sup>32</sup>

If it is discovered that the population of feral pigs is growing, there are two possible scenarios. CDFG could sell more licenses and the hunters could bring the population under control. Alternatively, private hunting could fail to curtail the population and CDFG could pay a professional to control the population on an annual basis. The professional management would have two costs. First, there is the cost of paying the animal controller (\$200,000 undiscounted, \$148,775 using a 3% discount rate, and \$105,940 using a 7% discount rate, as further described at the end of this section). Second, there is a potential lost revenue stream from the hunting licenses. A pig hunting tag costs \$16.80 for residents of California.<sup>33</sup> Assuming the CDFG sells 20 licenses to California residents each year for the next 20 years, the present value of that lost stream of revenue would be \$6,720 undiscounted, \$4,999 using a 3% discount rate, and \$3,560 using a 7% discount rate.

The Solano Land Trust allows cattle from nearby ranches to graze at Rush Ranch. However, the SLT has already installed fences around the tidal marsh on Rush Ranch to prevent livestock from trampling and grazing in the areas where the Soft Bird's Beak and Suisun Thistle grow. According to personnel at SLT, the cattle in Rush Ranch are allowed to graze in the uplands, but prevented from entering the tidal marsh area by a fence. It is the tidal marsh area of Rush Ranch that is proposed as critical habitat. The past cost associated with installing the fence that is currently in place is partially attributed to the preservation of the Suisun Thistle and Soft Bird's Beak, along with other native plants and animals in the tidal marsh area. The past cost of installing the fence in 2004 was approximately \$59,800, where the cost of fencing was \$4 per foot, there were 2.5 miles of fence installed, there were 5 gates installed every 2,500 feet, each gate cost \$400, and installation took 20 labor-hours per mile of fencing at a rate of \$100/labor-hour. The net present value of the past cost of installing the fence ranges from approximately \$63,442 to \$68,465 using a discount rate of three percent and seven percent, respectively. Additionally, the fence will have to be replaced in 10 years because much of the fence is in water.<sup>34</sup> The present value of the cost of repairing the fence in 10 years is approximately \$47,207 using a three percent discount rate and \$34,804 using a seven percent discount rate.

While the habitat area is currently fenced off to prevent cattle grazing and to protect the Soft Bird's Beak and Suisun Thistle, the land could be grazed. Not allowing grazing in the habitat unit is a cost to the SLT in the form of lost revenue. The SLT currently makes \$15 to \$23 per acre from leasing its land to ranchers. If the SLT allowed cattle to graze in the 950 acres of proposed critical habitat for the next 20 years at the average price of \$19/acre, the lost stream of revenue would total \$361,000. The net present value of that revenue stream is \$268,538, where

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<sup>31</sup> Telephone interview with Dan Perritt, Biologist, U.S. Fish & Wildlife Service, Oregon Office, July 19, 2006.

<sup>32</sup> Telephone interview with Larry Wyckoff, Senior Wildlife Biologist, CA Dept. of Fish and Game, June 21 and 27, 2006.

<sup>33</sup> California Department of Fish and Game, License and Revenue Branch website at: <http://www.dfg.ca.gov/licensing/hunting/huntdescrip.html>.

<sup>34</sup> Telephone interview, Ken Poerner, Solano Land Trust, July 27, 2006.

the discount rate is assumed to be 3%, or \$191,222, where the discount rate is assumed to be 7%.<sup>35</sup>

The Solano Land Trust currently controls the feral pig population to the extent it can with one individual volunteer hunter.<sup>36</sup> If the population grew and was found to be damaging the habitat, there could be potential costs to mitigate the threat. The SLT could sell licenses to hunt the pigs, with any revenue generated from the licenses likely matched by equal or greater costs to provide a safe hunting environment. Alternatively, if hunting were not working or if demand for hunting was not sufficient, a professional animal control expert would have to be brought in. The SLT estimates the cost of the expert would be \$10,000 per year<sup>37</sup>. The total cost for the time period 2006 to 2025 would come to \$200,000 in undiscounted terms, or \$148,775 using a 3% discount rate and \$105,940 using a 7% discount rate.

**b) Unit 1 for Suisun Thistle and Unit 2 for Soft Bird's Beak (Hill Slough Marsh Unit)**

According to senior staff at the CDFG, feral pigs are not a problem in this unit or the Peytonia Slough Unit below.<sup>38</sup> In addition, CDFG does not allow cattle to graze on any of its land. CDFG has formally asked the Service to remove this unit from the proposed rule because CDFG is already planning to do a tidal marsh restoration project in this unit to restore it to its natural tidal marsh state, which would protect the listed species to an equal or greater extent than the CHD. CDFG feels its tidal marsh restoration project is sufficient to conserve both the Suisun Thistle and Soft Bird's Beak, without any other mitigation needed.<sup>39</sup>

If CDFG were required by the Service to fence off the property to prevent pigs or cattle from ever entering this unit, the one time cost of installing a fence would be approximately \$149,783. This calculation assumes the fence cost is \$4 per foot, there were 33,019 feet of fence installed, there were 13 gates installed every 2,500 feet, each gate cost \$400, and installation required 20 labor-hours per mile of fencing at a rate of \$100/labor-hour.

**c) Unit 2 for Suisun Thistle (Peytonia Slough Marsh Unit)**

According to senior staff at the CDFG, feral pigs are not a problem in this unit or the Hill Slough Unit above. The CDFG does not allow cattle to graze on any of its land.<sup>40</sup>

The private land owners of the high tidal marsh in this unit are required under the Suisun Marsh Protection Plan to manage their land as wild and open space. They are not allowed to develop the land or use it for agricultural practices. They are allowed to graze cattle on their land. The loss in revenue to private land owners from stopping cattle grazing is expected to be minimal.

If CDFG were required by the Service to fence off the property to prevent pigs or cattle from ever entering this unit, the one time cost of installing a fence around this unit would be

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<sup>35</sup> Acres allocated to cattle grazing estimated by Ken Poerner, Solano Land Trust, June 30, 2006.

<sup>36</sup> Telephone interview with Ken Poerner, Solano Land Trust, June 28, 2006.

<sup>37</sup> Telephone interview with Ken Poerner, Solano Land Trust, July 27, 2006.

<sup>38</sup> Telephone interview, Larry Wyckoff, Senior Wildlife Biologist, CA Dept. of Fish and Game, June 21, 2006.

<sup>39</sup> *Ibid.*

<sup>40</sup> *Ibid.*

approximately \$152,248. The fence cost is assumed to be \$4 per foot, there were assumed to be 33,582 feet of fence installed, 13 gates installed every 2,500 feet, each gate was assumed to cost \$400, and installation required 20 labor-hours per mile of fencing at a rate of \$100/labor-hour.

Table 6: Economic Impacts - Cattle and Feral Pigs

Threat	Critical Habitat Unit	Stakeholder	Mitigation Action	Undiscounted Impacts	Present Value (3%) <sup>1</sup>	Present Value (7%) <sup>1</sup>
Cattle and Feral Pigs	S.T. Unit 3 /	CDFG	Fencing <sup>2</sup>	\$281,282	\$281,282	\$281,282
	S.B.B Unit 4		Animal Control Expert <sup>3</sup>	\$200,000	\$148,775	\$105,940
			Lost License Revenue <sup>3</sup>	\$6,720	\$4,999	\$3,560
		SLT	Grazing Revenue <sup>3</sup>	\$361,000	\$268,538	\$191,222
			Past Fencing Cost <sup>4</sup>	\$59,800	\$63,442	\$68,465
			Fencing Repairs <sup>3</sup>	\$59,800	\$47,207	\$34,804
			Animal Control Expert <sup>3</sup>	\$200,000	\$148,775	\$105,940
		S.T. Unit 1 / S.B.B. Unit 2	CDFG	Fencing <sup>2</sup>	\$149,783	\$149,783
	S.T. Unit 2A & 2B	CDFG	Fencing <sup>2</sup>	\$152,248	\$152,248	\$152,248
<b>Total</b>				<b>\$1,470,634</b>	<b>\$1,265,049</b>	<b>\$1,093,245</b>
<b>Annualized Costs</b>				<b>\$73,532</b>	<b>\$82,555</b>	<b>\$96,444</b>

Notes:

1. 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.
2. These fencing costs are a one time cost that is presumed to occur upon the time of habitat designation.
3. These costs are ongoing and are calculated over a twenty year time period, from 2006 to 2025.
4. This past cost occurred in 2004.
5. S.B.B. is an acronym for Soft Bird's Beak; S.T. is an acronym for Suisun Thistle

### 3. Alternations to channel water salinity and tidal regimes from the operation of the Suisun Marsh Salinity Control Gates that could affect the depth, duration, and frequency of tidal events and the degree of salinity in the channel water column

The operation of the Suisun Marsh Salinity Control Gates was identified as a threat to both species in all units that lie within Suisun Marsh. The history of policy actions that lead to the current operation of the Suisun Marsh Salinity Control Gates is summarized below. Policies have evolved to accommodate native species such as the Suisun Thistle and Soft Bird's Beak, while recognizing the importance of the many other public benefits in the Suisun Marsh. The

most recent policy development has been recognized by the Service as possibly sufficient to fully address the threat of the operation of the Suisun Marsh Salinity Control Gates to the species.

**a) Historic water quality policies focused on needs of waterfowl hunting clubs**

In 1976, the San Francisco Bay Conservation and Development Commission (BCDC) developed the Suisun Marsh Protection Plan. The focus of this plan was on maintaining waterfowl habitat, but it also addressed the importance of tidal marshes and recommended restoring historical marsh areas. The plan states that "if, in the future, some of the managed wetlands are no longer needed for waterfowl hunting, they should also be restored as tidal marshes."

The Suisun Marsh Protection Plan was requested to be implemented by AB 1717, the Suisun Marsh Protection Act of 1977. This Act focused on recommending actions that would preserve waterfowl habitat, while recognizing actions that would support the diverse wildlife in Suisun Marsh as well. The primary recommendations made by the Act were: establishment and maintenance of adequate water quality; improvement of current water management practices; establishment of criteria for the production of waterfowl food plants; and provision for supplemental water supplies and facilities to maintain adequate water quality.

In 1978, the State Water Resources Control Board issued Water Rights Decision 1485, which included channel water salinity standards from October to May and preserved the area as brackish water tidal marsh. The water quality standards laid out in the Decision 1485 were based on recommendations made by the DWR. DWR's recommendations were based on two ecological studies that examined the relative value of marsh plants as duck food, the influence of soil salinity on distribution and growth of marsh plants, and the relationships between channel water salinity and soil salinity. DFG concluded that water control facilities and adequate quality of water were needed to achieve desired soil salinity conditions for waterfowl food plants. Order 7 of Decision 1485 required DWR and USBR to develop and fully implement a plan to meet the water quality standards.

In accordance with Decision 1485, DWR and USBR developed and began to implement the Plan of Protection for the Suisun Marsh in 1984. The Plan of Protection strategy was to construct large facilities and distribution systems to meet the low channel water salinity standards, as an alternative to releasing significant storage from the Central Valley Project/State Water Project to meet the low channel water salinity standards (estimated to be as high as 2 million acre-feet in dry years). Two of the six phases of the Plan of Protection were completed: the Initial Facilities and the Suisun Marsh Salinity Control Gates.

The Suisun Marsh Salinity Control Gates became officially operational in November 1989. The California Department of Water Resources operates the Suisun Marsh Salinity Control Gates. The Gates operated when necessary from October to May to meet the water quality standards of Decision 1485, which, as noted above, focused primarily on water quality standards that would support waterfowl habitat.

**b) Water quality conditions to accommodate other species begin to be emphasized**

The 1987 Suisun Marsh Preservation Agreement required DWR and USBR to meet salinity standards, set a timeline for implementing the Plan of Protection, and delineated monitoring and mitigation requirements. The Suisun Marsh Mitigation Agreement, which defined habitat requirements to mitigate effects of facilities and operations, and the Suisun Marsh Monitoring

Agreement, which defined requirements for monitoring salinity and species in the Marsh, were also signed at this time.

The Principles for Agreement on Bay-Delta Standards between the State of California and the Federal Government, referred to the Bay-Delta Accord, was signed by State and federal agencies in December 1994. The Bay-Delta Accord had four components: 1) establish the CALFED Bay-Delta Program, which was to develop a long-term ecosystem approach to solving issues on the Delta; 2) establish the decision making group of CALFED, the Ops Group; 3) commit water users to fund \$10 million annually for three years for ecosystem restoration; and 4) finalize USEPA water quality standards for the Bay-Delta, and interim State standards proposed by the SWRCB.<sup>41</sup>

Concerns about the appropriateness of the western Suisun Marsh channel water salinity standards were expressed by wildlife and fishery agencies and urban water users in 1994. The State Water Resources Control Board, in the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, published in May 1995, modified the Suisun Marsh salinity objectives.

The 1995 Water Quality Control Plan recommended that DWR convene a multi-agency ecological workgroup to evaluate the beneficial uses and water quality objectives in the Marsh. The SWRCB asked for specific measures that would help to implement the objectives in the 1995 Water Quality Control Plan.

Also in 1995, Amendment Three to the 1987 Suisun Marsh Preservation Agreement was created with the purpose of providing equivalent protection to Suisun marsh managed wetlands as intended under the original 1987 Suisun Marsh Preservation Agreement, while recognizing the effects of increased outflow from the Delta and the effects of operation of the Suisun Marsh Salinity Control Gates.

In October 1999, in accordance with Section 7 of the Endangered Species Act, the biological assessment of Amendment Three was created by the DWR Environmental Services Office and the Suisun Marsh Preservation Agreement Amendment Three Environmental Documentation Team to evaluate the effect of the proposed actions in Amendment Three on any threatened, endangered, proposed, or sensitive species that may be present in the project area. The Suisun Thistle and Soft Bird's Beak are both recognized as federally endangered species in the Amendment Three project area in the biological assessment. The following actions of Amendment Three were recognized as potentially affecting Suisun Thistle and Soft Bird's Beak: making salinity standards consistent with the 1995 Water Quality Control Plan; managed wetland improvement fund; establishing criteria for September SMSCG operations; water management program; joint-use facilities program; and the portable pumps program. With regard to the proposed September operations of the SMSCG, the report states, "September SMSCG operations may have benefits for Suisun land managers, but these benefits may come at a cost to high inter-tidal plant communities which thrive at the more saline end of the aqueous salinity gradient."<sup>42</sup>

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<sup>41</sup> California Department of Water Resources Environmental Services Office, Suisun Marsh Monitoring Program Reference Guide, June 2000, version 2, p. 33.

<sup>42</sup> California Department of Water Resources, Environmental Services Office and the Suisun Marsh Preservation Agreement Amendment Three Environmental Documentation Team, Biological Assessment, Suisun Marsh Preservation Agreement as modified by Amendment Three, October 1999.

In December 1999, Decision 1641 was issued by the State Water Resources Control Board to update salinity standards in Suisun Marsh. DWR proposed that the SWRCB adopt the Amendment Three actions for Suisun Marsh in this Decision. The SWRCB was unable to adopt Amendment Three actions because the Section 7 consultation with the US Fish and Wildlife Service had not concluded.

In 2000, the US Fish and Wildlife Service published the Draft Jeopardy Biological Opinion, which expressed the Services concerns that implementation of Amendment 3, would have serious negative consequences for endangered species and could reduce their likelihood of survival and recovery.<sup>43</sup>

In 2001, the Suisun Ecological Workgroup presented a report to the State Water Resources Control Board in response to the 1995 Water Quality Control Plan. The SEW Report evaluated the Suisun Marsh water quality objectives and their effects on uses beneficial to the public. The SEW report examines the impact of various salinity regimes on four major ecosystem components of Suisun Marsh: brackish marsh vegetation, aquatic habitat, waterfowl, and other wildlife. The subcommittee for the brackish marsh vegetation subcommittee evaluated the salinity standards necessary to protect and maintain the undiked tidal wetland plant communities of Suisun Marsh. The brackish marsh vegetation subcommittee made the following recommendations: “estuarine salinity has ecological interactions...that are not addressed by the [Suisun Marsh Salinity Control] gates...SWRCB should revise the narrative standard for protection of biodiversity of brackish tidal wetlands...The [Suisun Marsh Salinity Control] gates should generally not be operated in winter and springs...[Brackish marsh vegetation] should be allowed to respond to annual fluctuations in salinity, including extreme (non-catastrophic) events. ...The gates may be operated in fall only in coordination with...phases of the lifecycle which we presume are least responsive to salinity changes.” There were differences between the recommended salinity standards of all four subcommittees. The SEW reported the different recommendations of each subcommittee, along with records of the agreements and disagreements between the subcommittees. The SEW left the judgment of how to use and implement the recommendations up to the SWRCB.<sup>44</sup> It is unclear whether or how these recommendations were implemented by the SWRCB.

### **c) Implementation of the Charter changes water quality standards to address additional environmental concerns**

The goal of the Suisun Charter is to, “develop a regional plan that balances implementation of the CALFED Program, Suisun Marsh Preservation Agreement, and other management and restoration programs within Suisun Marsh in a manner responsive to the concerns of stakeholders and based upon voluntary participation by private land owners.” The members of the Suisun Marsh Charter are: Suisun Resource Conservation District (SRCD), which serves on the Charter Group to represent the interests of private landowners, U.S. Fish and Wildlife Service (FWS), National Marine Fisheries Service (NOAA Fisheries), U.S. Bureau of Reclamation (BOR), California Department of Fish and Game (DFG), California Department of Water Resources (DWR), and California Bay-Delta Authority (CBDA). The Charter Group has

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<sup>43</sup> History of policies source: Suisun Marsh Program, Environmental Services Office, Department of Water Resources website at: <http://iep.water.ca.gov/suisun/program/index.html>.

<sup>44</sup> Suisun Ecological Workgroup, “Final Report to the State Water Resource Control Board,” November 2001.

also consulted other participating agencies, including the San Francisco Bay Conservation and Development Commission (BCDC) and U.S. Army Corps of Engineers (COE).<sup>45</sup> The US Fish and Wildlife Service and US Bureau of Reclamation are participating as National Environmental Policy Act (NEPA) co-lead Federal agencies, and the CDFG is the lead California Environmental Quality Act (CEQA) State Agency, for the development of the Programmatic Environmental Impact Statement/Report.

The 2001 Suisun Marsh Charter Implementation Plan called for a coordinated protection plan in the Suisun Marsh. The Suisun Charter has been charged with developing a regional plan that would outline the actions needed in Suisun Marsh to preserve and enhance managed seasonal wetlands, restore tidal marsh habitat, implement a comprehensive levee program, and protect ecosystem and drinking water quality. The proposed Suisun Marsh Habitat Management, Preservation, and Restoration Plan would be consistent with the Federal Endangered Species Act, along with other management and protection plans in Suisun Marsh.

In 2003, the Charter began writing the Suisun Marsh Habitat Management, Preservation, and Restoration Plan (SMHMP). The SMHMP is in the final stages of development. The SMHMP was not available for consideration in this analysis.

The Suisun Resource Conservation District (SRCD) is a principal contributor to the SMHMP. According to the SRCD director, revisions have been made in the last 15 years to the operation of the Suisun Marsh Salinity Control Gates to accommodate aquatic and terrestrial species that are native to the Suisun Marsh. Now, the Gates maintain a range of water salinity and quality in the Montezuma Slough that supports native waterfowl, vegetation, fish, and wildlife. Before the construction of water storage facilities in the Sierra Nevada foothills of Northern California, salinity levels in the Sacramento-San Joaquin Delta fluctuated seasonally with rain, runoff, and dry spells. Native plants in the Delta evolved according to these natural fluctuations in salinity. Today, fluctuations are similar but the highest levels of salinity (reached in the late summer/early fall season) are higher than natural historic levels. Following the construction of dams in the foothills, the Delta does not receive as much fresh water, leading to higher peak levels of salinity in the Delta during late summer/early fall. The Suisun Marsh Salinity Control Gates operate to keep the peak level of salinity lower to accommodate native species that have evolved to live with the historic salinity fluctuations. According to the director of the SRCD, the current salinity level standards are the best possible, given the variety of native species in the area, the heritage of waterfowl hunting, and the importance of the Delta water source for human consumption.<sup>46</sup>

The Service is in the process of determining if the developing SMHMP might provide an alternative to critical habitat designation. The Service recognizes that the benefit of excluding lands from critical habitat could possibly outweigh the benefits of including that land because designating the particular area might prevent the implementation of a local plan, which would otherwise provide a greater benefit to the species. The Service is evaluating the SMHMP and the previously developed Suisun Marsh Protection Plan to determine whether their implementation would provide a similar or greater level of conservation benefits to the Suisun Thistle and Soft Bird's Beak, compared to the proposed critical habitat designation.<sup>47</sup>

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<sup>45</sup> Suisun Marsh Charter website at: <http://www.delta.dfg.ca.gov/suisunmarsh/charter>.

<sup>46</sup> Telephone interview, Steve Chapelle, Director, Suisun Resource Conservation District, June 29, 2006.

<sup>47</sup> U.S. Fish & Wildlife Service, Federal Register, v. 71, no. 69, April 11, 2006, p. 18459.

The Service feels that the Suisun Marsh Salinity Control Gates are operating in the best way possible for the needs of the Suisun Thistle, Soft Bird's Beak, and all other public benefits of the Suisun Marsh. The Service is of the opinion that the SMHMP will sufficiently address the operation of the Gates as a threat to these two species. The Service has no interest in further changing the operation of the Gates in order to protect the species.<sup>48</sup>

**4. Increases in the proliferation of non-native invasive plants from human-induced soil disturbances leading to the invasives outcompeting the endangered species**

The proliferation of non-native plants is identified as a threat to the two listed species in all proposed critical habitat units.

“Human-induced soil disturbances” refer to large scale alterations to the landscape such as ditch digging, bulldozing, and tearing up the top soil with off-road vehicles. “Human-induced soil disturbances” do not refer to foot traffic.<sup>49</sup>

The cost of mitigating the threat of off-road vehicles is analyzed in detail below.

None of the mosquito abatement districts engage in ditching or dredging to control mosquito populations.<sup>50</sup> To the best of our knowledge, none of the other land owners or managers engages in soil disturbances, as defined by the Service, at this time.

**5. Control or removal of non-native invasive plants, especially perennial pepperweed (*Lepidium latifolium*), which, if not carefully managed, can damage the Suisun Thistle and Soft Bird's Beak through injudicious application of herbicides, direct trampling, or accidental transport of invasive plant seeds to new areas**

Control or removal of non-native plants, when not carefully managed, was identified as a threat to both species in all of the units.

The Service has recognized that the encroachment of non-native invasive plants such as the perennial pepperweed (*Lepidium latifolium*, also known as broadleaved pepperweed, broadleaved peppergrass, broad-leafed pepperweed, tall pepperweed, perennial peppergrass, and tall whitetop<sup>51</sup>) could be more of a threat than controlling the perennial pepperweed with the current methods which may potentially threaten the Suisun Thistle and Soft Bird's Beak.<sup>52</sup> The Service will allow state and local land managers to continue to mitigate the threat of invasive plants using the same methods as they have in the past.<sup>53</sup>

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<sup>48</sup> Telephone interview, Arnold Roessler, Listing Branch Chief, U.S. Fish & Wildlife Service, Sacramento Office, July 25, 2006.

<sup>49</sup> Telephone interview with Dan Perritt, Biologist, U.S. Fish & Wildlife Service, Oregon Office, June 27, 2006.

<sup>50</sup> Telephone interviews with Wesley Maffei, Manager, Napa County Mosquito Abatement District; Malamud-Roam, Karl, Ph.D., Environmental Programs Manager, Contra Costa Mosquito and Vector Control District; and Jon A. Blegen, Manager, Solano County Mosquito Abatement District, June 26-30, 2006.

<sup>51</sup> U.S. Department of Agriculture, Natural Resources Conservation Service website at: <http://plants.usda.gov/java/profile?symbol=LELA2>.

<sup>52</sup> Telephone interview with Dan Perritt, Biologist, U.S. Fish & Wildlife Service, Oregon Office, June 27, 2006.

<sup>53</sup> Telephone interview with Arnold Roessler, Listing Branch Chief, U.S. Fish & Wildlife Service, Sacramento Office, July 25, 2006.

The California State Parks and Recreation Department (CDPR) manages the Southampton Marsh (unit 5 for Soft Bird's Beak) within the Benicia State Recreation Area as a natural preserve. Marsh restoration efforts include an active project to remove the invasive *Spartina*, or cork grass, through treatment with an herbicide called Habitat. CDPR uses the herbicide carefully so as not to endanger the Soft Bird's Beak, including abstaining from spraying when the Soft Bird's Beak is flowering. The Service has given its approval to this project, and acknowledged that it does not threaten Soft Bird's Beak. The project is funded through the Coastal Conservancy.<sup>54</sup> The cost to the CDPR of avoiding Soft Bird's Beak is negligible.

Invasive plants are not a problem at the Point Pinole Regional Shoreline Park (unit 3 for Soft Bird's Beak). EBRPD does not actively manage the Park for invasive species because it believes they are not a threat to the Soft Bird's Beak or any other native ecosystems within the Park.<sup>55</sup>

CDFG manages the majority of the land within the Grizzly Island, Hill Slough, Peytonia Slough, and Fagan Slough areas. CDFG controls the invasive perennial pepperweed through the use of Rodeo (an herbicide containing glyphosate as the active ingredient and is approved for use in wetlands). CDFG recognizes the herbicide is potentially harmful to native species, including the Suisun Thistle and Soft Bird's Beak, and avoids native plants when spraying with Rodeo.<sup>56</sup> The cost to CDFG of avoiding Suisun Thistle and Soft Bird's Beak is negligible.

SLT, which manages part of Rush Ranch, just received a grant from the Service for \$50,000 to control perennial pepperweed. The grant money will be used to pay for materials as well as coordinating the effort. SLT will use Rodeo to kill the weed.<sup>57</sup>

The County of Napa does not have an invasive species control project in the Fagan Slough area. It is unknown at this time if the City of Napa or any of the private land owners in unit 1 for Soft Bird's Beak control invasive plants.

## **6. Urban or residential encroachment**

Stormwater and wastewater runoff from urban or residential encroachment was identified as a threat in units 1 and 2 for Suisun Thistle and in unit 5 for Soft Bird's Beak. A discussion of the economic impact by unit is presented below.

The Service views this threat as two-fold. First, there is the threat to the endangered species caused by pollution in the runoff. Second, the runoff itself could affect the salinity of the habitat.<sup>58</sup>

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<sup>54</sup> Telephone interview with Cindy Shafer, Resource Ecologist, Diablo Vista District of the California State Parks, June 22, 2006.

<sup>55</sup> Telephone interview with John Hitchin, Supervisor, Point Pinole Regional Shoreline Park., June 12, 2006.

<sup>56</sup> Telephone interview with Larry Wyckoff, Senior Wildlife Biologist, CA Dept. of Fish and Game, June 21 and 27, 2006.

<sup>57</sup> Telephone interview with Ben Wallace, Solano Land Trust, June 27, 2006.

<sup>58</sup> Telephone interview with Dan Perritt, Biologist, U.S. Fish & Wildlife Service, Oregon Office, June 27, 2006.

**a) Units 1 and 2 for Suisun Thistle: Urban or residential encroachment from Suisun City to the north that could increase stormwater and wastewater runoff**

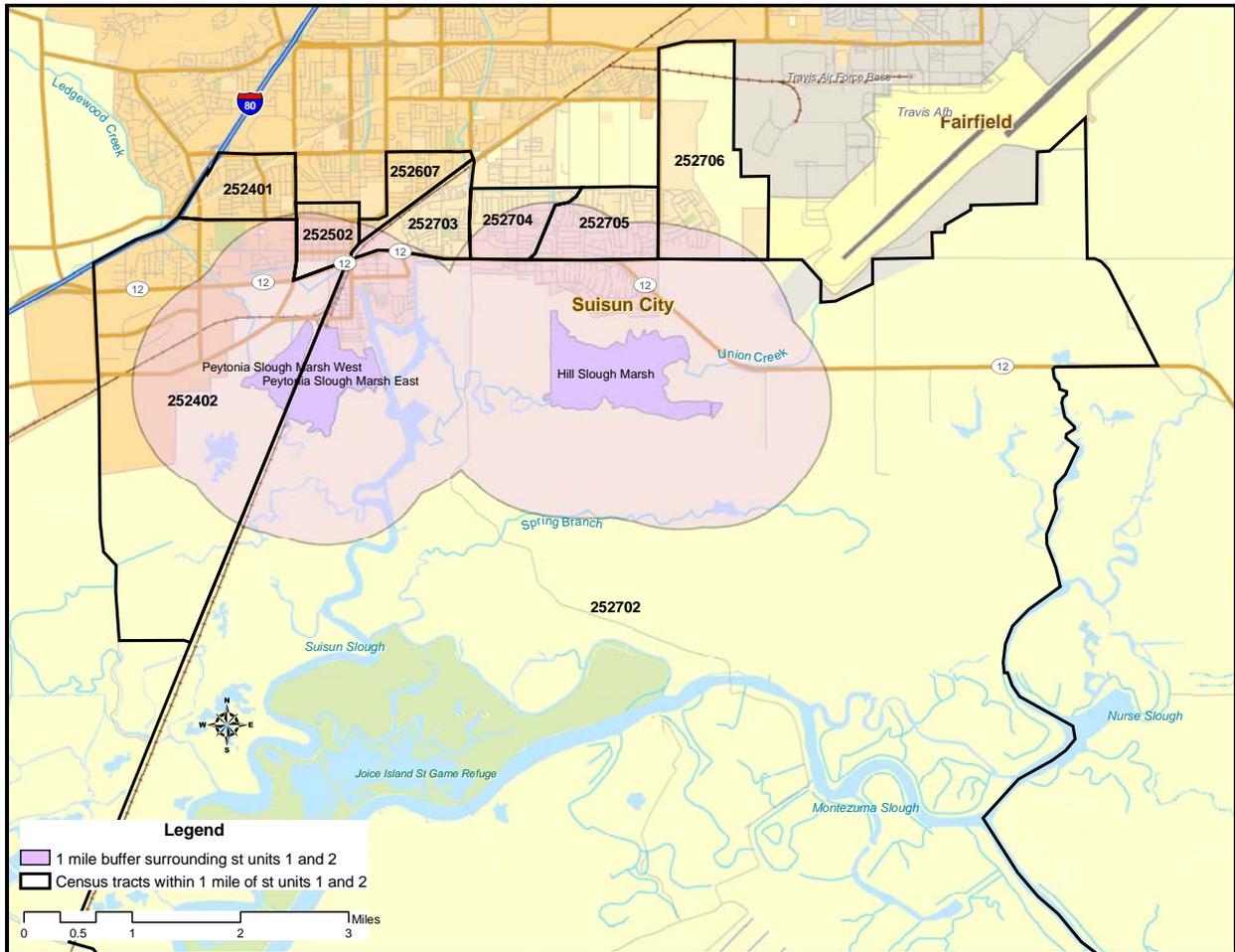
The Service has stated that pollution controls that meet the State Water Quality Control Board standards are sufficient to mitigate the threat from pollution run-off. Suisun City requires that all developments over 1 acre in size establish a stormwater treatment plan with the Fairfield-Suisun Sewer District (FSSD).<sup>59</sup>

To quantify the threat posed by additional stormwater runoff, one must first identify how much additional housing will be built around the proposed critical habitat. The census tracts that lie within or partially within a 1-mile buffer zone surrounding these 2 proposed critical habitat units were identified (see Figure 8 below).

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<sup>59</sup> Telephone interview with John Duanne, Interim Public Works Manager, Suisun City, July 26, 2006.

Figure 8: Census Tracts within One Mile of Proposed Critical Habitat for Suisun Thistle



According to housing projection data from the Association of Bay Area Governments (ABAG), approximately 3,891 households in total will be added in these census tracts within the next 20 years. The projected household growth is summarized in Table 7 below.

Table 7: Census Tracts within 1 mile of Suisun Thistle Units 1 and 2

<b>Tract</b>	<b>Projected Household Growth 2005 - 2025</b>
252401	307
252402	577
252502	503
252607	268
252702	1,166
252703	339
252704	244
252705	288
252706	199
<b>Total</b>	<b>3,891</b>

The FSSD requires all stormwater treatment plans to meet the State Water Quality Control Board Standards.<sup>60</sup> Thus, no actions above the baseline will be needed to mitigate the pollution threat caused by stormwater runoff from residential encroachment.

**b) Soft Bird’s Beak Unit 5: Urban or residential encroachment from the north that could increase stormwater and wastewater runoff**

California Department of Parks and Recreation (CDPR) is not currently managing this threat in the Southampton Marsh.

There will be little, if any, further development to the north of the Southampton Marsh Unit. There is one four to five acre unit that is surrounded by wetlands, but could possibly be developed as a commercial site in the future. According to City of Benicia personnel, there is no other possible development in the sub-basin that drains in to the Southampton Marsh.<sup>61</sup>

All current stormwater runoff in the sub-basin is directed to the Marsh. City of Benicia personnel stated that the only alternative to draining into the Marsh would be to pump the water out of the sub-basin, which would require significant capital expenditures.<sup>62</sup>

The Service has not identified how much, if any, of the current or future stormwater runoff would need to be diverted to maintain proper salinity levels in the proposed habitat areas. Additionally, the Service has not identified what mitigation actions would be recommended. The Service has not determined what level of incremental runoff, if any, would affect the long term salinity levels in the habitat. The history of consultations provides no guidance in this matter. Until more definitive actions can be determined, costs cannot be estimated.

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<sup>60</sup> Telephone interview with Kevin Cullen, Fairfield-Suisun Sewer District, July 28, 2006.

<sup>61</sup> Telephone conversation with Lee Cowells, Assistant Engineer, City of Benicia, June 30, 2006.

<sup>62</sup> *Ibid.*

## B. THREATS TO SUISUN THISTLE

### 1. Presence of *Rhinocyllus conicus* (a non-native biological control weevil) or other plant-eating insects that could reduce the reproductive potential of Suisun Thistle

This control weevil was identified as a threat in unit 3 for Suisun Thistle.

Although this weevil has not yet been found in the area, it could migrate into the area and potentially threaten the Suisun Thistle in the future. The Service has recommended that monitoring programs be organized in the area to make sure the control weevil does not exist in the area.<sup>63</sup>

Unit 3 for Suisun Thistle is managed by the CDFG and the Solano Land Trust. Neither the SLT nor the CDFG monitor their land for the presence of *Rhinocyllus conicus*.<sup>64</sup>

The cost of implementing a monitoring program is likely minimal. If the presence of the weevil is detected and it is determined that damage is being done, there could be costs associated with mitigating the damage. The Service has not identified what mitigation actions would be recommended.

## C. THREATS TO SOFT BIRD'S BEAK

### 1. General foot and off-road vehicle traffic through Soft Bird's Beak populations that could result in their damage and loss in impacted areas

General foot and off-road vehicle traffic was identified as a threat to Soft Bird's Beak in all five proposed critical habitat units for the Soft Bird's Beak.

The analysis of this threat is related to the threat of livestock and feral pigs above in that the optimal mitigation effort recommended by the Service would involve installing fences around all of the proposed critical habitat units to keep people from entering and trampling.<sup>65</sup> The Service believes this threat could be mitigated by actions that range from a simple change in policy by the land holder to restrict access to the land to completely fencing off of the habitat unit. The Service could not rule out the potential need to fence off the habitat unit in order to mitigate the threat.<sup>66</sup> Thus, the cost of fencing off each unit is calculated as a potential impact.

The CDFG, which manages portions of units 1, 2, and 4 for Soft Bird's Beak, states that their land must remain open to the public according to the laws governing state-owned public land. Therefore, the foot and off-road vehicle traffic could not be restricted, even if proposed by the

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<sup>63</sup> Telephone interview with Dan Perritt, Biologist, U.S. Fish & Wildlife Service, Oregon Office, June 27, 2006.

<sup>64</sup> Telephone interview with Ben Wallace, Solano Land Trust, June 27, 2006; telephone interview with Larry Wyckoff, Senior Wildlife Biologist, CA Dept. of Fish and Game, June 21, 2006.

<sup>65</sup> Telephone interview with Dan Perritt, Biologist, U.S. Fish and Wildlife Service, Oregon Office, June 27, 2006.

<sup>66</sup> Telephone interview with Arnold Roessler, Listing Branch Chief, U.S. Fish & Wildlife Service, Sacramento Office, July 25, 2006.

Service. The CDFG uses off-road vehicles for their own transportation purposes around the units.<sup>67</sup>

The cost to CDFG of installing fences around the Grizzly Island, and Hill Slough areas are explained in sections 5.A.2.a and 5.A.2.b above. The cost of installing a fence around the perimeter of the Fagan Slough Unit would be approximately \$98,727.64. This calculation assumes the fence cost is \$4 per foot, there were 21,816 feet of fence installed, there were 8 gates installed every 2,500 feet, each gate cost \$400, and installation required 20 labor-hours per mile of fencing at a rate of \$100/labor-hour.

SLT, which manages the remaining portion of unit 4 for Soft Bird's Beak has already installed a fence around the area of the Rush Ranch that is proposed critical habitat. This calculation is explained in section 5.A.2.a above for the past cost of installing the fence. The SLT does not allow off-road vehicles on its land.<sup>68</sup>

CDPR already restricts access to the Southampton Marsh Unit (unit 5 for Soft Bird's Beak). It has put up signs around the unit indicating public access is not allowed at any time of year. It also seasonally restricts researchers and the individuals who remove invasive species from the unit to coincide with the flowering stage of Soft Bird's Beak. No off-road vehicles are allowed in the unit.<sup>69</sup> No mitigation efforts should be necessary in this unit because the threat is already controlled.

If the Service were to require CDPR to fence off this unit to insure that no one could walk in it, the total cost would be \$82,441, where the cost of fencing is \$4 per foot, there were 18,188 feet of fence installed, there were 7 gates installed every 2,500 feet, each gate cost \$400, and installation required 20 labor-hours per mile of fencing at a rate of \$100/labor-hour.

EBRPD does not strictly prevent foot and off-road vehicle traffic in the area of the Point Pinole Regional Shoreline Park where the Soft Bird's Beak grows. However, the supervisor of the EBRPD claims that no foot and off-road vehicle traffic occurs in the area of proposed critical habitat, except for one or two fishermen who walk into the area each month.<sup>70</sup> Therefore, no mitigation efforts should be necessary in this unit because the threat has already been controlled.

If the Service were to require EBRPD to fence off this unit to insure that no one could walk in it, the total cost would be \$30,611, where the cost of fencing is \$4 per foot, there were 6,808 feet of fence installed, there were 2 gates installed every 2,500 feet, each gate cost \$400, and installation required 20 labor-hours per mile of fencing at a rate of \$100/labor-hour.

The County of Napa owns a portion of unit 1 and manages it as an airport. The area is already fenced off. It was mentioned in a field survey that evidence of foot traffic was seen within the habitat.<sup>71</sup> Simple repairs to the fence and ensuring gates are properly locked would mitigate this threat at minimal cost.

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<sup>67</sup> Telephone interview with Larry Wyckoff, Senior Wildlife Biologist, CA Dept. of Fish and Game, June 21 and June 27, 2006.

<sup>68</sup> Telephone interview with Ben Wallace, Solano Land Trust, June 27, 2006.

<sup>69</sup> Telephone interview with Cindy Shafer, Resource Ecologist, Diablo Vista District of the California State Parks, June 22, 2006.

<sup>70</sup> Telephone interview with John Hitchin, Point Pinole Regional Shoreline Park Supervisor, June 12, 2006.

<sup>71</sup> Telephone interview with Dan Perritt, Biologist, U.S. Fish & Wildlife Service, Oregon Office, June 27, 2006.

Table 8: Economic Impacts - General Foot and Off-road Vehicle Traffic

<b>Threat</b>	<b>Critical Habitat Unit</b>	<b>Stakeholder</b>	<b>Mitigation Action</b>	<b>Undiscounted Impacts</b>	<b>Present Value (3%)<sup>1</sup></b>	<b>Present Value (7%)<sup>1</sup></b>
General Foot and Off-road Vehicle Traffic	S.B.B. Unit 1	CDFG, Napa County	Fencing <sup>2</sup>	\$98,728	\$98,728	\$98,728
	S.B.B. Unit 2	CDFG	Fencing <sup>2</sup>	\$149,783	\$149,783	\$149,783
	S.B.B. Unit 3	EBRPD	Fencing <sup>2</sup>	\$30,611	\$30,611	\$30,611
	S.B.B. Unit 4	CDFG	Fencing <sup>2</sup>	\$281,282	\$281,282	\$281,282
		SLT	Past Fencing Cost <sup>4</sup>	\$59,800	\$63,442	\$68,465
			Fencing Repairs <sup>3</sup>	\$59,800	\$47,207	\$34,804
	S.B.B. Unit 5	CDPR	Fencing <sup>2</sup>	\$82,441	\$82,441	\$82,441
<b>Total</b>				<b>\$762,445</b>	<b>\$753,493</b>	<b>\$746,114</b>
<b>Annualized Costs</b>				<b>\$38,122</b>	<b>\$49,171</b>	<b>\$65,820</b>

Notes:

1. 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.
2. These fencing costs are a one time cost that is presumed to occur upon the time of habitat designation.
3. These costs are ongoing and are calculated over a twenty year time period, from 2006 to 2025.
4. This past cost occurred in 2004.
5. S.B.B. is an acronym for Soft Bird's Beak

**2. Presence of moth larvae (*Lipographis fenestrella*) that could reduce the reproductive potential of Soft Bird's Beak through flower, fruit, and seed predation**

This was identified as a threat in all units of proposed critical habitat for Soft Bird's Beak.

Although the full extent to which the moth larvae exist in the area is not known, a sighting was reported in unit 5. The land owners or managers in the proposed critical habitat units are not aware of the presence of this species of moth larvae. The Service is not aware of what, if any, damage the larvae have done to the Soft Bird's Beak population. The Service has recommended that monitoring programs be organized in all areas to determine if the moth larvae is present and what, if any, damage the larvae is doing to the endangered plant.<sup>72</sup>

<sup>72</sup> Telephone interview with Dan Perritt, Biologist, U.S. Fish & Wildlife Service, Oregon Office, June 27, 2006.

The cost of implementing a monitoring program is likely minimal. If the presence of the moth larvae is detected and it is determined that damage is being done, there could be costs associated with mitigating the damage. The Service has not identified what mitigation actions would be recommended.

### **3. Contamination from bay oil spills that could directly impact populations and seed banks**

Contamination from oil spills was identified as a threat to Soft Bird's Beak in unit 3 and unit 5.

The California coast is one of the most active marine transportation areas in the world. Thousands of ships from around the world carry goods in containers and oil in their holds for use in the U.S. San Francisco Bay is the fifth largest U.S. port, home to seven major shipping ports, oil refineries, and other major industries. Nearly 1,000 fuel oil tankers pass through its waters every year. Since 1984 the San Francisco Bay area has seen two major oil spills, and one smaller, but no less damaging, spill. In October 1984, the oil tanker M/V Puerto Rican exploded and later broke apart, releasing 1.5 million gallons of oil and killing over 3,000 birds. In 1988, a Shell Oil storage tank spilled 420,000 gallons, destroying wetland and shoreline areas.

In 1996, the SS Cape Mohican leaked 40,000 of its 96,000 gallons into the San Francisco Bay while under maintenance in dry dock. The oil eventually made its way to the shores of the Gulf of the Farallones and Monterey Bay National Marine Sanctuaries, the Golden Gate National Recreation Area, the Point Reyes National Seashore, the San Francisco Maritime National Historical Park, Angel Island State Park, and Fort Point National Historic Site. Impacted resources included sand and gravel beaches, rocky intertidal habitat, kelp beds, mudflats, and wetlands, as well as the closure of recreation areas and oiling of marinas, vessels, and historical ships.

Under the 1990 Oil Pollution Act, responsible parties are liable to pay for damages from oil spills. Much of this money is used to reimburse cleanup costs and to restore damaged natural resources. San Francisco Drydock and the federal government reached an agreement to pay \$8 million to settle the 1996 Cape Mohican oil spill. Half of the settlement money was used to buy shoreline property, restore wildlife habitat and improve recreational facilities along the coast. The rest reimbursed government agencies charged with cleaning up the spill.

The Office of Oil Spill Prevention and Response (OSPR) is California's lead agency charged with oil spill prevention and response within the state's marine environment. Part of the California Department of Fish and Game, the OSPR retains the Department's public trustee and custodial responsibility for protecting and managing the state's fish, wildlife and plants. It is one of the few state agencies in the United States that has both major pollution response authority and public trustee authority for fish, wildlife and habitat resources.

The OSPR is involved in developing and revising oil spill prevention and response regulations, handling technical aspects of protection, and accounting for the state's natural marine resources through such activities as environmental sensitivity area mapping, establishment of a comprehensive geographic information system, assessment of impact on natural resources, and sponsorship of needed research. The OSPR is also oversees the preparation and review of state-required oil spill contingency plans for all marine facilities and all vessels carrying petroleum cargo. The OSPR has established five harbor safety committees that have developed plans to reduce the risk of accidents near major harbor facilities by identifying impediments to the safe

navigation of oil tankers and barges, as well as all other vessels, and recommending solutions to these navigational problems.<sup>73</sup>

Companies and government agencies have spent and will continue to spend a significant amount of time and money to prevent oil spills in the Bay. An oil spill in the Bay would harm multiple public benefits, including beaches, water quality, fish, birds, and other wildlife. Industries ranging from commercial fishing to tourism would be significantly affected. Soft Bird's Beak is one of the many public goods protected by oil spill prevention measures. However, Soft Bird's Beak is not a proximate cause of the prevention measures.

#### **4. Industrial or commercial encroachment from the south that could increase stormwater and wastewater runoff**

Stormwater and wastewater runoff was identified as a threat potentially affecting Soft Bird's Beak in unit 3. The Service identified this as a threat due to the existence of a few heavy industry sites south of the unit and the possibility that toxic materials could be stored on those sites and runoff from the toxic materials could affect the habitat. The heavy industry sites have been vacated and converted to commercial sites since the time of the listing and there are no other future development plans in the area.<sup>74</sup> The commercial sites currently drain away from the habitat. A man-made pond created for the enjoyment of a near by residential development does drain through a canal through the habitat.<sup>75</sup> This canal drains directly into the Bay and thus poses no threat to the habitat. Thus, there would be no costs associated with mitigating this threat.

#### **D. SUMMARY OF ECONOMIC IMPACTS**

As shown in Table 9, total costs are calculated to be \$1.7 million in undiscounted dollars. On a present value basis, costs total between \$1.3 and \$1.5 million depending on the discount rate applied. The management recommendations made by the Service for many of the threats will have little or no economic impact. Some threats are already being managed with techniques the Service approves of and do not need to be altered. The Service has not identified actions that need to be taken to manage the threat of urban or residential encroachment. Until more specific actions are identified, the cost cannot be accurately estimated. The presence of plant-eating insects is a potential threat which might need management in the future; the cost of any necessary management is expected to be minimal. A significant amount of time and money will continue to be spent on preventing oil spills in the Bay, but it is unlikely that oil spill control measures are directly attributable to the species in question.

Only two threats have measurable economic impacts: Cattle and Feral Pigs, and General Foot and Off-Road Vehicle Traffic. The economic impact of mitigating the threat from cattle and feral pigs represents totals \$1.5 million. The cost of installing fencing around the threatened units totals \$702,914. Restrictions on cattle will result in lost grazing revenues totaling \$361,000. The threat of expansion of the feral pig population may need to be controlled by hiring an animal control expert. The cost of hiring such an expert is \$200,000.

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<sup>73</sup> National Oceanic and Atmospheric Association.

[http://response.restoration.noaa.gov/legacy/watersheds/sanfrancisco/sfb\\_html/chapters/chapter5d.html](http://response.restoration.noaa.gov/legacy/watersheds/sanfrancisco/sfb_html/chapters/chapter5d.html)

<sup>74</sup> Telephone interview with Lena Velasco, Associate Planner, City of Richmond, CA, June 26, 2006.

<sup>75</sup> Telephone interview with Lynne Scarpa, City Engineer, City of Richmond, CA, July 28, 2006.

The economic impact of mitigating the threat from foot and off road vehicle traffic results in fencing costs of \$762,445. Fencing in units 2 and 4 of Soft Bird's Beak will overlap fencing to protect against cattle and feral pigs. Consequently, the incremental fencing costs to manage the threat of foot and off road vehicle traffic are \$211,780.

Several additional potential impacts were reviewed including mitigation costs in the Southampton Marsh Superfund site, the Napa County Airport, and the Solano Land Trust educational facilities. No substantial, reasonably foreseeable costs were identified in these locations.

Table 9: Economic Impacts

Threat	Critical Habitat Unit	Stakeholder	Mitigation Action	Undiscounted Impacts	Present Value (3%) <sub>1</sub>	Present Value (7%) <sub>1</sub>
Mosquito Abatement Activities	All	The Districts	None	\$0	\$0	\$0
Cattle and Feral Pigs	S.T. Unit 3 /	CDFG	Fencing <sup>2</sup>	\$281,282	\$281,282	\$281,282
	S.B.B Unit 4		Animal Control Expert <sup>3</sup>	\$200,000	\$148,775	\$105,940
		SLT	Lost License Revenue <sup>3</sup>	\$6,720	\$4,999	\$3,560
			Grazing Revenue <sup>3</sup>	\$361,000	\$268,538	\$191,222
			Past Fencing Cost <sup>4</sup>	\$59,800	\$63,442	\$68,465
		S.T. Unit 1 / S.B.B. Unit 2	Fencing Repairs <sup>3</sup>	\$59,800	\$47,207	\$34,804
			Animal Control Expert <sup>3</sup>	\$200,000	\$148,775	\$105,940
			Fencing <sup>2</sup>	\$149,783	\$149,783	\$149,783
	S.T. Unit 2A & 2B	CDFG	Fencing <sup>2</sup>	\$152,248	\$152,248	\$152,248
Operation of the Suisun Marsh Salinity Control Gates	S.T. All / S.B.B. Units 2, 4	n/a	None	\$0	\$0	\$0
Increase in Invasive Plants	All	All	None	\$0	\$0	\$0
Damage to Protected Species During Invasive Plant Removal	All	All	None	\$0	\$0	\$0
Urban or Residential Encroachment	S.T. Unit 1	Private Land Holders	Stormwater BMPs	Unknown	Unknown	Unknown
	S.T. Unit 2	Private Land Holders	Stormwater BMPs	Unknown	Unknown	Unknown
	S.B.B. Unit 5	Private Land Holders	Stormwater BMPs	Unknown	Unknown	Unknown
Presence of <i>Rhynocyllus conicus</i>	S.T. Unit 3	CDFG, SLT	Monitoring	Negligible	Negligible	Negligible
General Foot and Off-road Vehicle Traffic	S.B.B. Unit 1	CDFG, Napa County	Fencing <sup>2</sup>	\$98,728	\$98,728	\$98,728
	S.B.B. Unit 2	CDFG	Fencing <sup>2,5</sup>	\$149,783	\$149,783	\$149,783
	S.B.B. Unit 3	EBRPD	Fencing <sup>2</sup>	\$30,611	\$30,611	\$30,611
	S.B.B. Unit 4	CDFG	Fencing <sup>2,5</sup>	\$281,282	\$281,282	\$281,282
			Past Fencing Cost <sup>4,5</sup>	\$59,800	\$63,442	\$68,465
			Fencing Repairs <sup>3,5</sup>	\$59,800	\$47,207	\$34,804
	S.B.B. Unit 5	CDPR	Fencing <sup>2</sup>	\$82,441	\$82,441	\$82,441
Presence of <i>Lipographis fenestrella</i> larvae	S.B.B. Units 1-5	All	Monitoring	Negligible	Negligible	Negligible
Contamination from Bay Oil Spills	S.B.B. Units 3, 5	n/a	None	\$0	\$0	\$0
Industrial or Commercial Encroachment	S.B.B. Unit 3	EBRPD	None	\$0	\$0	\$0
<b>Total<sup>6</sup></b>				<b>\$1,682,413</b>	<b>\$1,476,829</b>	<b>\$1,305,024</b>
<b>Annualized Costs</b>				<b>\$84,121</b>	<b>\$96,375</b>	<b>\$115,126</b>

Notes:

- 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.
- These fencing costs are a one time cost that is presumed to occur upon the time of habitat designation.
- These costs are ongoing and are calculated over a twenty year time period, from 2006 to 2025.
- This past cost occurred in 2004.
- These costs are identical to fencing cost calculation under 'Cattle and Feral Pigs' above and will not be summed in the total.
- The total is not the sum of all the items in the column, as some of the cost of fencing to separately manage the threats of General Foot and Off-road Vehicle Traffic and Cattle and Feral Pigs will overlap when the two threats are managed simultaneously.
- S.B.B. is an acronym for Soft Bird's Beak; S.T. is an acronym for Suisun Thistle
- "All" refers to all land owners, managers, and stakeholders associated with all of the proposed critical habitat units
- n/a = not applicable to this threat

## 6. SECONDARY ECONOMIC EFFECTS

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Federal guidelines require additional analysis of potential effects on the energy industry and small businesses.

### A. IMPACTS ON THE ENERGY INDUSTRY

Pursuant to Executive Order 13211, Federal agencies are required to submit a summary of the potential effects of regulatory actions on the supply, distribution, and use of energy, assuming those actions meet certain criteria outlined by the OMB:<sup>76</sup>

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

No present or planned power generation facilities are located within the area of proposed critical habitat, therefore no energy-related impacts associated with this CHD are expected.

### B. IMPACTS ON SMALL BUSINESSES

In accordance with Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) in 1996, when a Federal agency publishes a notice of rulemaking for any proposed or final rule, it must make available for public comments a regulatory flexibility analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions). No regulatory flexibility analysis is required; however, if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the RFA to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have significant economic impact on a substantial number of small entities.<sup>77</sup>

To assist in this process, the following represents a screening level analysis of the potential for Suisun Thistle or Soft Bird's Beak conservation efforts to affect small entities. This analysis is

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<sup>76</sup> U.S. Office of Management and Budget, "Memorandum for Heads of Executive Departments and Agencies, and Independent Regulatory Agencies," July 13, 2001.

<sup>77</sup> EPA, "Revised Interim Guidance for EPA Rulewriters: Regulatory Flexibility Act as Amended by the Small Business Regulatory Enforcement Fairness Act," 29 March 1999, p.11.

based on the estimated impacts associated with the proposed rulemaking as described in Section 5 of this analysis.

Table 10 summarizes the results of the screening analysis. Two small entities are potentially affected by conservation efforts for the Suisun Thistle and Soft Bird’s Beak. They include a land trust and a private landowner.

Table 10: Potentially Affected Small Entities

<b>Small Entity</b>	<b>Annualized Impact</b>	<b>Annualized Impact as a Percentage of Annual Revenues</b>
Solano Land Trust	\$31,000	0.32%
Land Tule Ranch	Unknown	Unknown

Sources:

Solano Land Trust Financial Statements, June 30, 2004 and 2005.

The remainder of this section describes the screening analysis in greater detail. It first identifies the businesses, governments, and not-for-profit organizations that may experience impacts due to Suisun Thistle or Soft Bird’s Beak conservation efforts within or adjacent to the potential critical habitat. Then, it identifies those entities that are likely to be small. Finally, it provides a more detailed description of the specific type of impacts potentially affecting small entities.

### C. IDENTIFICATION OF POTENTIALLY AFFECTED SMALL ENTITIES

This analysis estimates prospective economic impacts due to implementation of Suisun Thistle or Soft Bird’s Beak conservation activities associated with 10 potential threats. Table 11 lists each threat and the associated businesses, governments, or organizations potentially affected by conservation measures designed to protect the plants. For a detailed discussion of how each entity contributes to the associated threat, see Section 5.<sup>78</sup>

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<sup>78</sup> Actions taken to protect the Suisun Thistle and Soft Bird’s Beak from increases in the proliferation of non-native invasive plants from human-induced soil disturbances are unlikely to occur, because to the best of our knowledge, none of the land owners or managers engage in soil disturbances (off-road vehicle use, which may lead to soil disturbances, is discussed separately). Therefore, this analysis does not anticipate that any businesses, governments, or organizations will be affected by conservation efforts related to this threat. In addition, although oil spills occur within San Francisco Bay, companies and government agencies have spent and will continue to spend a significant amount of time and money to prevent these spills. Soft Bird’s Beak is one of many public goods protected by oil spill prevention measures. However, it is not a proximate cause of these efforts. Therefore, this analysis does not estimate impacts associated with this threat.

Table 11: Potentially Affected Businesses, Governments, or Organizations

Threat	Potentially Affected Entities
Mosquito abatement activities	<ul style="list-style-type: none"> <li>• Solano County Mosquito Abatement District</li> <li>• Napa County Mosquito Abatement District</li> <li>• Contra Costa Mosquito Abatement District</li> </ul>
Rooting, wallowing, trampling, and grazing impacts from livestock and feral pigs	<ul style="list-style-type: none"> <li>• California Department of Fish and Game (CDFG)</li> <li>• Solano Land Trust</li> <li>• Private landowners</li> </ul>
Alterations to channel salinity and tidal regimes from the operation of the Suisun Marsh Salinity Control Gates	<ul style="list-style-type: none"> <li>• California Department of Water Resources</li> </ul>
Control or removal of non-native invasive plants which, if not carefully managed, can damage the plants through injudicious application of herbicides, direct trampling, or accidental transport of invasive plant seeds to new areas	<ul style="list-style-type: none"> <li>• California State Parks and Recreation Department (CDPR)</li> <li>• Solano Land Trust</li> </ul>
Residential, industrial, or commercial encroachment that could increase stormwater and wastewater runoff	<ul style="list-style-type: none"> <li>• Developers will pass costs on to consumers of housing</li> </ul>
Presence of <i>Rhynocyllus conicus</i> , moth larvae, or other plant-eating insects	<ul style="list-style-type: none"> <li>• CDPR</li> <li>• Solano Land Trust</li> </ul>
General foot and off-road vehicle traffic	<ul style="list-style-type: none"> <li>• CDFG</li> <li>• CDPR</li> <li>• East Bay Regional Park District (EBRPD)</li> <li>• Private landowners</li> </ul>
Trash removal at Southampton Marsh	<ul style="list-style-type: none"> <li>• CDPR</li> </ul>
Airport activities	<ul style="list-style-type: none"> <li>• Napa County Airport</li> </ul>

Table 12 lists the Small Business Administration's (SBA's) standard defining "small" entities for each government, organization, or business potentially affected.<sup>79</sup> Most of the impacts estimated in Section 5 will be borne by the State of California, and Solano, Napa, and Contra Costa Counties. None of these governments are considered to be "small" by SBA, because they serve populations exceeding 50,000. The remaining entities are discussed in greater detail below.

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<sup>79</sup> Developers are not included in this list, because they will pass the costs of stormwater and wastewater controls on to consumers of housing in the form of higher prices for new homes.

Table 12: Size Standards for Potentially Affected Entities

<b>Entity</b>	<b>SBA Size Standard<sup>1</sup></b>	<b>Meets SBA's Definition of a Small Entity?</b>
Solano County Mosquito Abatement District	Governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000	No <sup>2</sup>
Napa County Mosquito Abatement District		No <sup>2</sup>
Contra Costa Mosquito Abatement District		No <sup>2</sup>
California Department of Fish and Game (CDFG)		No <sup>2</sup>
California Department of Water Resources		No <sup>2</sup>
California State Parks and Recreation Department (CDPR)		No <sup>2</sup>
East Bay Regional Park District (EBRPD)		No <sup>2</sup>
Napa County Airport <sup>3</sup>		No
Solano Land Trust	Not-for-profit enterprise that is independently owned and operated and not dominant in its field	Yes
Private landowners: Lang Tule Ranch	\$0.75 million	Unknown

Notes

Napa County Airport receives 80.86% of its annual revenue from state and federal agencies (\$9,103,005.00 of a total of \$11,257,337.00). It is therefore considered a government entity not a business.

The Solano Land Trust is considered a small entity for the purposes of this analysis.

It is assumed the Lang Tule Ranch falls under NAICS code 112111 – Beef Cattle Ranching and Farming. Information for the revenue of the Lang Tule Ranch was not available.

Sources

SBA size standards for governments and not-for-profit enterprises taken from SBA, Office of Advocacy, *A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act*, May 2003, p. 12. Size standard for NAICS codes 488390 and 112111 taken from NAICS Association, "Small Business Size Standards - Matched to NAICS," at [http://www.naics.com/sba\\_sizestandards.htm](http://www.naics.com/sba_sizestandards.htm), on August 24, 2006.

1. County population data obtained from U.S. Census Bureau: State and County QuickFacts, at <http://quickfacts.census.gov/qfd/states/06/06055.html>, on August 11, 2006.

2. Napa County Airport revenue information obtained from the Napa Airport Budget - Recommended Phase 2007, Fund: 4500 Department: 16000 Capital Improvement Budget and Department: 31000 Airport Enterprise Budget, received August 21, 2006.

## D. IMPACTS ON THE REVENUES OF POTENTIALLY AFFECTED SMALL ENTITIES

### 1. Solano Land Trust

The Solano Land Trust is "a private, non-profit organization whose mission is the preservation of agricultural lands, open space, and resources through the acquisition of land and conservation easements, education, and land management."<sup>80</sup> It owns property valued at over \$15.3 million, and manages additional lands, held under easements, valued at over \$7.4 million. For the purposes of this analysis, we assume that Solano Land Trust is a small entity.

To prevent livestock from trampling and grazing in Suisun Thistle and Soft Bird's Beak habitat, the Solano Land Trust has already installed fences around the tidal marsh at Rush Ranch. These fences will have to be replaced in 10 years, because much of the fencing is located in water. Replacement costs are estimated to be approximately \$34,804 to \$47,207 in present value terms assuming discount rates of seven and three percent, respectively. Annualized costs over the time period are approximately \$3,000.

In addition, the Solano Land Trust experiences lost revenues it would have collected from grazing fees, totaling \$361,000 in undiscounted dollars, or \$191,222 to \$268,538 in present value terms assuming discount rates of seven and three percent, respectively. Annualized costs over the time period are \$18,050.

Finally, the Solano Land Trust controls the feral pig population using one individual volunteer hunter. If this method is unsuccessful in the future, the organization may hire a professional animal control expert, for a total cost of \$200,000 in undiscounted dollars, or \$105,940 to \$148,775 in present value terms assuming discount rates of seven and three percent, respectively. Annualized costs over the time period are \$10,000.

In total, the annualized impact to Solano Land trust, including mitigation costs and lost revenues from cattle grazing, are approximately \$31,050. This represents 0.32 percent of the organization's annual revenue of \$9,843,583.

### 2. Private Landowner: Lang Tule Ranch

The Lang Tule Ranch is a small, privately owned ranch that grazes a small number of cattle on its land. The Ranch is located in the eastern portion of the Hill Slough Marsh (unit 1 for Suisun Thistle and unit 2 for Soft Bird's Beak). Grazing impacts from livestock is identified as a threat to the Suisun Thistle and Soft Bird's Beak in the Hill Slough Marsh, and the possibility of the Service requiring grazing activities to cease on the Lang Tule Ranch cannot be ruled out. This potential loss in revenue is too small to trigger a regulatory flexibility analysis.

## E. CONCLUSION OF SMALL BUSINESS ANALYSIS

Only two small businesses were identified as potentially affected by the designation of critical habitat for Suisun Thistle and Soft Bird's Beak. One business has unknown revenue with effects of the habitat designation likely being negligible. The other business would potentially face annualized costs worth only 0.32% of annual revenue. These minimal losses will not affect small businesses in a significant way.

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<sup>80</sup> Solano Land Trust, Home Page, as viewed at <http://www.solanolandtrust.org/> on August 14, 2006.