



ECONOMIC ANALYSIS OF  
CRITICAL HABITAT FOR THE  
DEVILS RIVER MINNOW

Final Economic Analysis | June 17, 2008

A decorative horizontal bar spanning the width of the page. The left portion is a solid dark blue, and the right portion is a photograph of a rocky streambed with green moss and yellow flowers.

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## EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential economic impacts associated with the proposed critical habitat designation for the federally listed Devils River minnow (*Dionda diaboli*) (hereafter, “DRM”). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service’s (Service) Division of Economics.
2. The Service has proposed 45.7 river miles across three spring-fed streams and their tributaries in Val Verde County and Kinney County, Texas (see Exhibit ES-1). Specifically, critical habitat units are proposed in the Devils River, San Felipe Creek, and Pinto Creek (see Exhibits ES-2 through ES-4). At the Service’s request, this analysis also included two areas for possible inclusion in the critical habitat designation. Specifically, a 2.5-mile section of Sycamore Creek and an 11.7-mile section of Las Moras Creek are included in the economic impact analysis (see Exhibits ES-5 and ES-6). These areas were not proposed for critical habitat in the published rule; however, they were identified for consideration in the critical habitat designation. The three proposed critical habitat units are considered occupied by the DRM, whereas the Sycamore Creek and Las Moras Creek units are currently unoccupied by the species.
3. Because proposed critical habitat designation is limited to the normal wetted channel of the streams (i.e., the width of the stream channel at bankfull stage), all proposed critical habitat units are state owned.<sup>1</sup> The land adjacent to the proposed critical habitat units is privately owned, except for two stretches: 2.17 miles along the proposed Devils River unit owned by the State as part of the Devils River State Natural Area; and 2.1 miles along the proposed San Felipe Creek unit owned by the City of Del Rio. The majority of the privately owned lands adjacent to the proposed critical habitat units are maintained as rangeland or recreational areas (e.g., parks and golf courses); however, The Nature Conservancy (TNC) owns a significant amount of land and conservation easements along the proposed Devils River unit.
4. The Proposed Rule lists four threats to the DRM in proposed critical habitat areas: damage to water quality caused by pollution, groundwater and surface water extraction, nonnative species, and stream channel alteration. This report describes and quantifies the potential economic impacts associated with proposed critical habitat designation for the DRM in relation to the threats identified by the Service. That is, analyzed impacts are

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<sup>1</sup> U.S. Fish and Wildlife Service, “Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Devils River Minnow; Proposed Rule,” July 31, 2007.

due to conservation measures for the DRM that address one or more of the threats to the species identified by the Service.

5. Key findings of this analysis are presented below. Detailed pre-designation baseline, post-designation baseline, and post-designation incremental impacts are presented for each proposed critical habitat unit in Exhibits ES-7 through ES-9. Total pre-designation baseline impacts (1999-2007) are estimated to be \$388,000, assuming a three percent discount rate, and \$402,000, assuming a seven percent discount rate. Post-designation baseline impacts (2008-2027) are estimated to be \$406,000, assuming a three percent discount rate, and \$300,000, assuming a seven percent discount rate. The post-designation incremental impacts (2008-2027) are estimated to be \$47,600, assuming a three percent discount rate, and \$33,600, assuming a seven percent discount rate.
6. The majority of post-designation impacts stem from baseline activities that began following the listing of the species, prior to the designation of critical habitat, that are forecast to continue following the designation of critical habitat. All estimated post-designation incremental impacts are related to administrative efforts to consider adverse modification under section 7 of the Endangered Species Act (Act).
7. Exhibits ES-10 and ES-11 rank the proposed critical habitat units by the magnitude of post-designation baseline impacts and post-designation incremental impacts. Exhibits ES-12 and ES-13 present the distribution of total post-designation baseline and total post-designation incremental impacts by activity, while Exhibits ES-14 and ES-15 present the distribution of impacts geographically by activity for each proposed critical habitat unit.
8. The San Felipe Creek unit has the highest post-designation baseline and post-designation incremental impacts, representing at least 75 percent of the total post-designation baseline impacts and at least 61 percent of the total post-designation incremental impacts.
9. This analysis classifies post-designation baseline and post-designation incremental impacts by activity. The activities described and quantified in this analysis include administrative activities related to consultations for the DRM and its habitat under section 7 of the Act. Administrative costs represent more of the post-designation baseline impacts than any other activity type for all units except the San Felipe Creek unit. Specifically, administrative costs represent 48 percent and 58 percent of the post-designation baseline impacts in the Devils River and Pinto Creek units respectively. Administrative costs represent approximately 27 percent of the post-designation baseline impacts in the San Felipe Creek unit, while costs related to water quality activities represent 52 percent of the impacts. The relatively high costs of water quality activities in the San Felipe Creek unit are due to forecast project modifications related to the preservation of water quality for the DRM in the San Felipe Creek unit.

### KEY FINDINGS<sup>1</sup>

**Baseline Impacts:** Baseline impacts associated with conservation efforts for the DRM in the study area for the analysis (five units) are estimated to be \$300,000, or \$28,300 annually, assuming a seven percent discount rate (\$406,000, or \$27,300 annually, assuming a three percent discount rate).

**Incremental Impacts:** Incremental impacts are related solely to the cost of conducting section 7 consultations, as no additional conservation measures are expected in the next 20 years due to the designation of critical habitat. Incremental impacts are estimated to be \$33,600, or \$3,200 annually, assuming a seven percent discount rate (\$47,600, or \$3,200 annually, assuming a three percent discount rate).

**Quantified Baseline Impacts:** The baseline impacts associated with each activity type are presented below. Administrative costs represent at least 44 percent of the total post-designation baseline impacts in the Devils River and Pinto Creek units, regardless of discount rate. Costs associated with water quality measures for the DRM represent the majority of baseline impacts in the San Felipe Creek unit. The costs of nonnative species activities and other activities combined represent between 40 percent and 60 percent of the baseline impacts in the Devils River and Pinto Creek units, but only 20 percent in the San Felipe Creek unit due to the high water quality costs. There are no impacts associated with limiting groundwater extraction to maintain stream flow for the DRM in any of the proposed units.

- **Water Quality:** The costs of conservation activities related to maintaining water quality for the DRM are estimated to be \$119,000 (discounted at seven percent) over the next 20 years. The majority of costs are related to erosion control measures, sampling and monitoring efforts, and water quality control measures that will occur as part of consultations for the DRM in the San Felipe Creek unit. Specifically, these costs are attributable to water quality measures in San Felipe Creek, including efforts to remove African rivercane from the creek banks and restore natural vegetation buffers.
- **Nonnative Species:** The costs of limiting the effects of nonnative species on the DRM over the next 20 years are estimated to be \$45,700 (discounted at seven percent). These costs are associated with sampling, monitoring, and research efforts for nonnative species in the Devils River, San Felipe Creek, and Pinto Creek units. The San Felipe Creek unit has the highest costs of all proposed units due to an additional \$30,000 forecast to be spent by the Texas Parks and Wildlife Department (TPWD) in 2008 to monitor armored catfish populations in the creek.
- **Groundwater Extraction:** Although planning efforts are underway to transport groundwater from Val Verde and Kinney counties to the greater San Antonio area, establishing a link between groundwater extraction and impacts on DRM habitat is not straightforward. In addition, uncertainty exists as to whether a Federal nexus for groundwater extraction projects exists in critical habitat areas, and potential modifications to projects that could be requested by the Service as part of a consultation are unknown at this time. Thus, this analysis is unable to quantify potential economic impacts to groundwater pumping activities that could be incurred of behalf of the DRM. The analysis does recognize that potential negative impacts on both the water suppliers and the end water users of transferred water could occur, should restrictions on water use be undertaken on as a result of DRM conservation efforts. In terms of potential incremental impacts of DRM critical habitat on these projects, impacts over and above those that would already occur following the listing of the species appear improbable.
- **Other Activities:** The costs of other conservation activities for the DRM are estimated to be \$35,300 (discounted at seven percent) over the next 20 years. These costs are due to forecast sampling and monitoring efforts by TPWD for DRM populations and habitat quality in the Devils River, San Felipe Creek, and Pinto Creek units.
- **Administrative Costs:** The total post-designation baseline costs associated with section 7 consultations are estimated to be \$101,000 (discounted at seven percent) over the next 20 years.

**KEY FINDINGS<sup>1</sup>**

**Quantified Incremental Impacts:** Activities included in the pre-designation baseline are expected to continue to occur as part of the post-designation baseline over the next 20 years. Thus, expected incremental impacts of critical habitat designation are limited to administrative efforts related to addressing adverse modification in post-designation section 7 consultations. Total post-designation incremental impacts are estimated to \$42,600, or \$2,860 annually, assuming a three percent discount rate (\$30,300, or \$2,860 annually, assuming a seven percent discount rate).

**Critical Habitat Unit with Highest Impacts:** The San Felipe Creek unit has the highest baseline and incremental impacts. Additionally, the San Felipe Creek unit has the highest impacts for each activity type. Specifically, the post-designation baseline impacts to the San Felipe Creek unit are estimated to be \$229,000 (discounted at seven percent) and represent at least 76 percent of the total baseline impacts, regardless of discount rate; the post-designation incremental impacts to the San Felipe Creek unit are estimated to be \$20,500 (discounted at seven percent) and represent 64 percent of the total incremental impacts, regardless of discount rate.

Note:

1. All impacts discussed in the Key Findings section are post-designation impacts. Estimates include potential impacts to Sycamore and Las Moras Creeks as well as the three units proposed for critical habitat designation.

EXHIBIT ES-1 PROPOSED CRITICAL HABITAT FOR THE DEVILS RIVER MINNOW

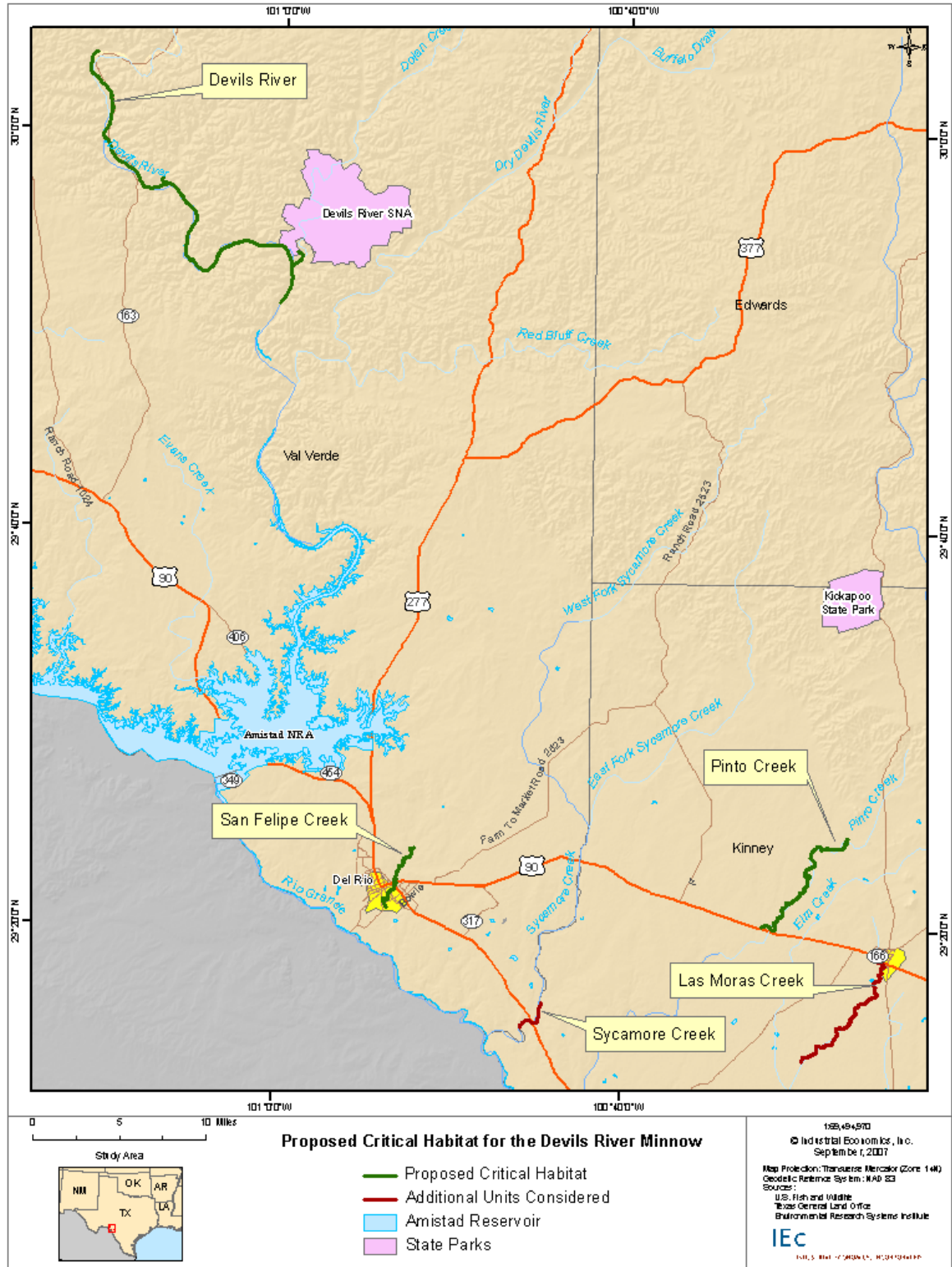




EXHIBIT ES-2 PROPOSED DEVILS RIVER CRITICAL HABITAT UNIT

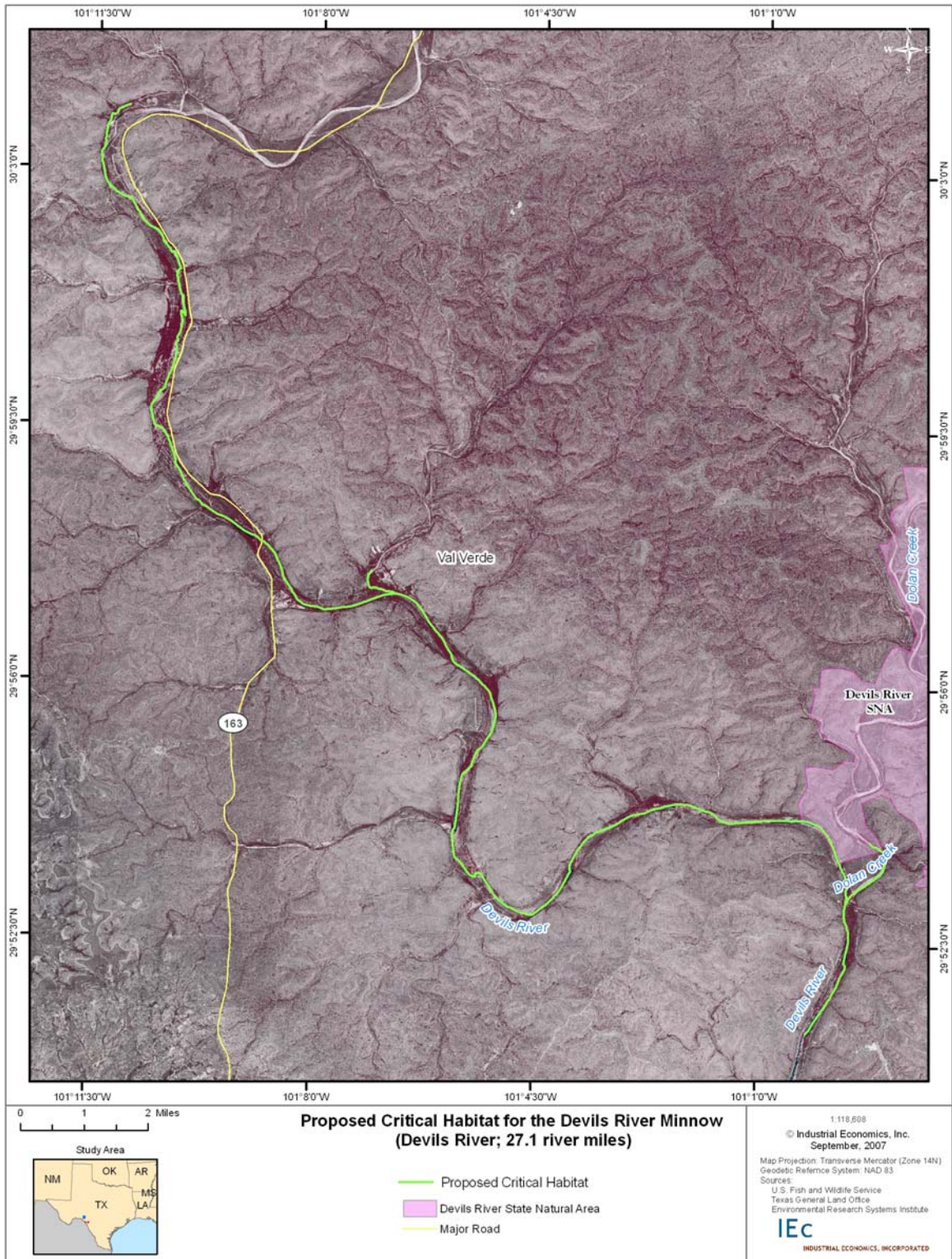


EXHIBIT ES-3 PROPOSED SAN FELIPE CREEK CRITICAL HABITAT UNIT



EXHIBIT ES-4 PROPOSED PINTO CREEK CRITICAL HABITAT UNIT

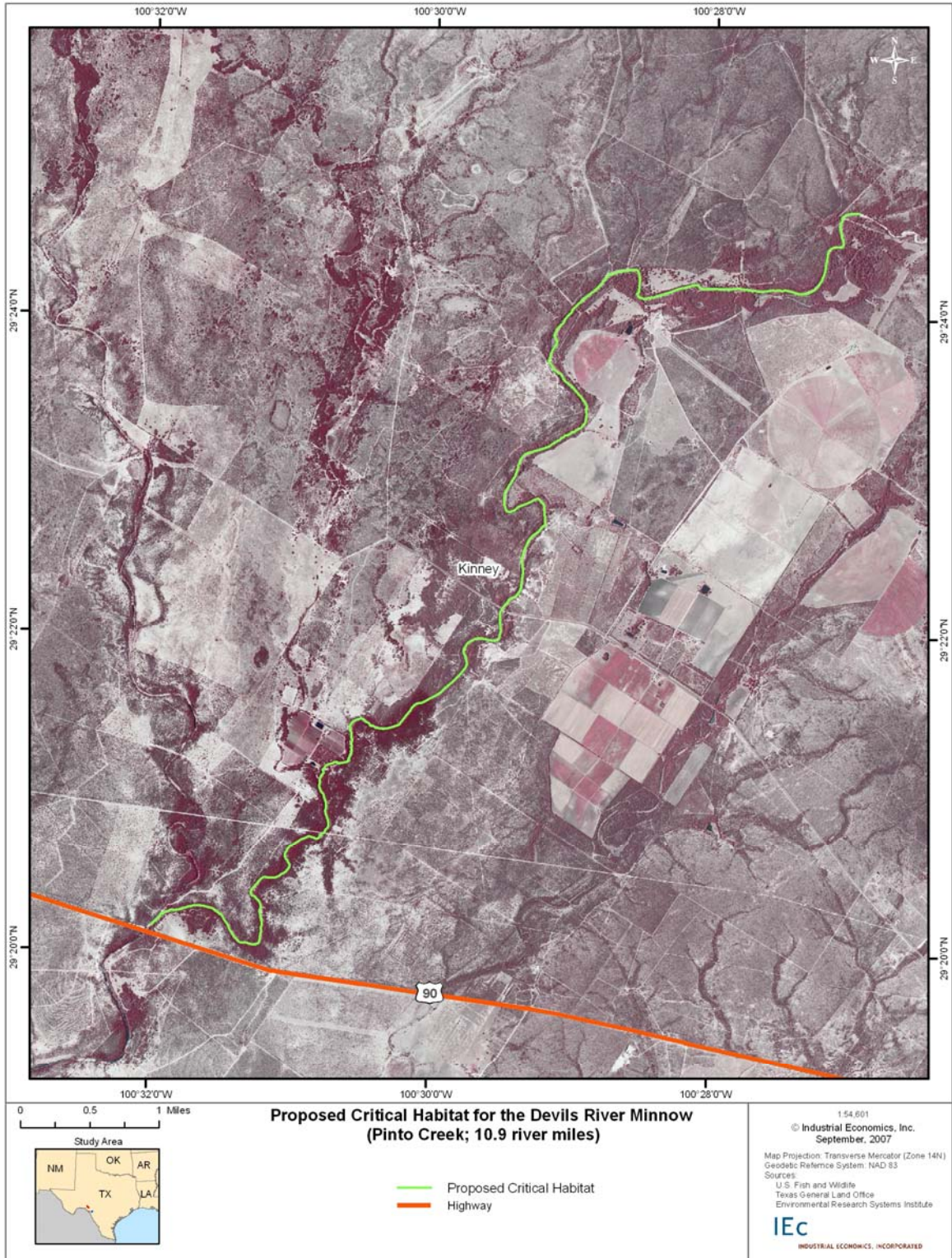
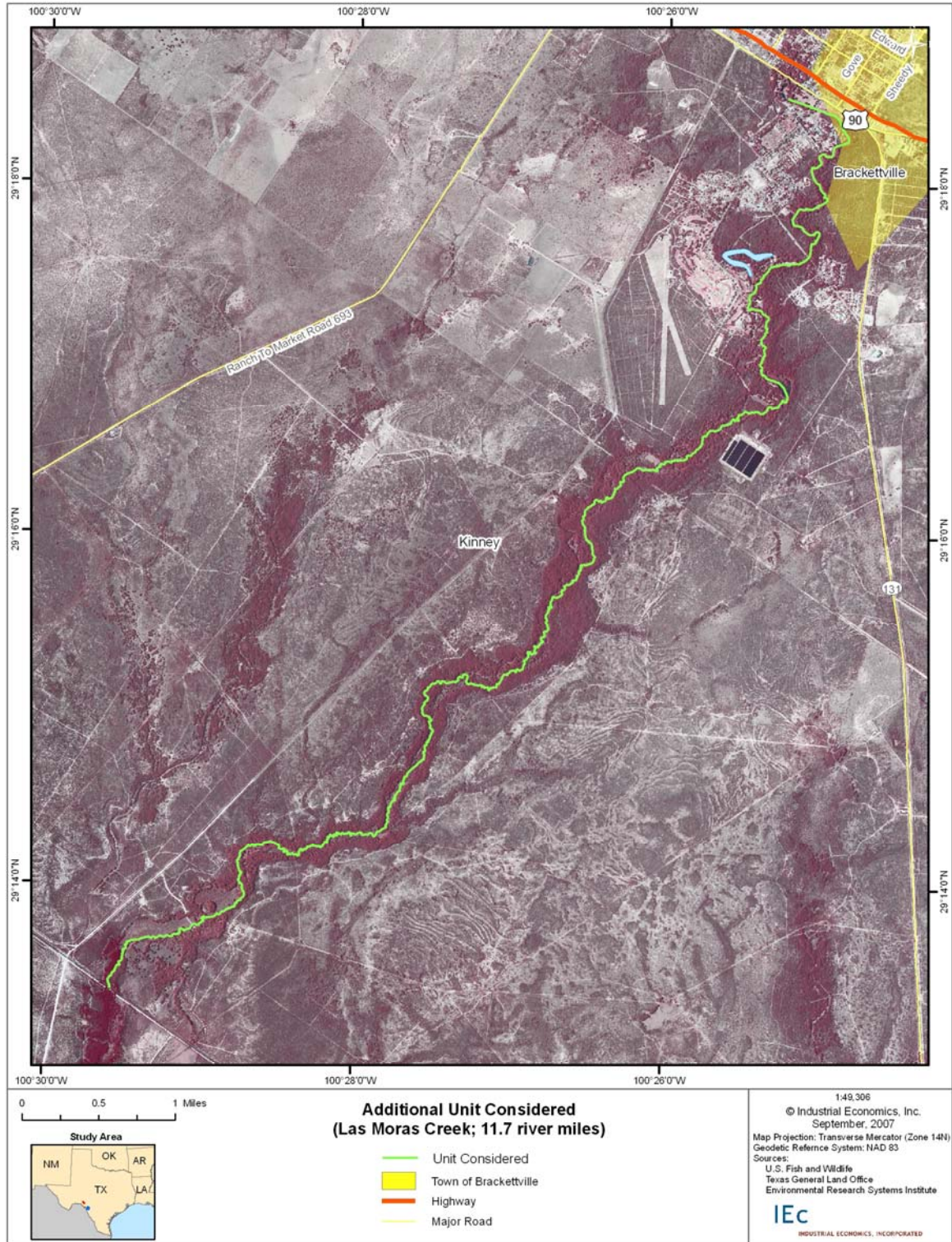


EXHIBIT ES-5 SYCAMORE CREEK UNIT



EXHIBIT ES-6 LAS MORAS CREEK UNIT



## EXHIBIT ES-7 PRE-DESIGNATION BASELINE IMPACTS BY UNIT

UNIT	DISCOUNTED COSTS (3 %)	DISCOUNTED COSTS (7 %)
Devils River	\$59,500	\$66,400
San Felipe Creek	\$286,000	\$288,000
Pinto Creek	\$39,400	\$44,300
Las Moras Creek	\$1,630	\$1,830
Sycamore Creek	\$1,630	\$1,830
<b>Total</b>	<b>\$388,000</b>	<b>\$402,000</b>

## EXHIBIT ES-8 POST-DESIGNATION BASELINE IMPACTS BY UNIT

UNIT	DISCOUNTED COSTS (3 %)	DISCOUNTED COSTS (7 %)	ANNUALIZED COSTS (3 %)	ANNUALIZED COSTS (7 %)
Devils River	\$57,100	\$40,800	\$3,840	\$3,850
San Felipe Creek	\$306,000	\$229,000	\$20,600	\$21,700
Pinto Creek	\$34,400	\$23,700	\$2,310	\$2,230
Las Moras Creek	\$4,370	\$3,220	\$293	\$304
Sycamore Creek	\$4,370	\$3,220	\$293	\$304
<b>Total</b>	<b>\$406,000</b>	<b>\$300,000</b>	<b>\$27,300</b>	<b>\$28,300</b>

## EXHIBIT ES-9 POST-DESIGNATION INCREMENTAL IMPACTS BY UNIT

UNIT	DISCOUNTED COSTS (3 %)	DISCOUNTED COSTS (7 %)	ANNUALIZED COSTS (3 %)	ANNUALIZED COSTS (7 %)
Devils River	\$9,120	\$6,540	\$613	\$617
San Felipe Creek	\$29,100	\$20,500	\$1,950	\$1,940
Pinto Creek	\$6,500	\$4,370	\$437	\$412
Las Moras Creek	\$1,460	\$1,070	\$98	\$101
Sycamore Creek	\$1,460	\$1,070	\$98	\$101
<b>Total</b>	<b>\$47,600</b>	<b>\$33,600</b>	<b>\$3,200</b>	<b>\$3,170</b>

**EXHIBIT ES-10 RANK OF PROPOSED CRITICAL HABITAT UNITS ACCORDING TO THE MAGNITUDE OF POST-DESIGNATION BASELINE IMPACTS**

RANK	UNIT	IMPACTS DISCOUNTED AT 3 %	PERCENT OF TOTAL IMPACTS DISCOUNTED AT 3%	IMPACTS DISCOUNTED AT 7 %	PERCENT OF TOTAL IMPACTS DISCOUNTED AT 7%
1	San Felipe	\$306,000	75%	\$229,000	76%
2	Devils River	\$57,100	14%	\$40,800	14%
3	Pinto Creek	\$34,400	8%	\$23,700	8%
4	Las Moras Creek	\$4,370	1%	\$3,220	1%
5	Sycamore Creek	\$4,370	1%	\$3,220	1%
<b>Total</b>		<b>\$406,000</b>	<b>100%</b>	<b>\$300,000</b>	<b>100%</b>

**EXHIBIT ES-11 RANK OF PROPOSED CRITICAL HABITAT UNITS ACCORDING TO THE MAGNITUDE OF POST-DESIGNATION INCREMENTAL IMPACTS**

RANK	UNIT	IMPACTS DISCOUNTED AT 3 %	PERCENT OF TOTAL IMPACTS DISCOUNTED AT 3%	IMPACTS DISCOUNTED AT 7 %	PERCENT OF TOTAL IMPACTS DISCOUNTED AT 7%
1	San Felipe	\$29,100	61%	\$20,500	61%
2	Devils River	\$9,120	19%	\$6,540	19%
3	Pinto Creek	\$6,500	14%	\$4,370	13%
4	Las Moras Creek	\$1,460	3%	\$1,070	3%
5	Sycamore Creek	\$1,460	3%	\$1,070	3%
<b>Total</b>		<b>\$47,600</b>	<b>100%</b>	<b>\$33,600</b>	<b>100%</b>

EXHIBIT ES-12 DISTRIBUTION OF POST-DESIGNATION BASELINE IMPACTS BY ACTIVITY TYPE<sup>2</sup>

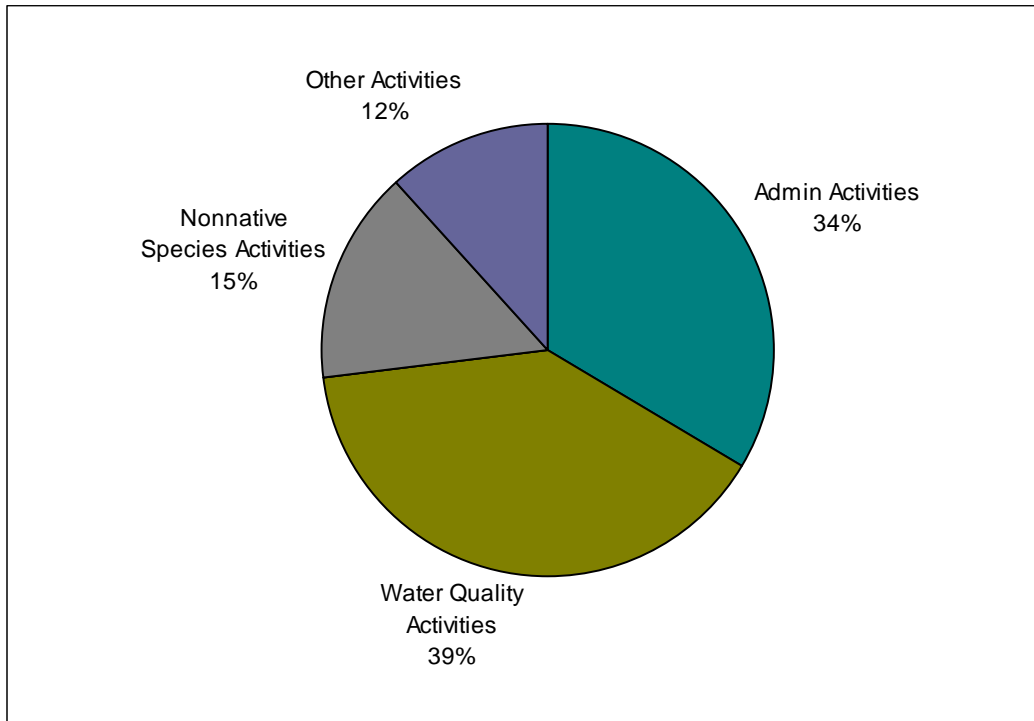
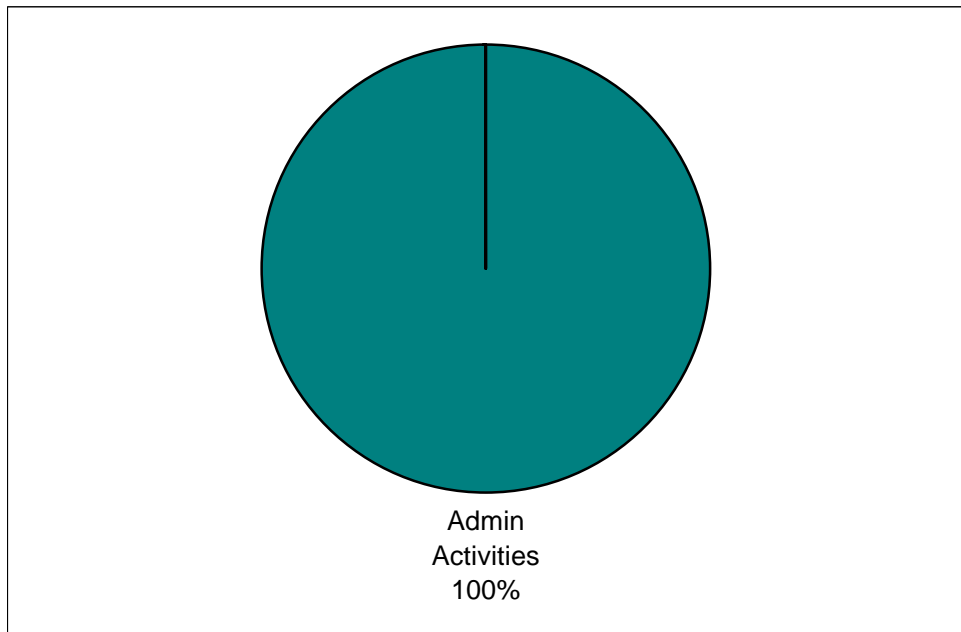


EXHIBIT ES-13 DISTRIBUTION OF POST-DESIGNATION INCREMENTAL IMPACTS BY ACTIVITY TYPE<sup>3</sup>

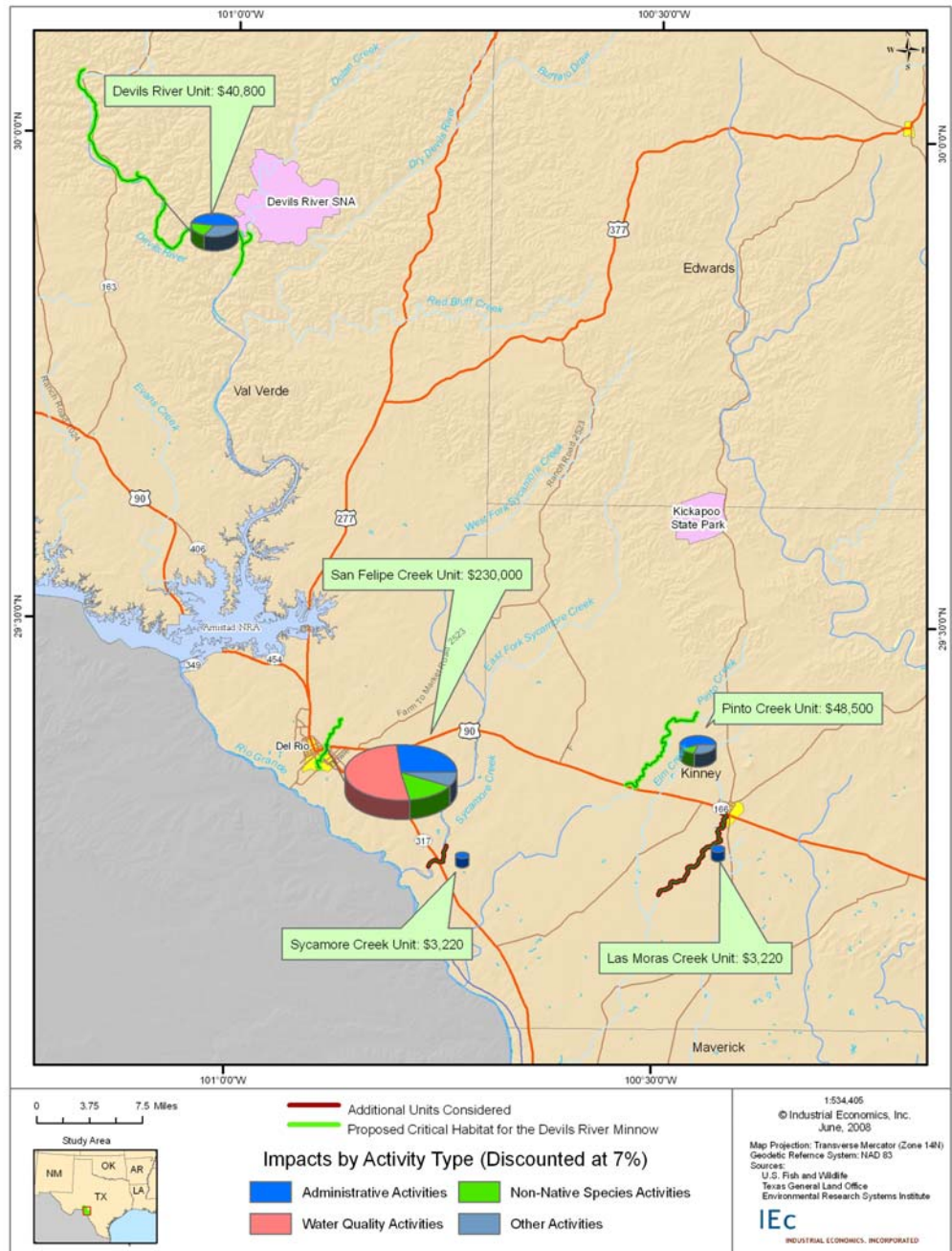


<sup>2</sup> The distribution of impacts by activity type is presented for impacts discounted at seven percent.

<sup>3</sup> Ibid.

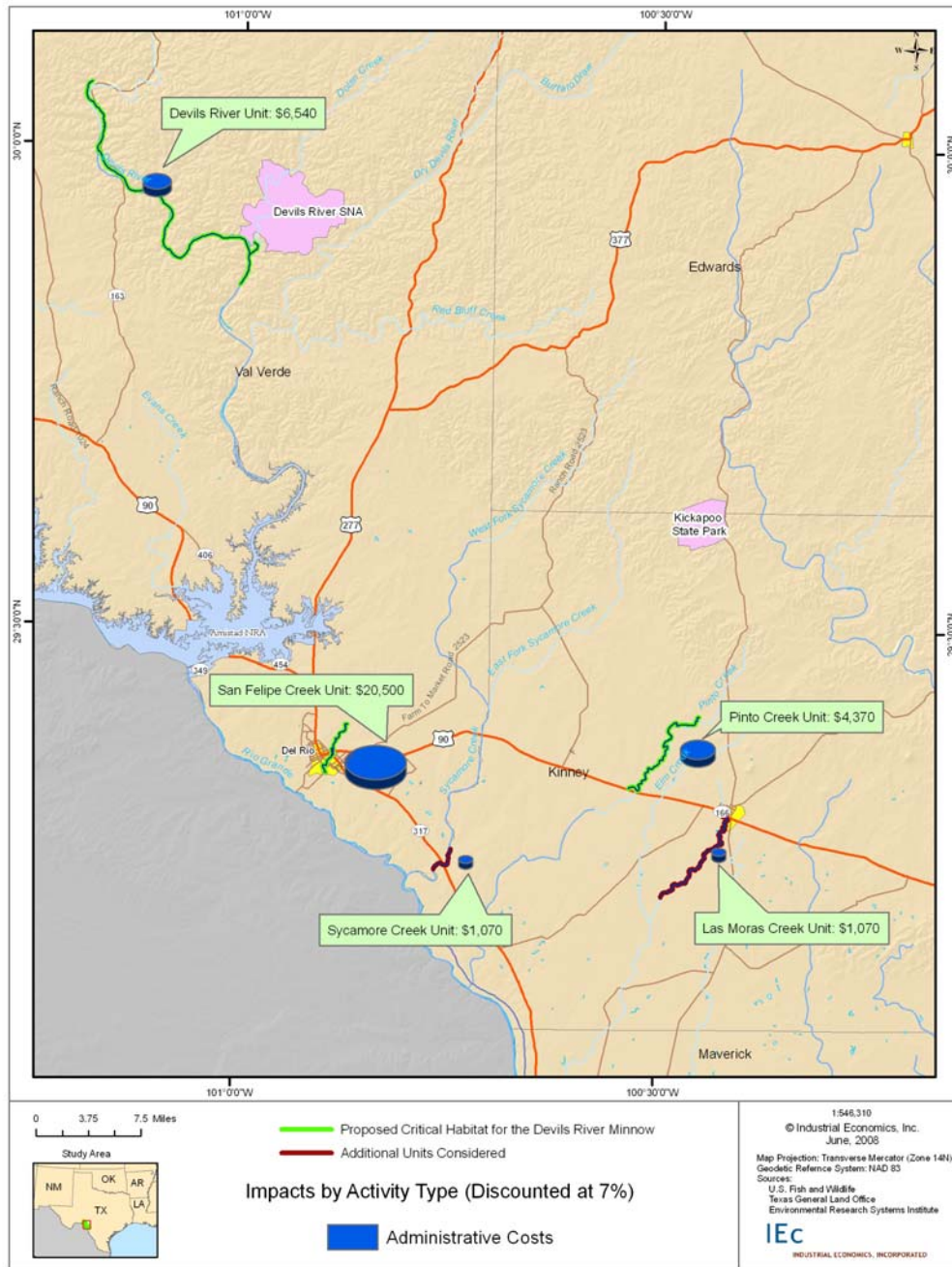


EXHIBIT ES-14 PROPOSED CRITICAL HABITAT UNITS AND THE DISTRIBUTION OF POST-DESIGNATION BASELINE IMPACTS BY ACTIVITY TYPE<sup>4</sup>



<sup>4</sup> The distribution of impacts by activity type is presented for impacts discounted at seven percent.

EXHIBIT ES-15 PROPOSED CRITICAL HABITAT UNITS AND THE DISTRIBUTION OF POST-DESIGNATION INCREMENTAL IMPACTS BY ACTIVITY TYPE<sup>5</sup>



<sup>5</sup> The distribution of impacts by activity type is presented for impacts discounted at seven percent.

## CHAPTER 1 | FRAMEWORK FOR THE ANALYSIS

10. The purpose of this report is to estimate the economic impact of actions taken to protect the federally listed Devils River minnow (*Dionda diaboli*) (hereafter, "DRM") and its habitat. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the areas considered for critical habitat designation. This analysis employs "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections already accorded the DRM; for example, under the Federal listing and other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for the DRM. The analysis looks retrospectively at baseline impacts incurred since the species was listed, and forecasts both baseline and incremental impacts likely to occur after the proposed critical habitat is finalized.
11. This information is intended to assist the Secretary in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.<sup>6</sup> In addition, this information allows the Service to address the requirements of Executive Orders 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).<sup>7</sup>
12. This section describes the framework for the analysis. First, it provides background on the framework applied. It then describes general categories of economic effects that may be associated with species conservation, including a discussion of both efficiency and distributional effects. Next, this section discusses the analytic framework and scope of the analysis, including the link between existing and critical habitat-related protection efforts and economic impacts, and the consideration of benefits. It then presents the information sources relied upon in the analysis and the structure of the report.

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<sup>6</sup> 16 U.S.C. '1533(b)(2).

<sup>7</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.

## 1.1 BACKGROUND

13. The U.S. Office of Management and Budget's (OMB) guidelines for conducting economic analysis of regulations direct Federal agencies to measure the costs of a regulatory action against a baseline, which it defines as the "best assessment of the way the world would look absent the proposed action."<sup>8</sup> In other words, the baseline includes the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat. Impacts that are incremental to that baseline (i.e., occurring over and above existing constraints) are attributable to the proposed regulation. Significant debate has occurred regarding whether assessing the impacts of the Service's proposed regulations using this baseline approach is appropriate in the context of critical habitat designations.
14. In 2001, the U.S. Tenth Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed critical habitat, regardless of whether those impacts are attributable coextensively to other causes.<sup>9</sup> Specifically, the court stated,
- “The statutory language is plain in requiring some kind of consideration of economic impact in the CHD phase. Although 50 C.F.R. 402.02 is not at issue here, the regulation's definition of the jeopardy standard as fully encompassing the adverse modification standard renders any purported economic analysis done utilizing the baseline approach virtually meaningless. We are compelled by the canons of statutory interpretation to give some effect to the congressional directive that economic impacts be considered at the time of critical habitat designation.... Because economic analysis done using the FWS's baseline model is rendered essentially without meaning by 50 C.F.R. § 402.02, we conclude Congress intended that the FWS conduct a full analysis of all of the economic impacts of a critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes. Thus, we hold the baseline approach to economic analysis is not in accord with the language or intent of the ESA.”<sup>10</sup>
15. Since that decision, however, courts in other cases have held that an incremental analysis of impacts stemming solely from the critical habitat rulemaking is proper.<sup>11</sup> For example, In the March 2006 court order ruling that the August 2004 critical habitat rule for the Peirson's milk-vetch was arbitrary and capricious, the United States District Court for the Northern District of California stated,

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<sup>8</sup> OMB, "Circular A-4," September 17, 2003.

<sup>9</sup> *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

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

<sup>11</sup> *Cape Hatteras Access Preservation Alliance v. Department of Interior*, 344 F. Supp. 2d 108 (D.D.C.); *CBD v. BLM*, 422 F. Supp. 2d 1115 (N.D. Cal. 2006).

“The Court is not persuaded by the reasoning of *New Mexico Cattle Growers*, and instead agrees with the reasoning and holding of *Cape Hatteras Access Preservation Alliance v. U.S. Dep’t of the Interior*, 344 F. Supp 2d 108 (D.D.C. 2004). That case also involved a challenge to the Service’s baseline approach and the court held that the baseline approach was both consistent with the language and purpose of the ESA and that it was a reasonable method for assessing the actual costs of a particular critical habitat designation *Id* at 130. ‘To find the true cost of a designation, the world with the designation must be compared to the world without it.’”<sup>12</sup>

16. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis reports both:
- a. the baseline impacts of DRM conservation from protections afforded the species absent critical habitat designation; and
  - b. the estimated incremental impacts precipitated specifically by the designation of critical habitat for the species.

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

17. Incremental effects of critical habitat designation are determined using the Service's December 9, 2004 interim guidance on “Application of the ‘Destruction or Adverse Modification’ Standard Under Section 7(a)(2) of the Endangered Species Act” and information from the Service regarding what potential consultations and project modifications would be imposed as a result of critical habitat designation over and above those associated with the listing.<sup>13</sup> The following section describes the methods employed to identify baseline and incremental impacts of DRM conservation.

## 1.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

18. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the DRM and its habitat (hereinafter referred to collectively as “DRM conservation efforts”). Economic efficiency effects generally reflect “opportunity costs” associated with the commitment of resources required to accomplish species and habitat conservation. For example, if activities that can take place on a parcel of land are limited as a result of the designation or the presence of the species, and thus the market value of the land is reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly,

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<sup>12</sup> Center for Biological Diversity et al, Plaintiffs, v. Bureau of Land Management et. al, Defendants and American Sand Association, et al, Defendant Intervenors. Order re: Cross Motions for Summary Judgment. Case 3:03-cv-02509 Document 174 Filed 03/14/2006. Pages 44-45.

<sup>13</sup> Director, U.S. Fish and Wildlife Service, Memorandum to Regional Directors and Manager of the California-Nevada Operations Office, Subject: Application of the “Destruction or Adverse Modification” Standard under Section 7(a)(2) of the Endangered Species Act, dated December 9, 2004.

the costs incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs of DRM conservation efforts.

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

#### 1.2.1 EFFICIENCY EFFECTS

20. At the guidance of the Office of Management and Budget (OMB) and in compliance with Executive Order 12866 "Regulatory Planning and Review," Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action. In the context of regulations that protect DRM habitat, these efficiency effects represent the opportunity cost of resources used or benefits foregone by society as a result of the regulations. Economists generally characterize opportunity costs in terms of changes in producer and consumer surpluses in affected markets.<sup>14</sup>
21. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a Federal land manager, such as the U.S. Forest Service, may enter into a consultation with the Service to ensure that a particular activity will not adversely modify critical habitat. The effort required for the consultation is an economic opportunity cost because the landowner or manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When compliance activity is not expected to significantly affect markets -- that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.
22. Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, 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

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<sup>14</sup> For additional information on the definition of "surplus" and an explanation of consumer and producer surplus in the context of regulatory analysis, see: Gramlich, Edward M., A Guide to Benefit-Cost Analysis (2nd Ed.), Prospect Heights, Illinois: Waveland Press, Inc., 1990; and U.S. Environmental Protection Agency, Guidelines for Preparing Economic Analyses, EPA 240-R-00-003, September 2000, available at <http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html>.

(i.e., social welfare) can be measured by considering changes in producer and consumer surplus in the market.

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

#### 1.2.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

24. Measurements of changes in economic efficiency focus on the net impact of conservation efforts, without consideration of how certain economic sectors or groups of people are affected. Thus, a discussion of efficiency effects alone may miss important distributional considerations. OMB encourages Federal agencies to consider distributional effects separately from efficiency effects.<sup>15</sup> This analysis considers several types of distributional effects, including impacts on small entities; impacts on energy supply, distribution, and use; and regional economic impacts. It is important to note that these are fundamentally different measures of economic impact than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.

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

25. This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the Regulatory Flexibility Act, might be affected by future species conservation efforts.<sup>16</sup> In addition, in response to Executive Order 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the future impacts of conservation efforts on the energy industry and its customers.<sup>17</sup>

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<sup>15</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>16</sup> 5 U.S.C. ' 601 et seq.

<sup>17</sup> Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

### Calculating Present Value and Annualized Impacts

For each land use activity, this analysis presents economic impacts incurred in different time periods in present value terms. The present value represents the value of a payment or stream of payments in common dollar terms. That is, it is the sum of a series of past or future cash flows expressed in today's dollars. Translation of the economic impacts of past or future impacts to present value terms requires the following: a) past or projected future impacts of species conservation efforts; and b) the specific years in which these impacts have been or are expected to be incurred. With these data, the present value of the past or future stream of impacts ( $PV_c$ ) of DRM conservation efforts from year  $t$  to  $T$  is measured in 2007 dollars according to the following standard formula:<sup>a</sup>

$$PV_c = \sum_{t=t_0}^{t=T} \frac{C_t}{(1+r)^{t-2007}}$$

$C_t$  = cost of species conservation efforts in year  $t$

$r$  = discount rate<sup>b</sup>

Impacts of conservation efforts for each land use activity in each unit are also expressed as annualized values (i.e., the series of equal annual costs over some defined time period that have the same present value as estimated total impacts). Annualized values are calculated to provide comparison of impacts across activities with varying forecast periods ( $T$ ). This analysis employs a forecast period of 20 years, 2008 through 2027. Annualized impacts of future DRM conservation efforts ( $APV_c$ ) are calculated using the following standard formula:

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

$N$  = number of years in the forecast period

<sup>a</sup> To derive the present value of pre-designation conservation efforts for this analysis,  $t$  is 1999 and  $T$  is 2007; to derive the present value of post-designation conservation efforts,  $t$  is 2008 and  $T$  is 2027.

<sup>b</sup> To discount and annualize costs, guidance provided by the OMB specifies the use of a real rate of seven percent. In addition, OMB recommends sensitivity analysis using other discount rates such as three percent, which some economists believe better reflects the social rate of time preference. (U.S. Office of Management and Budget, Circular A-4, September 17, 2003 and U.S. Office of Management and



#### Regional Economic Effects

26. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation efforts. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by recreators) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreators). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.
27. The use of regional input/output models in an analysis of the impacts of species and habitat conservation efforts can overstate the long-term impacts of a regulatory change. Most importantly, these models provide a static view of the economy of a region. That is, they measure the initial impact of a regulatory change on an economy but do not consider long-term adjustments that the economy will make in response to this change. For example, these models provide estimates of the number of jobs lost as a result of a regulatory change, but do not consider re-employment of these individuals over time or other adaptive responses by impacted businesses. In addition, the flow of goods and services across the regional boundaries defined in the model may change as a result of the regulation, compensating for a potential decrease in economic activity within the region.
28. Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency losses. Thus, these types of distributional effects are reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects, but should be considered as distinct measures of impact.

#### 1.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

29. This analysis identifies those economic activities most likely to threaten the listed species and its habitat and, where possible, quantifies the economic impact to avoid, minimize, or mitigate such threats within the boundaries of the study area. This section provides a description of the methodology used to separately identify baseline impacts and incremental impacts stemming from the proposed designation of critical habitat for the DRM. This evaluation of impacts in a "with critical habitat designation" versus a "without critical habitat designation" framework effectively measures the net change in economic activity associated with the proposed rulemaking.

### 1.3.1 IDENTIFYING BASELINE IMPACTS

30. The baseline for this analysis is the existing state of regulation, prior to the designation of critical habitat, that provides protection to the species under the Act, as well as under other Federal, State and local laws and guidelines. The "without critical habitat designation" scenario, which represents the baseline for this analysis, considers a wide range of additional factors beyond the compliance costs of regulations that provide protection to the listed species. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by the Service and other government entities, and trends in other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.
31. Baseline impacts include sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections to the extent that they are expected to occur absent the designation of critical habitat for the species.
- Section 7 of the Act, absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species. The portion of the administrative costs of consultations under the jeopardy standard, along with the impacts of project modifications resulting from consideration of this standard, are considered baseline impacts.<sup>18</sup> Baseline administrative costs of section 7 consultation are summarized in Exhibit 1-2.
  - Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the "take" of endangered wildlife, where "take" means to "harass, harm, pursue, or collect, or to attempt to engage in any such conduct."<sup>19</sup> The economic impacts associated with this section manifest themselves in sections 7 and 10.
  - Under section 10(a)(1)(B) of the Act, an entity (e.g., a landowner or local government) may develop a Habitat Conservation Plan (HCP) for 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>20</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 development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be

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<sup>18</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 effect 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>19</sup> 16 U.S.C. 1532.

<sup>20</sup> U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

precipitated because of the designation of critical habitat, or the designation influences stipulated conservation efforts under HCPs.

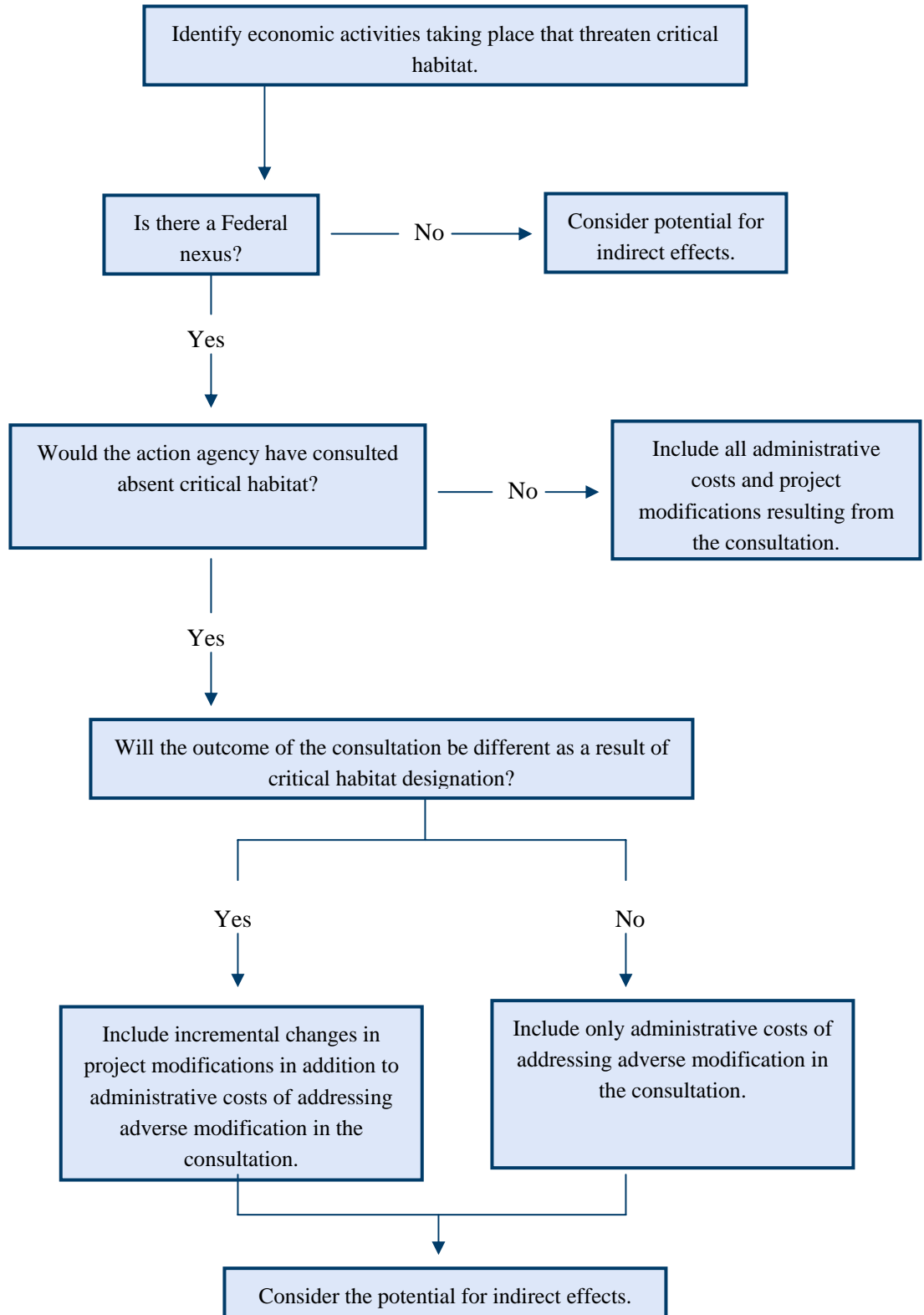
Enforcement actions taken in response to violations of the Act are not included in this analysis.

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

#### 1.3.2 IDENTIFYING INCREMENTAL IMPACTS

33. This analysis separately quantifies the incremental impacts of this rulemaking. The focus of the incremental analysis is to determine the impacts on land uses and activities from the designation of critical habitat that are above and beyond those impacts due to existing required or voluntary conservation efforts being undertaken due to other Federal, State, and local regulations or guidelines.
34. When critical habitat is designated, section 7 requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat (in addition to considering whether the actions are likely to jeopardize the continued existence of the species). The added administrative costs of including consideration of critical habitat in section 7 consultations, and the additional impacts of implementing project modifications resulting from the protection of critical habitat are the direct compliance costs of designating critical habitat. These costs are not in the baseline, and are considered incremental impacts of the rulemaking.
35. Exhibit 1-1 depicts the decision analysis regarding whether an impact should be considered incremental. The following sections describe this decision tree in detail.
36. Incremental impacts may be the direct compliance costs associated with additional effort for forecast consultations, reinitiated consultations, new consultations occurring specifically because of the designation, and additional project modifications that would not have been required under the jeopardy standard. Additionally, incremental impacts may include indirect impacts resulting from reaction to the potential designation of critical habitat (e.g., developing habitat conservation plans (HCPs) specifically to avoid designation of critical habitat), triggering of additional requirements under State or local laws intended to protect sensitive habitat, and uncertainty and perceptual effects on markets.

EXHIBIT 1-1 IDENTIFYING INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION



#### Direct Impacts

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

#### Administrative Section 7 Consultation Costs

38. Parties involved in section 7 consultations include the Service, a Federal "action agency," and in some cases, a private entity involved in the project or land use activity. The action agency (i.e., the Federal nexus necessitating the consultation) serves as the liaison with the Service. While consultations are required for activities that involve a Federal nexus and may jeopardize the continued existence of the species regardless of whether critical habitat is designated, the designation may increase the effort for consultations in the case that the project or activity in question may adversely modify critical habitat. Administrative efforts for consultation may therefore result in both baseline and incremental impacts.
39. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:
1. **Additional effort to address adverse modification in a new consultation** - New consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond the listing issues. In this case, only the additional administrative effort required to consider critical habitat is considered an incremental impact of the designation.
  2. **Re-initiation of consultation to address adverse modification** - Consultations that have already been completed on a project or activity may require re-initiation to address critical habitat. In this case, the costs of re-initiating the consultation, including all associated administrative and project modification costs are considered incremental impacts of the designation.
  3. **Incremental consultation resulting entirely from critical habitat designation** - Critical habitat designation may trigger additional consultations that may not occur absent the designation (e.g., for an activity for which adverse modification may be an issue, while jeopardy is not, or consultations resulting from the new information about the potential presence of the species provided by the designation). Such consultations may, for example, be triggered in critical habitat areas that are not occupied by the species. All associated administrative and project modification costs of incremental consultations are considered incremental impacts of the designation.

40. The administrative costs of these consultations vary depending on the specifics of the project. One way to address this variability is to show a range of possible costs of consultation as it may not be possible to predict the outcome of each future consultation in terms of level of effort. Review of consultation records and discussions with Service field offices resulted in the estimated range of administrative costs of consultation employed in this analysis.
41. Exhibit 1-2 provides estimated consultation costs representing effort required for all types of consultation, including those that considered both adverse modification and jeopardy. To estimate the fractions of the total administrative consultation costs that are baseline and incremental, the following assumptions were applied.
- For the costs of a consultation that only considers jeopardy or only adverse modification (i.e., an incremental consultation only occurring because of the designation of critical habitat) are attributed wholly to the baseline or to critical habitat, respectively.
  - Incremental costs of the re-initiation of a consultation because of the critical habitat designation are assumed to be approximately half the cost of the original consultation that considered only jeopardy. This assumes that re-initiations are less time-consuming as the groundwork for the project has already been considered in terms of its effect on the species.
  - Efficiencies exist with considering both jeopardy and adverse modification at the same time (e.g., in staff time saved for project review and report writing), and therefore incremental administrative costs of considering adverse modification in consultations that will already be required to consider jeopardy result in the least incremental effort of these three consultation categories, roughly half that of a re-initiation.

Importantly, the estimated costs represent the midpoint of a potential range of impacts to account for variability regarding levels of effort of specific consultations.<sup>21</sup>

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<sup>21</sup> Absent specific information on the probability that a consultation will be closer to the low or high end of the range, presenting the midpoint effectively assumes there is an even distribution of the consultation falling at any given point on the spectrum between the low-end cost and high-end cost.

EXHIBIT 1-2 RANGE OF ADMINISTRATIVE CONSULTATIONS COSTS, 2007\$

BASELINE ADMINISTRATIVE COSTS OF CONSULTATION (\$2007)					
CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT	TOTAL COSTS
CONSULTATION CONSIDERING ONLY JEOPARDY (NO CONSIDERATION OF CRITICAL HABITAT DESIGNATION)					
Technical Assistance	\$530	n/a	\$1,050	n/a	\$1,500
Informal	\$2,300	\$2,900	\$2,050	\$2,000	\$9,500
Formal	\$5,150	\$5,800	\$3,500	\$4,800	\$19,500
Programmatic	\$15,500	\$13,000	n/a	\$5,600	\$34,100
EFFORT TO ADDRESS JEOPARDY IN A NEW CONSULTATION THAT CONSIDERS BOTH JEOPARDY AND ADVERSE MODIFICATION					
Technical Assistance	\$398	n/a	\$788	n/a	\$1,130
Informal	\$1,730	\$2,180	\$1,540	\$1,500	\$7,130
Formal	\$3,860	\$4,350	\$2,630	\$3,600	\$14,600
Programmatic	\$11,600	\$9,710	n/a	\$4,200	\$25,500
INCREMENTAL ADMINISTRATIVE COSTS OF CONSULTATION (\$2007)					
CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT	TOTAL COSTS
INCREMENTAL CONSULTATION RESULTING ENTIRELY FROM CRITICAL HABITAT DESIGNATION					
Technical Assistance	\$530	n/a	\$1,050	n/a	\$1,500
Informal	\$2,300	\$2,900	\$2,050	\$2,000	\$9,500
Formal	\$5,150	\$5,800	\$3,500	\$4,800	\$19,500
Programmatic	\$15,500	\$13,000	n/a	\$5,600	\$34,100
RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION					
Technical Assistance	\$265	n/a	\$525	n/a	\$750
Informal	\$1,150	\$1,450	\$1,030	\$1,000	\$4,750
Formal	\$2,580	\$2,900	\$1,750	\$2,400	\$9,750
Programmatic	\$7,750	\$6,480	n/a	\$2,800	\$17,000
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION					
Technical Assistance	\$133	n/a	\$263	n/a	\$375
Informal	\$575	\$725	\$513	\$500	\$2,380
Formal	\$1,290	\$1,450	\$875	\$1,200	\$4,880
Programmatic	\$3,880	\$3,240	n/a	\$1,400	\$8,510
Source: IEC analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2007, and a review of consultation records from several Service field offices across the country conducted in 2002.					
Notes:					
1. Totals may not sum due to rounding.					
2. Estimates reflect average hourly time required by staff.					

### Section 7 Project Modification Impacts

42. Section 7 consultation considering critical habitat may also result in additional project modification recommendations specifically addressing potential destruction or adverse modification of critical habitat. For forecast consultations considering jeopardy and adverse modification, and for re-initiations of past consultations to consider critical habitat, the economic impacts of project modifications undertaken to avoid, minimize, or mitigate adverse modification are considered incremental impacts of critical habitat designation. For consultations that are forecast to occur specifically because of the designation (incremental consultations), impacts of all associated project modifications are assumed to be incremental impacts of the designation. This is summarized below.
1. **Additional effort to address adverse modification in a new consultation** - Only project modifications associated solely with avoiding, compensating for, or mitigating adverse modification are considered incremental.
  2. **Re-initiation of consultation to address adverse modification** - Only project modifications associated solely with avoiding, compensating for, or mitigating adverse modification are considered incremental.
  3. **Incremental consultation resulting entirely from critical habitat designation** - Impacts of all project modifications are considered incremental.

### Indirect Impacts

43. The designation of critical habitat may, under certain circumstances, affect actions that do not have a Federal nexus and thus are not subject to the provisions of section 7 under the Act. Indirect impacts are those unintended changes economic behavior that may occur outside of the Act, through other Federal, State, or local actions, that are caused by the designation of critical habitat. This section identifies common types of indirect impacts that may be associated with the designation of critical habitat. Importantly, these types of impacts are not always considered incremental. In the case that these types of conservation efforts and economic effects are expected to occur regardless of critical habitat designation, they are appropriately considered baseline impacts in this analysis.

### Habitat Conservation Plans

44. HCPs intends to counterbalance potential harmful effects that a proposed activity may have on a species, while allowing the otherwise lawful activity to proceed. As such, the purpose of the habitat conservation planning process is to ensure that the effects of incidental take are adequately minimized and mitigated. Thus, HCPs are developed to ensure compliance with section 9 of the Act and to meet the requirements of section 10 of the Act.
45. HCPs are not required or necessarily recommended by a critical habitat designation. Some landowners, however, may voluntarily complete a HCP in response to the prospect of having their land designated as critical habitat. In this case, the effort involved in



creating the HCP and undertaking associated conservation actions are considered an incremental effect of designation.

#### Other State and Local Laws

46. Under certain circumstances, critical habitat designation may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other State or local laws. In cases where these impacts would not have been triggered absent critical habitat designation, they are considered indirect, incremental impacts of the designation.
47. The California Environmental Quality Act (CEQA), for example, requires that lead agencies, public agencies responsible for project approval, consider the environmental effects of proposed projects that are considered discretionary in nature and not categorically or statutorily exempt. In some instances, critical habitat designation may trigger CEQA-related requirements. This is most likely to occur in areas where the critical habitat designation provides clearer information on the importance of particular areas as habitat for a listed species. In addition, applicants who were “categorically exempt” from preparing an Environmental Impact Report under CEQA may no longer be exempt once critical habitat is designated. In cases where the designation triggers the CEQA significance test or results in a reduction of categorically exempt activities, associated impacts are considered to be an indirect, incremental effect of the designation.

#### Additional Indirect Impacts

48. In addition to the indirect effects of compliance with other laws or triggered by the designation, project proponents, land managers and landowners may face additional indirect impacts, including the following:
- **Time Delays** - Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to reinitiate the section 7 consultation process and/or compliance with other laws triggered by the designation. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
  - **Regulatory Uncertainty** - The Service conducts each section 7 consultation on a case-by-case basis and issues a biological opinion on formal consultations based on species-specific and site-specific information. As a result, government agencies and affiliated private parties who consult with the Service under section 7 may face uncertainty concerning whether project modifications will be recommended by the Service and what the nature of these modifications will be. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation.

- **Stigma** - In some cases, the public may perceive that critical habitat designation may result in limitations on private property uses above and beyond those associated with anticipated project modifications and regulatory uncertainty described above. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed. All else equal, a property that is designated as critical habitat may have a lower market value than an identical property that is not within the boundaries of critical habitat due to perceived limitations or restrictions. As the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets may decrease. To the extent that potential stigma effects on markets are probable and identifiable, these impacts are considered indirect, incremental impacts of the designation.

In the case of the DRM critical habitat areas, it appears unlikely that critical habitat designation for the Devils River minnow will result in long term stigma effects for property owners abutting designated stream segments. Unless a landowner receives Federal assistance related to carrying out property management actions, no nexus exists that would to compel a Federal action agency to consider requiring conservation measures for the species. For ongoing private land use activities, such a nexus is expected to be rare. Further, several public commenters stated that proposed critical habitat areas are experiencing a transition from ranching and agriculture to recreation and conservation-based land uses. In these cases, any perceptions that development activities may be limited in those areas could in fact increase the attractiveness of property in those areas. In either case, as the public becomes aware of the true regulatory burden imposed by critical habitat, any impact of the designation on property values would be expected to decrease.

### 1.3.3 BENEFITS

49. 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>
50. In the context of critical habitat, the primary purpose of the rulemaking (i.e., the direct benefit) is the potential to enhance conservation of the species. The published economics literature has documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species. In its guidance for implementing Executive Order 12866, OMB acknowledges that it may not be feasible to monetize, or

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<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>.

even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research.<sup>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.*

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

#### 1.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

53. The geographic scope of the analysis includes areas proposed for final critical habitat as well as additional areas included in the analysis at the Service's request (the Sycamore Creek and Las Moras Creek units). For the purposes of this analysis, these are collectively referred to as the "study area." The analysis quantifies impacts to land use activities within or affecting the study area.

#### 1.3.5 ANALYTIC TIME FRAME

54. The analysis estimates impacts based on activities that are "reasonably foreseeable," including, but not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. The analysis estimates economic impacts to activities from 1999 (year of the species' final listing) to 2027 (20 years from the expected year of final critical habitat designation). Estimated impacts are divided into pre-designation (1999-2007) and post-designation (2008-2027) impacts.<sup>25</sup>

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<sup>24</sup> Ibid.

<sup>25</sup> As described in the Proposed Rule, the Service listed the DRM in 1999 (U.S. Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants; Final Rule to List the Devils River Minnow as Threatened," October 20, 1999). In this

Due to the region's rural character, current land use patterns, and relatively low population growth rate (one percent annually from 2000-2003)<sup>26</sup>, this analysis assumes that land uses within the study area will not substantially change over this time period.

#### 1.4 INFORMATION SOURCES

55. The primary sources of information for this report are communications with, and data provided by, personnel from the Service, Federal, State, and local governments and other stakeholders. In addition, this analysis relies upon the Service's section 7 consultation records, public comments received on this rule, public hearing records, and existing habitat management and conservation plans that consider the DRM. The specific stakeholders contacted during this analysis include:

- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers
- U.S. Department of Defense, Laughlin Air Force Base
- U.S. Department of Agriculture, Natural Resources Conservation Service
- Texas Parks and Wildlife Department
- Texas Department of Transportation
- City of Del Rio
- San Felipe Country Club
- Texas Water Development Board
- Kinney County Groundwater Conservation District
- The Nature Conservancy
- San Felipe Agricultural, Manufacturing, and Irrigation Company
- Grass Valley Water LP
- WaterTexas
- Fort Clark Springs Association, Incorporated

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report, "Pre-designation" refers to the time between listing and final critical habitat designation while "post-designation" refers to the twenty years following final designation of critical habitat.

<sup>26</sup> U.S. Census Bureau. State and County Quick Facts. Accessed at <http://quickfacts.census.gov/qfd/states/48/4819792.html> on June 2, 2008.

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**1.5 STRUCTURE OF REPORT**

56. This remainder of this report is organized as follows:

- Chapter 2: Water Quality
- Chapter 3: Groundwater Extraction
- Chapter 4: Nonnative Species
- Chapter 5: Other Activities
- Appendix A: Administrative Costs
- Appendix B: Small Business Analysis and Energy Impact Analysis
- Appendix C: Impacts at Three Percent Discount Rate
- Appendix D: Undiscounted Impacts by Activity and Unit

## CHAPTER 2 | WATER QUALITY

57. Maintaining high quality, pollutant-free water is important for the survival of the DRM.<sup>27</sup> This section describes water quality requirements for the DRM and summarizes the ongoing and forecast baseline and incremental impacts related to mitigation of current water quality threats to the minnow. Of the five units included in the study area, the primary threats to water quality exist along San Felipe Creek and Las Moras Creek. The remaining units are in rural settings and currently experience little human development. Thus, only minor threats to water quality exist along these units.

### SUMMARY OF IMPACTS (2008-2027)

58. The following economic impacts are anticipated in proposed critical habitat areas related to future conservation efforts aimed at maintaining water quality for the DRM. These impacts do not include administrative costs, which are presented in Appendix A.

#### Post-designation baseline impacts in areas proposed for critical habitat

- Present value applying a seven percent discount rate: \$119,000

#### Post-designation incremental impacts in areas proposed for critical habitat

- Present value applying a seven percent discount rate: \$0

### 2.1 WATER QUALITY REQUIREMENTS

59. The DRM is found only in spring-fed streams with relatively low pollution levels.<sup>28</sup> Although water quality factors limiting the survival of the DRM are not fully understood, it is thought that the DRM requires streams with moderate to warm temperatures, high dissolved oxygen contents, low salinity levels, and neutral to moderately high pH levels. The streams must also be relatively free of pollutants including but not limited to, heavy metals, pesticides, oil and gas products, sediments, and human or animal waste.

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<sup>27</sup> U.S. Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Devils River Minnow; Proposed Rule," July 31, 2007.

<sup>28</sup> Ibid.

## 2.2 THREATS TO WATER QUALITY

60. The Proposed Rule states that sedimentation due to grazing, brush clearing, road construction, channel alteration, off-road vehicle use, and other watershed and floodplain disturbances are primarily a threat to critical habitat for the minnow in the San Felipe Creek unit.<sup>29</sup> In addition, some threats to water quality may exist in the Las Moras Creek unit. The Proposed Rule also states that activities that alter stream channel shape or geometry, such as channelization, impoundment, armoring or stream banks, road and bridge construction, mining, dredging, and destruction of riparian vegetation, may negatively affect critical habitat for the Devils river minnow.<sup>30</sup> These actions can also lead to increased sedimentation and degradation of water quality levels. Stream channel alterations are of primary concern in the San Felipe Creek unit. These activities which may affect water quality are the subject of this chapter.
61. Largely due to their urban settings (San Felipe Creek runs through the City of Del Rio and Las Moras Creek runs through Bracketville), various forms of pollution threaten water quality in the San Felipe Creek and Las Moras Creek units.<sup>31,32</sup> Specific pollution threats to the San Felipe Creek unit include:
- The spill or discharge of hazardous materials including oil, gasoline, or toxic chemicals.
  - Surface runoff from city streets, parking lots, rooftops, and yards adjacent to San Felipe Creek.
  - The dumping of trash in or near the creek.
62. The primary pollutant threatening water quality in Las Moras Creek is chlorine. Specifically, the creek receives elevated levels of chlorine due to the chlorination of a community swimming pool in Fort Clark Springs, which discharges directly into Las Moras Creek. Such chlorine loading is thought to have been one of the main causes of the extirpation of the Devils River minnow from Las Moras Creek.<sup>33</sup>

## 2.3 BASELINE ACTIVITIES AND IMPACTS

63. This section describes the pre- and post-designation baseline conservation activities and potential impacts related to efforts aimed at reducing water quality threats to the minnow. Economic impacts associated with conservation measures taken between 1999 and 2007 are referred to as “pre-designation baseline impacts,” while impacts associated with

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<sup>29</sup> U.S. Fish and Wildlife Service, “Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Devils River Minnow; Proposed Rule,” July 31, 2007.

<sup>30</sup> U.S. Fish and Wildlife Service, “Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Devils River Minnow; Proposed Rule,” July 31, 2007.

<sup>31</sup> U.S. Fish and Wildlife Service, “Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Devils River Minnow; Proposed Rule,” July 31, 2007.

<sup>32</sup> U.S. Fish and Wildlife Service, Devils River Minnow Recovery Plan, September 2005.

<sup>33</sup> Ibid.

baseline conservation measures taken between 2008 and 2027 are referred to as “post-designation baseline impacts.”

**2.3.1 PRE-DESIGNATION IMPACTS**

- 64. The City of Del Rio, Texas Department of Transportation (TxDOT), and the San Felipe Creek County Club have undertaken a number of water quality conservation measures for the DRM in San Felipe Creek prior to critical habitat designation for the Devils River minnow. Descriptions of these measures and their associated costs are detailed below. A summary of these pre-designation baseline impacts of water quality conservation measures for the DRM are detailed in Exhibit 2-1.

**EXHIBIT 2-1 SUMMARY OF PRE-DESIGNATION IMPACTS ASSOCIATED WITH WATER QUALITY CONSERVATION MEASURES (NOT INCLUDING ADMINISTRATIVE COSTS)**

CRITICAL HABITAT UNIT	DISCOUNTED COSTS (7 %)
San Felipe Creek	\$164,000

**Conservation Measures Associated with the San Felipe Springs Water Treatment Plant Project**

- 65. As part of a broad water conservation goal, the City of Del Rio completed a new water treatment plant in 2002. The plant improved the efficiency of water pumping and cleaning, thereby limiting withdrawals from San Felipe Creek and the springs that feed it. As part of an informal consultation pursuant to section 7 of the Endangered Species Act, the City of Del Rio prepared a biological assessment for their water treatment plant construction project, which included specific measures to limit the impacts of the construction project on the DRM and its habitat.<sup>34</sup> The water quality conservation measures taken are presented in Exhibit 2-2.

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<sup>34</sup> City of Del Rio, San Felipe Springs Water Treatment Plant Project: Biological Assessment Final Report, Prepared by Camp Dresser & McKee Inc., May 2000.



**EXHIBIT 2-2 WATER CONSERVATION MEASURES TAKEN DURING THE SAN FELIPE SPRINGS WATER TREATMENT PLANT PROJECT AND ASSOCIATED COSTS (\$2000)**

ACTIVITY <sup>1</sup>	COSTS	NOTES
The installation of silt screens and turbidity barriers at creek and spring areas to limit the amount of silt and sediment entering San Felipe Creek and the East and West Springs during demolition, excavation, and building activities.	\$34,400 <sup>2</sup>	A total of \$34,400 was spent on minimizing sediment loading to San Felipe Creek during construction. Specifically, \$6,000 was spent on an erosion control blanket, \$22,000 was spent on silt fencing, and \$6,400 was spent on the maintenance of silt fencing.
Physical-chemical monitoring for total suspended solids, temperature, pH, dissolved oxygen, and conductivity for a two-year period before, during, and after construction.	\$15,000 <sup>3</sup>	A total of \$45,000 dollars was spent on sampling and monitoring DRM habitat attributes and population levels between 2001 and 2003. Of those total costs, we attribute 1/3 to physical-chemical monitoring, 1/3 to biological monitoring, and 1/3 stream flow monitoring.
Biological monitoring for a two-year period before, during, and after construction.	\$15,000 <sup>4</sup>	
Stream flow monitoring below the headwaters of the East and West Springs before, during, and after construction.	\$15,000 <sup>5</sup>	
Total	\$79,400	
<p>Sources:</p> <ol style="list-style-type: none"> <li>1. City of Del Rio, San Felipe Springs Water Treatment Plant Project: Biological Assessment Final Report, Prepared by Camp Dresser &amp; McKee Inc., May 2000.</li> <li>2. Personal communication with Ray Mathews, Texas Water Development Board, on November 21, 2007.</li> <li>3. Written communication Kirk Winemiller, Texas A &amp; M University, on November 13, 2007.</li> <li>4. Ibid.</li> <li>5. Ibid.</li> </ol>		

**Management Plan for San Felipe Creek**

66. In 1998 the Service, TPWD, and the City of Del Rio signed a voluntary Conservation Agreement for the DRM. The objective of the 1998 agreement was to preserve existing populations of the DRM and expedite the species' population recovery, possibly eliminating the need for species listing.<sup>35</sup> As a result of the 1998 Conservation Agreement, the City of Del Rio drafted a Management Plan for San Felipe Creek in 2003. The goal of this management plan was to conserve the DRM and restore the San Felipe Creek ecosystem to its natural state.<sup>36</sup> One of the Management Plan's stated objectives was to limit the amount and the effects of surface runoff entering the creek. Specific actions (and associated costs) to reduce surface runoff and its effects are presented in Exhibit 2-3.

<sup>35</sup> Texas Parks and Wildlife Department, Conservation Agreement: Devils River Minnow, September 1, 1998.

<sup>36</sup> City of Del Rio Management Plan for San Felipe Creek and the Devils River Minnow, September 2003. Found in Appendix C of the U.S. Fish and Wildlife Service, Devils River Minnow Recovery Plan, September 2005.

**EXHIBIT 2-3 WATER QUALITY CONSERVATION MEASURES TAKEN AS PART OF THE MANAGEMENT PLAN FOR SAN FELIPE CREEK AND ASSOCIATED COSTS (\$2003)**

ACTIVITY <sup>1</sup>	TOTAL COST	NOTES
The creation of 10-20 ft buffer zones when constructing new sidewalks along San Felipe Creek.	\$0	This has not yet occurred but may occur in the future as a result of a forthcoming Master Plan for San Felipe Creek (discussed above). Nonetheless, this analysis assumes maintenance of such buffer zones will occur at no cost.
Returning natural vegetation to the banks of the creek by removing non-native vegetation such as African rivercane, Chinese tallow, elephant’s ears, and other non-native species and replanting native species.	\$43,000 <sup>2</sup>	The city is currently two years into a five-year effort to eradicate African rivercane from the banks of San Felipe Creek. They have spent \$8,600 in each of the first two years and anticipate allocating the same annual funding going forward.
Constructing and repairing stream bank retention areas in the most natural method possible (i.e. using only natural vegetation, if practicable, followed by the use of fiber mats, gabions, and other non-intrusive erosion control instruments).	\$0	The City of Del Rio has not allocated funding to construct or maintain stream bank retention walls running along portions of San Felipe Creek. Such funding, and corresponding guidance on erosion control methods, will likely be addressed in the City’s forthcoming Master Plan for San Felipe Creek (discussed above). <sup>3</sup>
Limiting the use of pesticides and herbicides.	\$0	The city has limited its use of pesticides and herbicides in parks adjacent to San Felipe Creek at no additional costs. <sup>4</sup>
Removing or limiting the domestic duck population that exists near the creek. Thereby, limiting nutrient loading and fecal coliform pollution to the creek.	\$0	The Del Rio Chief of Police agreed to keep the domestic duck population on his property at no additional cost to the City. <sup>5</sup>
Total	\$43,000	
<p>Sources:</p> <ol style="list-style-type: none"> <li>1. City of Del Rio Management Plan for San Felipe Creek and the Devils River Minnow, September 2003. Found in Appendix C of the U.S. Fish and Wildlife Service, Devils River Minnow Recovery Plan, September 2005.</li> <li>2. Personal communication with Ben Rivera, Director of Parks and Recreation for the City of Del Rio on November 13, 2007. The substance and publication date of the City’s Master Plan for San Felipe Creek is currently unknown.</li> <li>3. Ibid.</li> <li>4. Ibid.</li> <li>5. Personal communication with Jackie Robinson, Director of the Economic Development Department for the City of Del Rio on October 25, 2007.</li> </ol>		

67. In addition to Del Rio’s 2003 Management Plan for San Felipe Creek, the San Felipe Creek Walk Commission is currently working on a Master Plan for San Felipe Creek in conjunction with the City. The Master Plan is expected to be released and ratified by the City sometime in the near future. The plan will most likely contain specific conservation measures for the DRM and measures to preserve the San Felipe Creek ecosystem.

68. Presently, the Commission is working to draft a vision statement for the Master plan. It is unclear when the Master Plan will be completed and what specific conservation measures it will include.<sup>37</sup>

*Conservation Measures Associated with the Bedell Street Bridge Replacement Project*

69. As part of their 2006 formal consultation with the Service on the Bedell Street Bridge Replacement Project in San Felipe Creek, TxDOT was required to implement specific conservation measures to limit incidental take of the DRM.<sup>38</sup> The Bedell Street Bridge crosses San Felipe Creek just south of the San Felipe Country Club, adjacent to Moore Park in Del Rio. The specific conservation measures (and associated costs) taken by TxDOT during their 2006 bridge replacement project are presented in Exhibit 2-4.

**EXHIBIT 2-4 WATER QUALITY CONSERVATION MEASURES TAKEN DURING THE BEDELL STREET BRIDGE REPLACEMENT PROJECT AND ASSOCIATED COSTS (\$2006)**

ACTIVITY <sup>1</sup>	TOTAL COST	NOTES
Limiting surface water runoff by redirecting water draining off the bridge to a large area of the grassy slope underlying the bridge.	\$15,000 <sup>2</sup>	NA
Sources: 1. U.S. Fish and Wildlife Service, Final Biological Opinion for the Bedell Street Bridge Replacement Project on San Felipe Creek near Moore Park, City of Del Rio, Val Verde County, Texas, March 24, 2006. 2. Personal communication with Hector Chapa, Design Technician for the Texas Department of Transportation (Laredo Office), on October 19, 2007.		

*San Felipe Country Club Management Plan*

70. In connection with the City of Del Rio’s 2003 Management Plan, the San Felipe Country Club voluntarily drafted its own management plan in 2003 in order to bolster conservation measures for the DRM being taken by the City. Similar to the Del Rio Management Plan for San Felipe Creek, the 2003 San Felipe Country Club Management Plan includes measures to limit surface water runoff.<sup>39</sup> The San Felipe Country Club, located on the eastern edge of Del Rio, contains two springs, the East and West Springs, which feed San Felipe Creek and serve as the main drinking source for the City of Del Rio and Laughlin Air Force Base (AFB). The East and West Springs and San Felipe Creek downstream from its confluence with the springs are thought to currently contain populations of the DRM.<sup>40</sup> Thus, surface water runoff from the country club could have significant effects on the water quality of San Felipe Creek and the health of the DRM.

<sup>37</sup> Meeting of the San Felipe Springs Creek Walk Commission at City Hall, City of Del Rio, on October 25, 2007.

<sup>38</sup> U.S. Fish and Wildlife Service, Final Biological Opinion for the Bedell Street Bridge Replacement Project on San Felipe Creek near Moore Park, City of Del Rio, Val Verde County, Texas, March 24, 2006.

<sup>39</sup> Management Plan for San Felipe Country Club in Del Rio, September 2003. Found in Appendix C of the U.S. Fish and Wildlife Service, Devils River Minnow Recovery Plan, September 2005.

<sup>40</sup> U.S. Fish and Wildlife Service, “Endangered and Threatened Wildlife and Plants: Final Rule to List the Devils River Minnow as Threatened,” October 20, 1999.

The specific conservation measures (and associated costs) described in the country club’s management plan are presented in Exhibit 2-5.

**EXHIBIT 2-5 WATER QUALITY CONSERVATION MEASURES TAKEN AS PART OF THE SAN FELIPE COUNTRY CLUB MANAGEMENT PLAN AND THE COSTS ASSOCIATED WITH THOSE MEASURES (\$2003)**

ACTIVITY <sup>1</sup>	TOTAL COST	NOTES
The maintenance of no-mow buffer zones with minimum widths of 20-30 ft along all watercourses and areas adjacent to San Felipe Creek.	\$0	No-mow buffer zones were installed around much of the golf course at no additional cost to the San Felipe Country Club. <sup>2</sup>
The removal of all African rivercane, Chinese tallow, elephant’s ears, and other exotic species from areas adjacent to the creek and the revegetation of such areas with native species.	\$11,520 <sup>3</sup>	The San Felipe Country Club employed an individual to remove African rivercane from the banks of San Felipe Creek at \$6 per hour for six-month periods in 2005 and 2006.
Minimizing the use of pesticides and herbicides by developing and utilizing an Integrated Pest Management Plan.	\$0	San Felipe Country Club began using more environmentally friendly petro-chemicals at no additional cost. <sup>4</sup>
Limiting the use of fertilizers to the bare minimum necessary to maintain the integrity of the golf course.	\$0	
<p>Sources:</p> <ol style="list-style-type: none"> <li>1. Management Plan for San Felipe Country Club in Del Rio, September 2003. Found in Appendix C of the U.S. Fish and Wildlife Service, Devils River Minnow Recovery Plan, September 2005.</li> <li>2. Personal communication with Beto Robago, Superintendent of the San Felipe Springs Golf Course, on October 18, 2007.</li> <li>3. Ibid.</li> <li>4. Ibid.</li> </ol>		

*Brush Control Activities*

71. A 2004 formal consultation between the Service and the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), occurred regarding activities associated with implementation of the 2002 Farm Bill conservation programs and its effects on 29 listed species in Western Texas.<sup>41</sup> This consultation, which focused on brush management treatment practices targeting control of honey mesquite, salt cedar, Ashe juniper, and redberry juniper, concluded that 2002 Farm Bill conservation actions, including actions conducted under the Environmental Quality Incentive Program (EQIP), Wildlife Habitat Incentives Program (WHIP), Grazing Lands Conservation Initiative, Conservation Security Program, Farm and Ranch Lands Protection Program, Grasslands Reserve Program, and Wetlands Reserve Program, would “be completely beneficial, and

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<sup>41</sup> U.S. Fish and Wildlife Service, Arlington Ecological Services Office, Biological Opinion of Natural Resource Conservation Service activities associated with implementation of the 2002 Farm Bill conservation programs and effects on Federally listed species, December 17, 2004; as amended on March 6, 2008.

therefore, are not likely to adversely affect” the minnow.<sup>42</sup> Thus, brush removal activities receiving funding from the NRCS under the 2002 Farm Bill were not delayed or otherwise altered to accommodate the minnow as a result of this consultation.

#### Las Moras Creek

72. Despite threats to water quality in Las Moras Creek, no conservation efforts have been undertaken to accommodate the DRM to date related to Fort Clark Springs Association activities, or on the private ranch land that comprises the majority of the unit.<sup>43</sup> Thus, no pre-designation impacts are estimated for the Las Moras Creek unit.

### 2.3.2 POST-DESIGNATION BASELINE IMPACTS

#### San Felipe Creek

73. Both the City of Del Rio’s Management Plan for San Felipe Creek<sup>44</sup> and the San Felipe Country Club Management Plan<sup>45</sup> include conservation measures expected to continue after 2008. The City of Del Rio's Management Plan for San Felipe Creek and the San Felipe Country Club Management Plan were both developed following a Conservation Agreement for the Devils River minnow between the Service, TPWD, and the City of Del Rio in 1998, prior to the species' listing. Thus, costs of those conservation measures listed in the management plans that are planned to occur in the near future are included in post-designation baseline estimates. These costs include continued efforts by the City of Del Rio to remove exotic plant species which are anticipated to continue through 2010. These efforts are estimated to be \$17,000 over this time period (undiscounted). Impacts related to conservation measures discussed in the management plans that are not anticipated to occur in the foreseeable future are not quantified in the analysis.
74. The City of Del Rio in conjunction with FEMA has permitting authority to restrict any future channeling, dredging, grading, or damming projects, in addition to any future projects that would alter floodplains and stream banks, in order to limit the effects of flooding. The City states that no projects are currently planned that would address the threat that stream channel alteration or water quality presents to the DRM.<sup>46</sup>
75. According to TxDOT, there are no transportation projects planned in the areas proposed for critical habitat that might require consultation for the DRM during the study period

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<sup>42</sup> Ibid.

<sup>43</sup> Personal communication with Genell Hobbs, Executive Secretary, Fort Clark Springs Association on October 30, 2007.

<sup>44</sup> City of Del Rio Management Plan for San Felipe Creek and the Devils River Minnow, September 2003. Found in Appendix C of the U.S. Fish and Wildlife Service, Devils River Minnow Recovery Plan, September 2005.

<sup>45</sup> Management Plan for San Felipe Country Club in Del Rio, September 2003. Found in Appendix C of the U.S. Fish and Wildlife Service, Devils River Minnow Recovery Plan, September 2005.

<sup>46</sup> Personal communication with Jackie Robinson, Director of the Economic Development Department for the City of Del Rio on October 25, 2007. Personal communication with Ben Rivera, Director of Parks and Recreation for the City of Del Rio on November 13, 2007.

for this analysis. The two large bridges that exist within critical habitat are not expected to undergo significant modifications, barring unforeseen events, within the study period.<sup>47</sup>

76. Although no known activities are currently planned within critical habitat areas that would likely result in a new consultation related to water quality for the minnow, the Proposed Rule cites water quality issues as a concern in San Felipe Creek due to the urban environment through which much of the creek flows. This threat is confirmed in the consultation history for San Felipe Creek, which contains the only existing formal consultation that found impacts to Devils River minnow as well as several informal consultations related to water quality issues. Thus, this analysis assumes that in the 20 years following critical habitat designation, consultations will occur, on average, at a rate similar to the past rate of consultations (1999-2007) in San Felipe Creek. As a result, this analysis forecasts that project modifications related to water quality may occur as part of two formal consultations and two informal consultations within critical habitat areas over the next 20 years. Project modifications are assumed to include erosion control measures as well as sampling and monitoring efforts at costs of \$15,000 per formal consultation, and \$79,000 per informal consultation effort, similar to past efforts (undiscounted costs). Including the ongoing costs to the City of Del Rio, total forecast project modification costs related to water quality issues in the San Felipe Creek unit are estimated to be approximately \$206,000 over 20 years (undiscounted), or \$119,000 (discounted at seven percent) under the baseline.

#### Las Moras Creek

77. The chlorination of the Fort Clark Springs pool and its periodic discharge into Las Moras Creek does not require a Federal permit.<sup>48</sup> Because there is no Federal nexus requiring the Service to consult on the degradation of water quality related to the operation and maintenance of the pool, and the Fort Clark Springs Association has expressed no plans to undertake conservation efforts for the minnow voluntarily,<sup>49</sup> this analysis assumes that there will be no conservation measures undertaken for the species in this area in the foreseeable future.

#### Brush Control Activities

78. One public commenter voiced a concern that future private brush control activities conducted using funds from NRCS, particularly under EQIP or WHIP, could be delayed to a point where landowners may miss the opportunity to carry out those activities for an entire year.<sup>50</sup> As discussed above, a 2004 formal consultation between the Service and

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<sup>47</sup> Personal communication with Mike Graham, District Environmental Coordinator for the Texas Department of Transportation, on September 28, 2007. Personal communication with Chris Kloss, Environmental Specialist, Texas Department of Transportation on October 19, 2007.

<sup>48</sup> Personal communication with Bob Walker, Maintenance Director, Fort Clark Springs on June 3, 2008.

<sup>49</sup> Personal communication with Bob Walker, Maintenance Director, Fort Clark Springs on June 3, 2008.

<sup>50</sup> Public comments of Selma Glasscock, Assistant Director, Welder Wildlife Foundation, submitted to the Service in response to the Public Hearing held on February 27, 2008 in Del Rio, Texas.

the NRCS occurred regarding activities associated with implementation of the 2002 Farm Bill conservation programs and its effects on listed species in Western Texas. This consultation, which focused on brush management treatment practices targeting control of honey mesquite, salt cedar, Ashe juniper, and redberry juniper, concluded that 2002 Farm Bill conservation actions, including funding for brush management treatment under EQIP and WHIP would “be completely beneficial, and therefore, are not likely to adversely affect” the minnow.<sup>51</sup> The action period for this consultation was recently extended until the end of Fiscal Year 2008.<sup>52</sup> Thus, brush removal activities receiving funding from the NRCS under the 2002 Farm Bill have not been altered for the minnow to date.

79. The expiration of the current biological opinion coincides with the implementation period for the new 2008 Farm Bill. Should NRCS choose to handle the minnow critical habitat by treating each proposed brush control project individually with regard to impacts on Devils river minnow, this would likely result in delays to brush control projects.<sup>53</sup> However, it appears most likely that the Service and NRCS will renegotiate a new consultation regarding the new Farm Bill following the expiration of the current bill which includes critical habitat along with the other 29 species and critical habitats currently included in the opinion.<sup>54</sup> While the specific form and outcome of the consultation is unknown at this time, the 2008 Farm Bill appears to contain many similarities to the previous bill. In addition, a standard Best Management Practice for NRCS funding is that no increased sedimentation to nearby streams may occur.<sup>55</sup> It therefore seems most likely that the same or similar conclusion will be reached regarding potential impacts to the DRM, and that no impacts on brush control activities would be needed to accommodate the minnow or its critical habitat.<sup>56</sup> Thus, this analysis assumes that no delays will occur to brush control activities in the foreseeable future due to minnow considerations. Additional biological opinions would be expected to accompany other future Farm Bills, expected every five to seven years. To be conservative, this analysis assumes that a formal biological opinion regarding brush control activities will occur every five years in the foreseeable future, but that no impacts on brush control activities will occur related to DRM concerns.

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<sup>51</sup> Ibid.

<sup>52</sup> U.S. Fish and Wildlife Service, Arlington Ecological Services Office, Biological Opinion of Natural Resource Conservation Service activities associated with implementation of the 2002 Farm Bill conservation programs and effects on Federally listed species, December 17, 2004; as amended on March 6, 2008.

<sup>53</sup> Personal communication with S. Baggett, Natural Resource Conservation Service, Temple, Texas Office, June 12, 2008.

<sup>54</sup> Personal communication with Service Biologists, Arlington Ecological Services Office, Texas, on June 12, 2008.

<sup>55</sup> Personal communication with Service Biologists, Arlington Ecological Services Office, Texas, on June 12, 2008.

<sup>56</sup> Personal communication with S. Baggett, Natural Resource Conservation Service, Temple, Texas Office, June 12, 2008; Personal communication with Service Biologists, Arlington Ecological Services Office, Texas, on June 11 and June 12, 2008.

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Summary of Post-Designation Baseline Impacts

80. In summary, this analysis finds that post-designation baseline impacts related to threats to maintaining water quality (i.e., sedimentation due to grazing, brush clearing, road construction, channel alteration, off-road vehicle use, and other watershed activities) are expected to occur in the San Felipe Creek unit (Exhibit 2-6) at a cost of \$119,000 over the next 20 years. Additional administrative impacts are detailed in Appendix A.

**EXHIBIT 2-6 SUMMARY OF POST-DESIGNATION BASELINE IMPACTS ASSOCIATED WITH WATER QUALITY CONSERVATION MEASURES (NOT INCLUDING ADMINISTRATIVE COSTS)**

CRITICAL HABITAT UNIT	DISCOUNTED COSTS (7%)	ANNUALIZED COSTS (7%)
San Felipe Creek	\$119,000	\$11,200

**2.4 POST-DESIGNATION INCREMENTAL ACTIVITIES AND IMPACTS**

81. Post-designation incremental activities are those activities expected to occur after the final designation of critical habitat in 2008 related to preventing the adverse modification of proposed critical habitat.
82. Future actions to preserve water quality for the DRM are expected to occur as a result of the Master Plan for San Felipe Creek and the San Felipe Country Club Management Plan. These actions are not expected to change due to the designation of critical habitat. Therefore, they are included as part of the economic baseline for this analysis.<sup>57</sup> As stated above, while temporary delays to some NRCS-funded brush control activities are possible, the most likely future effect of critical habitat appears to be the inclusion of the minnow critical habitat into future biological opinions on future Farm Bills that cover species in West Texas, and the arrival at the same or similar conclusions that the minnow will benefit from brush control activities. Thus, administrative costs of including critical habitat in future NRCS consultations are included in this analysis. Following discussions with the City of Del Rio, the San Felipe Country Club, and the Fort Clark Springs Association, this analysis finds that no other post-designation incremental impacts are anticipated beyond the additional administrative costs associated with consulting for critical habitat.<sup>58</sup> A detailed estimate of administrative costs is presented in Appendix A.

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<sup>57</sup> Although a federal nexus exists for NRCS funded brush removal activities along the Devils River, such activities are not expected to require modification following critical habitat designation based on a 2004 formal consultation between the Service and the NRCS, which found that such brush clearing activities benefited the DRM.

<sup>58</sup> Personal communication with Jackie Robinson, Director of the Economic Development Department for the City of Del Rio on October 25, 2007. Personal communication with Ben Rivera, Director of Parks and Recreation for the City of Del Rio on November 13, 2007. Personal communication with Beto Robago, Superintendent of the San Felipe Springs Golf Course, on October 18, 2007. Personal communication with Bob Walker, Maintenance Director, Fort Clark Springs on June 3, 2008.



## CHAPTER 3 | GROUNDWATER EXTRACTION

83. Spring water deriving from the Edwards and Edwards-Trinity Aquifer supports the flow and thermal regimes necessary to the survival of the DRM in the Devils River, San Felipe Creek, Pinto Creek, Sycamore Creek, and Las Moras Creek units.<sup>59</sup> The Proposed Rule lists water withdrawal, specifically groundwater pumping, as a threat to the species. This section discusses the difficulty in identifying economic impacts related to groundwater extraction and describes proposed groundwater extraction projects and major water users in the study area.

### SUMMARY OF IMPACTS

84. There have not been any consultations related to groundwater extraction and its effects on the DRM to date. Although planning efforts are underway to transport groundwater from Val Verde and Kinney counties to the greater San Antonio area, establishing a link between groundwater extraction and impacts on DRM habitat is not straightforward. In addition, uncertainty exists as to whether a Federal nexus for groundwater extraction projects exists in critical habitat areas, and potential modifications to projects that could be requested by the Service as part of a consultation are unknown at this time. Thus, this analysis is unable to quantify potential economic impacts to groundwater pumping activities that could be incurred as a result of DRM conservation efforts. The analysis does recognize that potential negative impacts on both the water suppliers and the end water users of transferred water could occur, should restrictions on water use be undertaken on behalf of the DRM. In terms of potential incremental impacts of DRM critical habitat on these projects, impacts over and above those that would already occur following the listing of the species appear improbable.

### 3.1 BACKGROUND OF GROUNDWATER USE IN THE STUDY AREA

85. Groundwater from the Edwards and Edwards-Trinity aquifers is pumped for agricultural, municipal, and industrial purposes.<sup>60</sup> Certain areas of these aquifers have experienced water level declines where recharge rates have not kept pace with rates of groundwater withdrawal.<sup>61</sup> This section discusses groundwater withdrawal issues near the study area,

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<sup>59</sup> U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Devils River Minnow; Proposed Rule, 72 FR 146, July 31, 2007.

<sup>60</sup> *Ibid.*, pg. 41685.

<sup>61</sup> Barker, Rene A., Ardis, Ann F. "Hydrogeologic Framework of the Edwards-Trinity Aquifer System, West-Central Texas". USGS Professional Paper 1421-B. United States Government Printing Office, 1996. Pg. B-50.

specifically the Las Moras Creek and Pinto Creek units, as these are the only units that, based on our analysis, we anticipate could be affected by post-designation groundwater extraction projects (2008-2027).

86. Without a clear connection between water use and DRM habitat loss, changes to existing water uses are unlikely to occur. However, for water managers, permitting agencies, and the Service, demonstrating the effect water use has on DRM habitat is not straightforward.
87. First, direct hydrological connections between specific groundwater aquifers and DRM surface water habitat changes are difficult to quantify. Current hydrologic models of the Edwards and Edwards-Trinity aquifers may not be adequate to determine if specific wells are withdrawing water from an aquifer source that contributes to surface water flows in DRM habitat. To show injurious surface water impacts from the cumulative effects of groundwater withdrawals, the aquifers contributing to springs flows in DRM habitat must be understood with some certainty.<sup>62</sup> In order for a Federal Action agency to find that an activity is likely to adversely affect the species, they need to be confident that the activity is indeed affecting it or its habitat.
88. Second, groundwater management in the study area typically does not involve Federal actions. Generally, groundwater in Texas is governed by the “rule of capture,” that is, groundwater is the private property of the owner of the overlying land. However, a number of state-mandated groundwater conservation districts (GCDs) have the ability to regulate the spacing and production of groundwater wells.<sup>63</sup> Each GCD falls within a larger Groundwater Management Area (GMA). Currently, 16 GMAs exist in Texas spanning the state’s major and minor aquifers.<sup>64</sup> In 2005, the Texas State Legislature required that all GCDs in a given GMA meet annually to determine a future desired groundwater condition for their respective GMA.<sup>65</sup> Based on the desired future condition specified by a given GMA, the Texas Water Development Board (TWDB) determines a managed available groundwater level for the GMA. Lands outside of GCDs are not subject to groundwater pumping regulations unless a landowner seeks state funding for a groundwater project. In this case, the specific project must be included in the GMA’s regional water plan. The total groundwater allotments permitted by the GMA must not exceed its managed available groundwater level.
89. In the areas proposed for critical habitat, only Kinney County has a GCD, which is known as the Kinney County Groundwater Conservation District (KCGCD). The

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<sup>62</sup> Modeling the Edwards Aquifer, The Edwards Aquifer Website. Accessed at <http://www.edwardsaquifer.net/modeling.html> on October 19, 2007.

<sup>63</sup> Texas Water Development Board. General Groundwater Management Plan Frequently Asked Questions. Accessed at <http://www.twdb.state.tx.us/qwrd/gcd/faggen.htm> on April 7, 2008.

<sup>64</sup> Texas Water Development Board. Groundwater Management Area Facts. Accessed at <http://www.twdb.state.tx.us/GwRD/GMA/gmafacts.htm> on April 7, 2008.

<sup>65</sup> Mace, R.E., Petrossian, R., Bradley, R. and W.F. Mullican, III. 2006. A streetcar named desired future conditions: the new groundwater availability for Texas. Texas Water Development Board. Austin, Texas.

KCGCD was formed in 2002.<sup>66</sup> A bill to establish a Val Verde County Groundwater Conservation District failed to pass the state legislature twice in the past four years and it appears unlikely that a district will form in the near future.<sup>67, 68</sup>

#### POTENTIAL GROUNDWATER RESTRICTIONS

90. KCGCD has regulatory control over the groundwater resources in Kinney County (which contains Las Moras Creek, Pinto Creek, and Sycamore Creek).<sup>69</sup> Currently, the KCGCD is finalizing a process for permitting groundwater use in the County and revising its overall water management plan. The draft plan does not include language limiting groundwater usage to conserve the DRM and there is no indication that their revised plan, due for publication in the spring of 2008, will include any such related language.<sup>70</sup> Although the KCGCD seeks to conserve surface water flows in these creeks, it is not clear to what degree this will occur, or the degree to which the DRM would benefit from any such conservation efforts. Thus, quantifying related impacts is not possible at this time. Therefore, this analysis does not quantify impacts related to the restriction of groundwater pumping in Kinney County to conserve surface water flow related to DRM conservation.

### 3.2 GROUNDWATER DEVELOPMENT PROJECTS POTENTIALLY AFFECTING THE STUDY AREA

91. The San Antonio Water System (SAWS), the agency charged with managing water resources for the City of San Antonio, includes, in its 50-year water resource plan, the possible development of groundwater resources in “Western Edwards water projects.”<sup>71</sup> As SAWS states in its public comments to the Service on the proposed critical habitat for the DRM, these Western Edwards water projects refer to “an assessment of water projects in the Kinney and Val Verde County areas and the surrounding region.”<sup>72</sup> SAWS reports that starting in 2001, it began to receive unsolicited proposals for water developments

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<sup>66</sup> Kinney County Groundwater Conservation District Management Plan, 2003. Accessed at [http://www.twdb.state.tx.us/gwrd/GCD/plans/Kinney\\_County\\_GCD\\_Management\\_Plan\\_2003.pdf](http://www.twdb.state.tx.us/gwrd/GCD/plans/Kinney_County_GCD_Management_Plan_2003.pdf) on November 6, 2007.

<sup>67</sup> Personal communication with Robert Bradley, Texas Water Development Board, on November 5, 2007.

<sup>68</sup> Sontag, Bill. “Failure likely in Del Rio’s bid for water district organization in 2007”, Southwest Texas Live. December 24, 2006. Accessed at <http://www.swtexaslive.com/node/2799> on November 15, 2007.

<sup>69</sup> Sycamore Creek represents the county border separating Val Verde and Kinney counties. However, as stated above, Sycamore Creek is not fed by the Edwards or Edwards-Trinity aquifers and thus is not subject to related groundwater threats.

<sup>70</sup> Personal communication with Diana Ward, Manager of the Kinney County Groundwater Conservation District on November 5, 2007.

<sup>71</sup> Public comments of Janelle Okorie, San Antonio Water System, “RE: Devils River Critical Habitat Proposed Rule; Draft Economic Analysis of Critical Habitat for the Devils River minnow,” Submitted to the Service, March 10, 2008.

<sup>72</sup> Ibid.

from this area, and that, over the next 18 months (presumably, through 2009), it will be reviewing the feasibility of these and other potential water developments.<sup>73</sup>

92. In response to proposals from Val Verde and Kinney County water developments, SAWS commissioned an evaluation of potential groundwater development in the area in 2001. The study concluded that, “sustainable pumpage of between 75,000 and 100,000 acre-feet per year may be achievable without reducing flows at San Felipe Springs below pre-Amistad historic low flows.”<sup>74</sup> As part of a larger effort to develop additional water supplies required to accommodate growth in San Antonio, SAWS plans to further evaluate water availability, environmental impacts, and design of a potential project that would yield a sustainable volume of water over time “without adversely affecting the environment and habitat of (the) area.”<sup>75</sup> While the outcome of the forthcoming feasibility study is unclear, SAWS and possibly other municipalities in the region are interested in the potential of groundwater development in the western Edwards aquifer.
93. Specifically, two specific proposals to extract groundwater from the Edwards and Edwards-Trinity aquifers exist that could potentially affect surface flows through the Las Moras Creek and Pinto Creek units. WaterTexas, Inc. and Grass Valley Water LP have each proposed projects to transport groundwater from Kinney County to the City of San Antonio.
94. WaterTexas, Inc. works in partnership with a number of Kinney County landowners to transfer water historically used for irrigation of row crops to municipal uses. Depending on forthcoming water availability studies, their proposal would transfer approximately 20,000 to 25,000 acre-feet of water to San Antonio annually from the Pinto Valley area. Currently, WaterTexas does not expect the forthcoming KCGCD management plan to affect their ongoing groundwater exportation project.<sup>76</sup> The company anticipates the need to obtain U.S. Army Corps of Engineers (ACOE) Section 404 (under the Clean Water Act) permits to traverse a number of relatively large rivers for future construction of a pipeline carrying water to San Antonio.<sup>77</sup> The DRM does not occupy streams in which the 404 permits would be requested, however, ACOE was unable to confirm whether or not they would anticipate consulting on the DRM for this project.<sup>78</sup> Due to the lack of DRM in areas for which the permit would be required, it appears unlikely that ACOE would consult on impacts to the DRM in the study area under section 7 of the Act.

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<sup>73</sup> Ibid.

<sup>74</sup> Public comments of Janelle Okorie, San Antonio Water System, “re: Devils River Critical Habitat Proposed Rule; Draft Economic Analysis of Critical Habitat for the Devils River minnow,” Submitted to the Service, March 10, 2008.

<sup>75</sup> Public comments of Janelle Okorie, San Antonio Water System, “re: Devils River Critical Habitat Proposed Rule; Draft Economic Analysis of Critical Habitat for the Devils River minnow,” Submitted to the Service, March 10, 2008.

<sup>76</sup> Public comments of Derek Saunders, WaterTexas, “re: Economic Analysis of Critical Habitat for the Devils River minnow,” submitted to the Service, March 6, 2008.

<sup>77</sup> Personal communication with Derek Saunders, founder and CEO of WaterTexas on November 7, 2007.

<sup>78</sup> Personal communication with Richard Lowe, Project Manager, Regulatory Branch of the US Army Corps Fort Worth District, on November 14, 2007. Personal communication Presley Hatcher, Chief of the Regulatory Branch of the US Army Corps Fort Worth District, on November 29, 2007.

Thus, this analysis assumes that no consultation is likely and thus does not forecast impacts to groundwater extraction related to WaterTexas' planned project.

95. In addition to potential section 404 permits, WaterTexas states that its "project is too preliminary to know for certain whether or not we will consult with the Federal government in any capacity over and above the ACOE section 404" permit.<sup>79</sup> For the purposes of this analysis, no additional Federal agencies were identified that would likely become involved in consultation on the DRM.
96. Another proposal in Kinney County of similar size and scope claims their water delivery system to San Antonio will not require any Federal involvement.<sup>80</sup> Grass Valley Water LP is proposing to export 22,000 acre-feet annually to San Antonio from a 22,000-acre ranch in eastern Kinney County. The project would draw water from the Edwards Balcones Fault Zone (BFZ), which according the company, does not affect Las Moras Springs.<sup>81</sup> Grass Valley Water LP has already invested a significant amount of resources into the project and believes that supplementing San Antonio's water supply could, among other positive effects, ease water-related threats to other listed species within the Edwards Aquifer.<sup>82</sup> Still, both projects must wait on KCGCD's forthcoming management plan and complete additional planning and approval before commencement.
97. In its discussion of potential impacts of any restrictions on its proposed project, Water Texas points out that the water to be used for the purposes of this project is part of the historical use of the area, and would be used to supplement current agricultural incomes. WaterTexas points out that any restrictions on the ability of its users to export their water would have a negative economic impact on them. SAWS further points to the clear limitations of options for their municipality for future groundwater resources, and that any restrictions on those options would result in potentially substantial economic impacts on those municipal users, presumably in terms of increased water prices that would occur if supply is constrained, or as more costly options for water development are undertaken.<sup>83</sup>
98. Due to the uncertainties with regard to linking groundwater withdrawals to DRM habitat, future Federal involvement in potential water transfer projects, and any potential changes to those projects that could be requested by the Service as part of a consultation, this

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<sup>79</sup> Public comments of Derek Saunders, WaterTexas, "re: Economic Analysis of Critical Habitat for the Devils River minnow," submitted to the Service, March 6, 2008.

<sup>80</sup> Ibid.

<sup>81</sup> Personal communication with Ray E. Smith, Principal of Grass Valley Water LP, on November 5, 2007. According to Mr. Smith, six recent rain events demonstrated a clear disconnect between the monitor well on their land (installed by the Edwards Aquifer Authority) and Las Moras Springs. When water levels rose at Las Moras Springs, there was no measurable change in the well on Grass Valley's land and vice versa.

<sup>82</sup> Both companies believe that augmenting San Antonio's water supply will help increase the flow of San Marcos and Comal Springs and benefit the seven endangered and one listed species dependant on the two spring flows.

<sup>83</sup> Public comments of Janelle Okorie, San Antonio Water System, "re: Devils River Critical Habitat Proposed Rule; Draft Economic Analysis of Critical Habitat for the Devils River minnow," Submitted to the Service, March 10, 2008.

analysis is unable to quantify potential economic impacts to groundwater pumping activities that could occur to benefit the DRM. The analysis does recognize that potential negative impacts on both the water suppliers and the end water users of transferred water could occur, should restrictions on water use be undertaken on behalf of the DRM. In terms of potential incremental impacts of DRM critical habitat on these projects, impacts over and above those that would already occur following the listing of the species appear improbable.

### 3.3 OTHER MAJOR WATER USERS WITHIN THE STUDY AREA

99. Currently, the two largest water users within the study area vicinity are the City of Del Rio and Laughlin Air Force Base (AFB). Laughlin AFB purchases water directly from the City, which draws its own water from San Felipe Creek. The demand for water in both areas is expected to increase over the next twenty years, however, the rate of water extraction is not expected to threaten the DRM.

#### City of Del Rio

100. Prior to 2002, the City used approximately 21 million gallons of water per day. Upon completion of the City's water treatment plant in 2002 and a corresponding increase in water rates, water extraction rates significantly dropped. Currently, the average water use during the summer months is approximately 12 million gallons per day and down to 6 million gallons per day in the winter.<sup>84</sup> Given that the area's population is 40,000 and growing just above 1%, this analysis does not foresee threats to the DRM over the next 20 years.<sup>85</sup> Laughlin AFB also plans to expand its operations; however, their anticipated expansion is not assumed to threaten proposed critical habitat.

#### Laughlin Air Force Base

101. Laughlin AFB lies roughly four miles east of City of Del Rio and is residence to about 6,000 people (up from approximately 2,225 in 2000).<sup>86</sup> Hydrogeologic features under the base and adjacent properties inhibit potable water occurrence so the base is entirely dependent on San Felipe Creek for water. Laughlin AFB currently uses approximately 1.5 million gallons per day (with peak usage exceeding 2.0 million gallons per day)<sup>87</sup> and anticipates an approximate 5% increase in demand based on planned mission growth within the next couple of years.<sup>88</sup> The base has been growing under the Base

<sup>84</sup> Personal communication with Mitchell Lomas, Superintendent of the City of Del Rio Water Treatment Plant, on October 17, 2007.

<sup>85</sup> U.S. Census Bureau. Population Estimates for Texas. Accessed at <http://quickfacts.census.gov/qfd/states/48/48197921k.html> on December 20, 2007.

<sup>86</sup> Personal communication with Eric C. Barefoot, 47 Civil Engineer Squadron/Environmental Management Flight, Laughlin Air Force Base on October 10, 2007.

<sup>87</sup> Mitchell Lomas, Superintendent of the City of Del Rio Water Treatment Plant, estimates that Laughlin AFB can use up to 3.5 million gallons per day.

<sup>88</sup> Written communication with Eric C. Barefoot, 47 Civil Engineer Squadron/Environmental Management Flight, Laughlin Air Force Base on October 12, 2007.

Realignment and Closure Act and posits, “future long term plans for Laughlin may lead to considerable growth.”<sup>89</sup> The Department of Defense views water supply as a major factor in the ability of a base to sustain and grow missions; it does not appear that this will become a significant liability regarding future growth at Laughlin AFB. In addition, Laughlin AFB contributes greater than \$230M to the local economy annually.<sup>90</sup>

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<sup>89</sup> Ibid.

<sup>90</sup> Ibid.

## CHAPTER 4 | NONNATIVE SPECIES

102. Nonnative species can significantly alter an ecosystem by affecting the equilibrium that exists in most natural communities. In freshwater streams supporting the DRM, nonnative fish species can increase competition for resources (e.g., food, space, oxygen, etc.), increase predation pressure, alter aquatic plant communities, and affect the physical environment by altering stream substrates and banks.<sup>91</sup> Nonnative vegetation may outcompete native vegetation, potentially limiting the DRM's use of aquatic vegetation as a reproductive and refuge area. Additionally, nonnative species may carry exotic parasites and bacteria that could negatively impact the DRM.<sup>92</sup> According to the Proposed Rule, "the absence of harmful nonnative species is an essential biological feature for conservation of the Devils River minnow."<sup>93</sup>

103. This section describes and quantifies the impacts of on-going and forecast measures related to mitigating the effects of nonnative species on the DRM.

### SUMMARY OF IMPACTS (2008-2027)

104. The following economic impacts are anticipated in proposed critical habitat areas related to future conservation efforts aimed at limiting the effects of nonnative species on the DRM. These impacts do not include administrative costs, which are presented in Appendix A.

#### Post-designation baseline impacts in areas proposed for critical habitat

- Present value applying a seven percent discount rate: \$45,700

#### Post-designation incremental impacts in areas proposed for critical habitat

- Present value applying a seven percent discount rate: \$0

### 4.1 NONNATIVE SPECIES IN PROPOSED CRITICAL HABITAT AREAS

105. Currently, two nonnative species, namely smallmouth bass in the Devils River and armored catfish in San Felipe Creek, are thought to pose a significant threat to the DRM

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<sup>91</sup> U.S. Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Devils River Minnow; Proposed Rule," July 31, 2007.

<sup>92</sup> U.S. Fish and Wildlife Service, Devils River Minnow Recovery Plan, September 2005.

<sup>93</sup> U.S. Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Devils River Minnow; Proposed Rule," July 31, 2007.



within the areas proposed for critical habitat.<sup>94</sup> Several other nonnative species are present within proposed critical habitat areas, however the effects of these species on the DRM are less clear.

#### Smallmouth Bass

106. Smallmouth bass were stocked in the Amistad Reservoir in 1975 as a sportfish and subsequently migrated up the Devils River from the reservoir in the early 1980s.<sup>95</sup> Smallmouth bass are very efficient predators on small to moderately sized fish and could reduce DRM populations in the Devils River through predation. However, the effect of smallmouth bass predation on DRM populations is not fully understood at this time.

#### Armored Catfish

107. According to the Service, armored catfish may compete with the DRM for food in the San Felipe Creek.<sup>96</sup> The two species occupy similar niches in the food web, grazing on algae and microorganisms found on the stream bottom. Other nonnative catfish species have been found to change plant communities, create bank erosion due to burrowing, and accidentally eat native fish eggs while grazing.

#### Other Nonnative Species

108. There are a number of additional nonnative species in San Felipe Creek and the Devils River with lesser-known effects on the DRM. Most notable are the large populations of African rivercane, Chinese tallow, and elephant's ears found along the banks of San Felipe Creek. Such nonnative vegetation can alter stream bank stability and erosion control, however the direct effects of these species on the DRM is most likely minimal. Additionally, San Felipe Creek contains populations of African cichlid, Asian snail, and Asian bivalve mollusk, while the Devils River contains a population of African cichlid. Little is known about the effects of these species on the DRM.

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<sup>94</sup> U.S. Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Devils River Minnow; Proposed Rule," July 31, 2007.

<sup>95</sup> U.S. Fish and Wildlife Service, Devils River Minnow Recovery Plan, September 2005.

<sup>96</sup> U.S. Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Devils River Minnow; Proposed Rule," July 31, 2007.

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## 4.2 BASELINE ACTIVITIES AND IMPACTS

109. This section describes the pre- and post-designation baseline impacts related to conservation measures focused on limiting the effects of nonnative species on the DRM.

### 4.2.1 PRE-DESIGNATION IMPACTS

110. To date, activities addressing the threat of nonnative species have included sampling, monitoring, and researching nonnative species to determine their extent in areas known to contain DRM. Specifically, as part of the voluntary 1998 Conservation Agreement between the Service, TPWD, the City of Del Rio, and local landowners, TPWD agreed to research and prevent the dumping of baitfish in the historic range of the DRM.<sup>97</sup> TPWD also agreed to sample for nonnative species in the Devils River, San Felipe Creek, and Pinto Creek. The annual costs of these sampling and monitoring activities vary depending on the year; the average annual costs (undiscounted) of sampling and monitoring for nonnative species in the Devils River, San Felipe Creek, and Pinto Creek are \$1,240, \$1,240, and \$620, respectively.<sup>98</sup> Starting in 2007, TPWD spent an additional \$60,000 on a two-year research project on the feeding behavior of armored catfish in San Felipe Creek. There are no pre-designation impacts to the Las Moras Creek and Sycamore Creek units, as no sampling, monitoring, and research of nonnative species occurred in these units between 1999 and 2007.<sup>99</sup>
111. Additionally, the management plans drafted by the City of Del Rio and the San Felipe Country Club in 2003 to conserve the DRM and return the San Felipe Creek ecosystem to its natural state include measures to remove nonnative vegetation (i.e. African rivercane, Chinese tallow, and elephant's ears) from the banks of the creek and replant these areas with native plant species. As the restoration of native vegetation to the banks of San Felipe Creek has the potential to improve water quality within the creek by limiting erosion and surface runoff, the economic impacts to the city and the country club of removing all nonnative vegetation along with a more detailed discussion of the specific measures the city and the country club have taken to remove nonnative vegetation are included in the baseline impacts presented in Chapter 2.
112. Total pre-designation costs to control the effects of nonnative species on the DRM are listed in Exhibit 4-1.

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<sup>97</sup> Texas Parks and Wildlife Department, Conservation Agreement: Devils River Minnow, September 1, 1998.

<sup>98</sup> Costs determined through personal communication with Gary Garrett, TPWD, on October 8, 2007. For the purposes of this analysis, general sampling and monitoring costs supplied by Gary Garrett are distributed equally among population, stream quality, and nonnative species sampling and monitoring efforts (i.e., 1/3 of the total costs are assigned to each of these categories). Further, the costs for each type of sampling and monitoring are distributed among the Devils River, San Felipe Creek, and Pinto Creek units based on percentage estimates provided by Gary Garrett on October 9, 2007. Specifically, 40% of sampling and monitoring costs are assigned to the Devils River unit, 40% are assigned to the San Felipe Creek unit, and 20% are assigned to the Pinto Creek unit.

<sup>99</sup> Personal communication with Gary Garrett, TPWD, on November 9, 2007. Although approximately 75 percent of the \$60,000 funded for the armored catfish research on the San Felipe Creek came from a Federal grant through the State Wildlife Grants funding program, for this analysis, the full \$60,000 is allotted to TPWD.

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**EXHIBIT 4-1 SUMMARY OF PRE-DESIGNATION IMPACTS ASSOCIATED WITH THE CONTROL OF NONNATIVE SPECIES**

CRITICAL HABITAT UNIT	DISCOUNTED COSTS (7 %)
Devils River	\$14,400
San Felipe Creek	\$14,400
Pinto Creek	\$7,220
Total	\$36,100
Notes:	
<p>1. The economic impacts to the San Felipe Creek Unit do not include the costs to the City of Del Rio and the San Felipe Country Club of removing nonnative vegetation. These costs are included in the pre-designation impacts presented in Chapter 2.</p> <p>2. Totals may not sum due to rounding.</p>	
Source: Written communication with Gary Garrett, Texas Parks and Wildlife Department, on October 8, 2007.	

**4.2.2 POST-DESIGNATION BASELINE IMPACTS**

113. Sampling, monitoring, and research efforts by TPWD (described in the previous section) are expected to continue in the Devils River, San Felipe Creek, and Pinto Creek units following 2008 at an average annual cost (undiscounted) of \$1,333, \$1,333, and \$667, respectively.<sup>100</sup> Such efforts are counted as part of the economic baseline as they would have occurred irrespective of the critical habitat designation. It is likely that TPWD will allocate more funding to researching the threat of nonnative species, however, the timing and amount of future funding for such research is unclear. The findings of such research will likely determine whether TPWD or other interested parties initiate efforts to control for nonnative species. However, the nature of potential future efforts to control nonnative species is not known. Currently, TPWD does not anticipate sampling for nonnative species in Las Moras Creek and Sycamore Creek. Thus, there are no post-designation baseline impacts to either of these units.<sup>101</sup>
114. Total post-designation baseline impacts associated with controlling the effects of nonnative species on the DRM are presented in Exhibit 4-2.

<sup>100</sup> Costs determined through personal communication with Gary Garrett, TPWD, on October 8, 2007. See footnote 57 for a discussion of how costs are distributed among different sampling and monitoring activities and among the different proposed critical habitat units.

<sup>101</sup> Personal communication with Gary Garrett, Texas Parks and Wildlife Department, on November 9 2007..

**EXHIBIT 4-2 SUMMARY OF POST-DESIGNATION BASELINE IMPACTS ASSOCIATED WITH THE CONTROL OF NONNATIVE SPECIES**

CRITICAL HABITAT UNIT	DISCOUNTED COSTS (7 %)	ANNUALIZED COSTS (7 %)
Devils River	\$7,060	\$667
San Felipe Creek	\$35,100	\$3,310
Pinto Creek	\$3,530	\$333
Total	\$45,700	\$4,310
Notes: Totals may not sum due to rounding.		
Source: Written communication with Gary Garrett, Texas Parks and Wildlife Department, on October 8, 2007.		

**4.3 POST-DESIGNATION INCREMENTAL ACTIVITIES AND IMPACTS**

115. Post-designation incremental activities are those activities that are expected to occur after the final designation of critical habitat in 2008 that are related to preventing the adverse modification of critical habitat for the DRM.
116. Future efforts to limit the effects of nonnative species on the DRM are expected to occur absent critical habitat as a result of the 1998 Conservation Agreement and the management plans for the City of Del Rio and San Felipe Country Club. Therefore, these efforts are counted as part of the economic baseline. Due to the lack of additional efforts to limit the effects of nonnative species on the DRM as a result of critical habitat designation, there are no incremental impacts quantified beyond the additional administrative costs of consulting for critical habitat.<sup>102</sup> A detailed estimate of administrative costs is presented in Appendix A.

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<sup>102</sup> Personal communication with Gary Garrett, Texas Parks and Wildlife Department, on November 9, 2007.

## CHAPTER 5 | OTHER ACTIVITIES

117. This section describes other ongoing or forecast activities for the conservation of the DRM and quantifies the economic impacts of these activities when appropriate. Other activities for the DRM include:
- Sampling and monitoring efforts not discussed in previous sections.
  - Potential future conservation activities in the Sycamore Creek and Las Moras Creek units as a result of critical habitat designation.

### SUMMARY OF IMPACTS (2008-2027)

118. The following economic impacts are anticipated in proposed critical habitat areas related to other future conservation efforts for the DRM. These impacts do not include administrative costs, which are presented in Appendix A.

#### Post-designation baseline impacts in areas proposed for critical habitat

- Present value applying a seven percent discount rate: \$35,300

#### Post-designation incremental impacts in areas proposed for critical habitat

- Present value applying a seven percent discount rate: \$0

### 5.1 BACKGROUND ON SAMPLING AND MONITORING EFFORTS

119. Most conservation measures for the DRM, other than those discussed in previous chapters involve sampling and monitoring for the species and its habitat. To date, TPWD has undertaken the majority of sampling and monitoring efforts. However, The Nature Conservancy (TNC) does a significant amount of ecological monitoring on its land and conservation easements, which includes monitoring stream quality and DRM populations.<sup>103</sup>

#### 5.1.1 TPWD SAMPLING AND MONITORING

120. As part of the 1998 Conservation Agreement, TPWD agreed to increase its sampling and monitoring efforts for the DRM by monitoring stream quality and habitat structure in the Devils River, San Felipe Creek, and Pinto Creek, in addition to ongoing population monitoring efforts in these streams.<sup>104</sup> Additionally, TPWD agreed to confer with

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<sup>103</sup> Personal communication with John Karges, The Nature Conservancy, on November 14, 2007.

<sup>104</sup> Texas Parks and Wildlife Department, Conservation Agreement: Devils River Minnow, September 1, 1998.

landowners interested in conserving the DRM and its habitat. Currently, TPWD continues its DRM sampling, monitoring, and consultation efforts.

#### 5.1.2 TNC SAMPLING AND MONITORING

121. TNC owns a large amount of land along the Devils River known as the Dolan Falls Preserve. Additionally, TNC owns a number of conservation easements along the Devils River. In total, TNC owns approximately 169,800 acres of land and conservation easements adjacent to the Devils River.<sup>105</sup> The conservation land and easements were purchased as part of the TNC's primary objective to preserve ecosystems and restore them to their natural state. In an effort to achieve its objective, TNC scientists sample and monitor a variety of biological and ecological parameters on TNC land and conservation easements. The DRM is one of the biological parameters studied within TNC's land and easements along the proposed Devils River critical habitat unit. Additionally, TNC monitors stream quality within the Devils River, which may provide information on changes to the habitat structure of the minnow in the stream.<sup>106</sup>
122. TNC also carries out groundwater monitoring during oil and gas exploration projects. Specifically, oil and gas exploration occurs within TNC's conservation easements along the Devils River. When an oil or gas well is drilled, TNC installs groundwater-monitoring wells at significant costs in order to monitor the effects of the oil or gas well on the level and quality of groundwater in the area.<sup>107</sup>
123. Because TNC's sampling and monitoring efforts for the DRM represent a small part of more general ecological monitoring,<sup>108</sup> which would occur if the minnow was not present in the Devils River, the costs of TNC's sampling and monitoring efforts are not included in this analysis.

#### 5.2 POTENTIAL FUTURE CONSERVATION ACTIVITIES IN SYCAMORE CREEK AND LAS MORAS CREEK

124. The Sycamore Creek and Las Moras Creek units are not currently occupied by the DRM nor were they occupied when the species was listed in 1999; thus, no conservation measures for the DRM were taken in these units following listing, resulting in pre- and post-designation baseline impacts of zero for both units. The Proposed Rule states that, "restoring Devils River minnow to Sycamore and Las Moras Creek may be important to achieve recovery goals for the species and optimize the chance of long-term species conservation."<sup>109</sup> According to the Service, repopulation of the DRM in Sycamore Creek

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<sup>105</sup> U.S. Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Devils River Minnow; Proposed Rule," July 31, 2007.

<sup>106</sup> Personal communication with John Karges, The Nature Conservancy, on November 14, 2007.

<sup>107</sup> Ibid.

<sup>108</sup> Ibid.

<sup>109</sup> U.S. Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Devils River Minnow; Proposed Rule," July 31, 2007.

and Las Moras Creek could occur in the future. However, repopulation efforts would not begin until an agreement between the Service and members of the communities near Sycamore Creek and Las Moras Creek was reached. The agreement would define the areas to be repopulated, taking into account the effects of such repopulation on the local community.<sup>110</sup>

125. TPWD would most likely undertake the DRM repopulation efforts in Sycamore Creek and Las Moras Creek, if repopulation of the DRM were to take place in these streams. TPWD would carry out habitat sampling prior to repopulating the streams to determine the best areas in each stream to stock the species. Following the stocking of the species, TPWD would monitor the introduced populations, while continuing to monitor habitat quality. However, no habitat sampling and monitoring or repopulation efforts are expected to occur until an agreement between the Service and local communities is reached.<sup>111</sup>
126. Because it is currently unclear if or when conservation measures for the DRM will be taken in the Sycamore Creek and Las Moras Creek units, this analysis does not quantify any post-designation incremental impacts for either unit beyond administrative costs related to consulting for adverse modification under section 7 of the Act.

### 5.3 BASELINE ACTIVITIES AND IMPACTS

127. This section describes the pre- and post-designation impacts related to sampling and monitoring efforts for the DRM.

#### 5.3.1 PRE-DESIGNATION ACTIVITIES AND IMPACTS

128. TPWD's sampling and monitoring efforts (described in section 5.1.1), prior to the final designation of critical habitat comprise the only pre-designation impacts related to the other conservation measures taken for the DRM. TPWD did not undertake any sampling and monitoring for the DRM in Las Moras Creek and Sycamore Creek. Thus, there are no pre-designation impacts in these units. The total costs of these efforts, presented in Exhibit 5-1, are \$64,100, discounted at three percent.<sup>112</sup>

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<sup>110</sup> Personal communication with Service biologist, U.S. Fish and Wildlife Service, on October 24, 2007.

<sup>111</sup> Personal communication with Gary Garrett, TPWD, on November 9, 2007.

<sup>112</sup> Costs determined through personal communication with Gary Garrett, TPWD, on October 8, 2007. For the purposes of this analysis, general sampling and monitoring costs supplied by Gary Garrett are distributed equally among population, stream quality, and nonnative species sampling and monitoring efforts (i.e., 1/3 of the total costs are assigned to each of these categories). Further, the costs for each type of sampling and monitoring are distributed among the Devils River, San Felipe Creek, and Pinto Creek units based on percentage estimates provided by Gary Garrett on October 9, 2007. Specifically, 40% of sampling and monitoring costs are assigned to the Devils River unit, 40% are assigned to the San Felipe Creek unit, and 20% are assigned to the Pinto Creek unit. Because nonnative species sampling and monitoring is included in Chapter 4 of this report, only population and stream quality sampling and monitoring efforts are included in the other activities section.

**EXHIBIT 5-1 PRE-DESIGNATION IMPACTS ASSOCIATED WITH GENERAL CONSERVATION MEASURES FOR THE DRM**

CRITICAL HABITAT UNIT	DISCOUNTED COSTS (7 %)
Devils River	\$28,900
San Felipe Creek	\$28,900
Pinto Creek	\$14,400
Total	\$72,200

Note: Totals may not sum due to rounding.

**5.3.2 POST-DESIGNATION ACTIVITIES AND IMPACTS**

129. Sampling and monitoring by TPWD is expected to continue in the Devils River, San Felipe Creek, and Las Moras Creek, irrespective of critical habitat designation. Therefore, the costs of sampling and monitoring efforts in these streams are included in the post-designation baseline. Currently, there is no sampling and monitoring planned for Las Moras Creek and Sycamore Creek. Thus, there are no post-designation baseline impacts in these units. The total costs of future sampling and monitoring activities, presented in Exhibit 5-2, are \$49,600 discounted at three percent.

**EXHIBIT 5-2 POST-DESIGNATION BASELINE IMPACTS ASSOCIATED WITH GENERAL CONSERVATION MEASURES FOR THE DRM**

CRITICAL HABITAT UNIT	DISCOUNTED COSTS (7 %)	ANNUALIZED COSTS (7 %)
Devils River	\$14,100	\$1,330
San Felipe Creek	\$14,100	\$1,330
Pinto Creek	\$7,060	\$667
Total	\$35,300	\$3,330

Note: Totals may not sum due to rounding.

**5.4 POST-DESIGNATION INCREMENTAL ACTIVITIES AND IMPACTS**

130. Post-designation incremental activities are those activities that are expected to occur after the final designation of critical habitat in 2008 that are related to preventing the adverse modification of critical habitat for the DRM.
131. No additional sampling and monitoring efforts are expected for the DRM as a result of critical habitat designation.<sup>113</sup> Thus, there are no post-designation incremental impacts quantified beyond the additional administrative costs of consulting for critical habitat. A detailed estimate of administrative costs is presented in Appendix A.

<sup>113</sup> Personal communication with Gary Garrett, Texas Parks and Wildlife Department on October 4, 2007.



## APPENDIX A | ADMINISTRATIVE COSTS

132. This appendix presents the administrative costs associated with past and future consultations for the DRM under section 7 of the Endangered Species Act in the areas proposed for critical habitat. Similar to other impact sections, administrative costs are broken into three categories: pre-designation baseline costs (1999-2007), post-designation baseline costs (2008-2027), and post-designation incremental costs (2008-2027). All administrative costs associated with consultations that occur before the final designation of critical habitat in 2008 are included in pre-designation baseline costs. Administrative costs associated with consultations following the final designation of critical habitat are split between post-designation baseline costs and post-designation incremental costs. Costs are counted as part of the post-designation baseline if they are due to a consultation regarding the take or jeopardy of the species. Costs are counted as post-designation incremental costs if they are due to a consultation regarding the adverse modification of critical habitat.
133. A detailed discussion of the different types of consultations possible under section 7, the cost of each consultation type, and the methodology used to breakdown post-designation consultation costs into baseline and incremental impacts is provided in Chapter 1. This appendix estimates the number of post-designation consultations expected in each critical habitat unit within a 20-year period following the final designation of critical habitat for the DRM. Using the number of post-designation consultations for each critical habitat unit, this appendix estimates the total administrative costs of all past and future consultations for the DRM.

### A.1 PRE-DESIGNATION BASELINE ADMINISTRATIVE COSTS

134. Since the DRM was listed as threatened in 1999, there has been one formal section 7 consultation, nine informal consultations, and five technical assistance events.<sup>114</sup> The total pre-designation administrative costs are estimated to be \$104,000 (undiscounted), or \$130,000, discounted at seven percent, as presented in Exhibit A-1. The San Felipe Creek unit has the highest past administrative costs (\$62,700), followed by the Devils

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<sup>114</sup> The number of past consultations is based on IEC's review of the consultation history for the DRM from 1999 to present day. Note that the past programmatic consultation regarding NRCS Farm Bill vegetation management is considered to have incurred costs approximately equal to one informal consultation related to Devils River minnow. Although Las Moras and Sycamore Creeks are not occupied by the species, the Service considers that they would have been addressed under the listing of the species. As such, the cost of this past informal species is split among the five units considered for designation.

River unit (\$19,700) and the Pinto Creek unit (\$18,500). The Las Moras Creek and Sycamore Creek units have estimated pre-designation costs of \$2,000 each.

**EXHIBIT A-1 ESTIMATED PRE-DESIGNATION BASELINE ADMINISTRATIVE COSTS BY TYPE OF CONSULT AND CRITICAL HABITAT UNIT (1999 - 2007, \$2007)**

UNIT	TYPE OF CONSULT	NUMBER OF CONSULTATIONS	TOTAL COSTS
Devils River	Formal	0	\$0
	Informal	2.2	\$18,200
	Technical Assistance	1	\$1,500
	<b>Subtotal</b>	3.2	\$19,700
San Felipe Creek	Formal	1	\$19,500
	Informal	4.2	\$37,200
	Technical Assistance	4	\$6,000
	<b>Subtotal</b>	9.2	\$62,700
Pinto Creek	Formal	0	\$0
	Informal	2.2	\$18,500
	Technical Assistance	0	\$0
	<b>Subtotal</b>	2.2	\$18,500
Las Moras Creek	Formal	0	\$0
	Informal	0.2	\$1,490
	Technical Assistance	0	\$0
	<b>Subtotal</b>	0.2	\$1,490
Sycamore Creek	Formal	0	\$0
	Informal	0.2	\$1,490
	Technical Assistance	0	\$0
	<b>Subtotal</b>	0.2	\$1,490
<b>Total (Undiscounted)</b>	Formal	1	\$19,500
	Informal	9	\$76,900
	Technical Assistance	5	\$7,500
	<b>Overall Total</b>	15	\$104,000
<b>Total (Discounted at 3%)</b>	<b>Overall Total</b>	15	\$114,000
<b>Total (Discounted at 7%)</b>	<b>Overall Total</b>	15	\$130,000
Notes:			
1. Totals may not sum due to rounding.			
2. Past costs for informal consultations do not equal the number of consultations multiplied by the full informal consultation cost of \$9,500 because there were three instances where an informal consultation did not include either a third party or a biological assessment. In those cases, the cost to a third party or the cost of a biological assessment was deducted from the total informal consultation cost.			

## A.2 POST-DESIGNATION CONSULTATIONS

135. In general, the frequency of consultations for a listed species increases following the designation of critical habitat if the frequency of projects requiring a consultation for the species increases or if additional consultations resulting entirely from critical habitat designation occur (i.e., consultations for just the adverse modification of critical habitat). Neither of these events is expected to occur for the DRM.

### Future projects requiring consultation for the DRM

136. Based on the amount and nature of currently planned projects in the areas proposed for DRM critical habitat, the frequency of projects requiring consultation for the minnow is not expected to increase in the near future.

### Additional consultations resulting entirely from critical habitat designation

137. The areas proposed for critical habitat in the Devils River, San Felipe Creek, and Pinto Creek are all currently occupied by the DRM. In addition, the Service considers that areas not currently known to be occupied would nonetheless have been addressed when relevant under any consultations related to DRM since the listing of the species.<sup>115</sup> As a result, no future consultations are expected to occur due entirely to the designation of critical habitat. However, future consultations in these areas will be required to address both jeopardy and adverse modification in the future.

### Estimating the frequency of post-designation consultations

138. As discussed in Section 2 of this analysis, this analysis assumes that a formal biological opinion regarding brush control activities will occur every five years in the foreseeable future with NRCS. In addition, based on the occurrence of pre-designation consultations, this analysis estimates the frequency of future consultations for each critical habitat unit over the 20-year period following the final designation of critical habitat. Because of the predominance of water quality issues in the existing consultation record, many of these future consultations are assumed to be related to this issue, although no specific projects were identified at present by affected agencies. Using the estimated frequencies of future consultations, this analysis estimates the total number of future consultations for each critical habitat unit (see Exhibit A-2).<sup>116</sup>

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<sup>115</sup> Teleconference communication with Service, Washington, DC, Southwest Regional Office, and the Austin Ecological Field Office, September 13, 2007.

<sup>116</sup> The frequency of future consultations within a given critical habitat unit is estimated by dividing the total number of past consultations (consultations occurring between 1999 and 2008) that have occurred in the unit by the number of years between the listing year (1999) and the year of final critical habitat designation (2008). The critical habitat unit-specific future consultation frequencies are reduced so that they each have a numerator of one. This provides an estimate of the consultation period (i.e. the number of years between consultation occurrences). The consultation period estimates are used to determine when future consultations will occur within each critical habitat unit. Summing the future consultations for each critical habitat unit over the twenty-year period following the final designation of critical habitat yields the total number of future consultations.

**A.3 POST-DESIGNATION BASELINE ADMINISTRATIVE COSTS**

139. The total post-designation baseline administrative costs are estimated to be \$192,000 (undiscounted), or \$101,000, discounted at seven percent, as presented in Exhibit A-2. over the twenty-year period following the final designation of critical habitat. This total is equivalent to an annualized value of \$9,500, assuming a seven percent discount rate. Similar to pre-designation baseline administrative costs, the San Felipe Creek unit has the highest post-designation baseline costs, \$118,000 (undiscounted) followed by the Devils River and Pinto Creek units. Minor costs associated with portions of future consultations with NRCS are expected to be associated with Las Moras and Sycamore Creeks.

**A.4 POST-DESIGNATION INCREMENTAL ADMINISTRATIVE COSTS**

140. The total post-designation incremental administrative costs are estimated to be \$64,000 (undiscounted), or \$33,600, discounted at seven percent, as presented in Exhibits A-4 and A-5. This total is equivalent to an annualized value of \$3,200 assuming a seven percent discount rate. Again, the San Felipe Creek unit has the highest administrative costs with an estimated post-designation incremental cost of \$20,500, assuming a seven percent discount rate. The Devils River unit and the Pinto Creek unit have estimated post-designation incremental administrative costs of \$6,500 and \$4,400 respectively, assuming a seven percent discount rate. Minor costs associated with portions of future consultations with NRCS are expected to be associated with Las Moras and Sycamore Creeks.

**A.5 CAVEATS**

141. The number of consultations and technical assistance efforts to be undertaken in the future for activities within a given critical habitat unit is highly uncertain. The frequency of such efforts will be related to the level of economic activity, the presence of HCPs or other regional plans that obviate the need for consultation, and the extent to which economic activity overlaps with critical habitat. To the extent that this analysis over or underestimates the number of these efforts in the future, estimated costs will be over or understated.

**EXHIBIT A-2 ESTIMATED POST-DESIGNATION BASELINE ADMINISTRATIVE COSTS BY TYPE OF CONSULT AND CRITICAL HABITAT UNIT (2008 - 2027, \$2007)**

UNIT	TYPE OF CONSULT	NUMBER OF CONSULTATIONS	TOTAL COSTS
Devils River	Formal	0	\$0
	Informal	4.8	\$34,200
	Technical Assistance	2	\$2,260
	<b>Subtotal</b>	6.8	\$36,500
San Felipe Creek	Formal	2	\$29,200
	Informal	10.8	\$77,000
	Technical Assistance	10	\$11,300
	<b>Subtotal</b>	22.8	\$118,000
Pinto Creek	Formal	0	\$0
	Informal	3.8	\$27,100
	Technical Assistance	0	\$0
	<b>Subtotal</b>	3.8	\$27,100
Las Moras Creek	Formal	0	\$0
	Informal	0.8	\$5,700
	Technical Assistance	0	\$0
	<b>Subtotal</b>	0.8	\$5,700
Sycamore Creek	Formal	0	\$0
	Informal	0.8	\$5,700
	Technical Assistance	0	\$0
	<b>Subtotal</b>	0.8	\$5,700
<b>Total (Undiscounted)</b>	Formal	2	\$29,200
	Informal	21	\$150,000
	Technical Assistance	12	\$13,600
	<b>Overall Total</b>	35	\$192,000
<b>Total (Discounted at 3%)</b>	<b>Overall Total</b>	35	\$143,000
<b>Total (Discounted at 7%)</b>	<b>Overall Total</b>	35	\$101,000

Note: Totals may not sum due to rounding. As discussed in Section 2 of this analysis, this analysis assumes that a formal biological opinion regarding brush control activities will occur every five years in the foreseeable future with NRCS. In addition, based on the occurrence of pre-designation consultations, this analysis estimates the frequency of future consultations for each critical habitat unit over the 20-year period following the final designation of critical habitat.

**EXHIBIT A-3 ESTIMATED TOTAL POST-DESIGNATION BASELINE ADMINISTRATIVE COSTS BY CRITICAL HABITAT UNIT (2008 - 2027, \$2007)**

UNIT	DISCOUNTED COSTS (7 %)	ANNUALIZED COSTS (7 %)
Devils River	\$19,600	\$1,850
San Felipe Creek	\$61,600	\$5,810
Pinto Creek	\$13,100	\$1,230
Las Moras Creek	\$3,220	\$304
Sycamore Creek	\$3,220	\$304
<b>Total</b>	<b>\$101,000</b>	<b>\$9,500</b>

Note: Totals may not sum due to rounding.

**EXHIBIT A-4 ESTIMATED POST-DESIGNATION INCREMENTAL ADMINISTRATIVE COSTS BY TYPE OF CONSULT AND CRITICAL HABITAT UNIT (2008 - 2027, \$2007)**

UNIT	TYPE OF CONSULT	NUMBER OF CONSULTATIONS	TOTAL COSTS
Devils River	Formal	0	\$0
	Informal	4.8	\$11,400
	Technical Assistance	2	\$750
	<b>Subtotal</b>	6.8	\$12,200
San Felipe Creek	Formal	2	\$9,760
	Informal	10.8	\$25,700
	Technical Assistance	10	\$3,750
	<b>Subtotal</b>	22.8	\$39,200
Pinto Creek	Formal	0	\$0
	Informal	3.8	\$9,040
	Technical Assistance	0	\$0
	<b>Subtotal</b>	3.8	\$9,040
Las Moras Creek	Formal	0	\$0
	Informal	0.8	\$1,900
	Technical Assistance	0	\$0
	<b>Subtotal</b>	0.8	\$1,900
Sycamore Creek	Formal	0	\$0
	Informal	0.8	\$1,900
	Technical Assistance	0	\$0
	<b>Subtotal</b>	0.8	\$1,900
<b>Total (Undiscounted)</b>	Formal	2	\$9,760
	Informal	21	\$50,000
	Technical Assistance	12	\$4,500
	<b>Overall Total</b>	35	\$64,200
<b>Total (Discounted at 3%)</b>	<b>Overall Total</b>	35	\$47,600
<b>Total (Discounted at 7%)</b>	<b>Overall Total</b>	35	\$33,600

Note: Totals may not sum due to rounding.

**EXHIBIT A-5 ESTIMATED TOTAL POST-DESIGNATION INCREMENTAL ADMINISTRATIVE COSTS BY CRITICAL HABITAT UNIT (2008 - 2027, \$2007)**

UNIT	DISCOUNTED COSTS (7 %)	ANNUALIZED COSTS (7 %)
Devils River	\$6,540	\$600
San Felipe Creek	\$20,500	\$1,900
Pinto Creek	\$4,370	\$400
Las Moras Creek	\$1,070	\$100
Sycamore Creek	\$1,070	\$100
<b>Total</b>	<b>\$33,600</b>	<b>\$3,200</b>

Note: Totals may not sum due to rounding.



## APPENDIX B | SMALL BUSINESS AND ENERGY IMPACT ANALYSES

142. This appendix considers the extent to which the impacts discussed in the previous sections could be borne by small businesses and the energy industry. The analysis presented in Section B.1 is conducted pursuant to the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996. Information for this analysis was gathered from the Small Business Administration (SBA), U.S. Census Bureau, and the Risk Management Association (RMA). The energy analysis in Section B.2 is conducted pursuant to Executive Order No. 13211.

### B.1 IMPACTS TO SMALL ENTITIES

143. When a Federal agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions).<sup>117</sup> No initial regulatory flexibility analysis (IRFA) is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the RFA to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have significant economic impact on a substantial number of small entities. To assist in this process, this appendix provides a screening level analysis of the potential for DRM conservation efforts to affect small entities.

### ANALYSIS OF IMPACTS TO SMALL ENTITIES

144. All post-designation incremental impacts are due to administrative costs related to consulting for adverse modification under section 7 of the Act (administrative costs are detailed in Appendix A). Because all incremental impacts are due to administrative costs, this screening analysis evaluates the potential for economic impacts related only to administrative costs.
145. Entities that are forecast to bear post-designation incremental impacts are:
- TxDOT
  - The City of Del Rio

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<sup>117</sup> 5 U.S.C. 601 et seq.

- Other Entities (e.g. USACOE, National Parks Service, U.S. Cellular, miscellaneous small entities)<sup>118</sup>

Of these entities, only the City of Del Rio and the miscellaneous small entities included as other entities in the analysis qualify as small businesses or entities. Specifically, the RFA defines three types of small entities:

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

146. Based on the analysis presented in Appendix A, the City of Del Rio and other miscellaneous small entities are expected to incur, at most, combined, annualized administrative costs related to consultations for adverse modification of approximately \$3,000, assuming a three percent discount rate. Due to the relatively small annualized

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<sup>118</sup> Miscellaneous small entities include local developers and private landowners. The consultation history for the DRM contained several past consultations involving local developers and private landowners. These entities represent third parties in consultations for the species. Although the same developers and landowners are not expected to undertake projects post-designation requiring consultation for the DRM, IEC assumes that similar consultations will occur as a result of future post-designation projects involving other local developers and private landowners. Thus, these parties are included in the "other entity" category.

post-designation incremental impacts expected for the City of Del Rio and other miscellaneous small entities, there are no forecast indirect impacts associated with post-designation incremental impacts to the small businesses and entities included in this analysis.

## **B.2 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY**

147. Pursuant to Executive Order No. 13211, “Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use,” issued May 18, 2001, Federal agencies must prepare and submit a “Statement of Energy Effects” for all “significant energy actions.” The purpose of this requirement is to ensure that all Federal agencies “appropriately weigh and consider the effects of the Federal Government’s regulations on the supply, distribution, and use of energy.”<sup>119</sup>
148. The Office of Management and Budget provides guidance for implementing this Executive Order, outlining nine outcomes that may constitute “a significant adverse effect” when compared with the regulatory action under consideration:
- Reductions in crude oil supply in excess of 10,000 barrels per day (bbls);
  - Reductions in fuel production in excess of 4,000 barrels per day;
  - Reductions in coal production in excess of 5 million tons per year;
  - Reductions in natural gas production in excess of 25 million Mcf per year;
  - Reductions in electricity production in excess of 1 billion kilowatts-hours per year or in excess of 500 megawatts of installed capacity;
  - Increases in energy use required by the regulatory action that exceed the thresholds above;
  - Increases in the cost of energy production in excess of one percent;
  - Increases in the cost of energy distribution in excess of one percent; or
  - Other similarly adverse outcomes.<sup>120</sup>

As none of these criteria is relevant to this analysis, energy-related impacts associated with conservation efforts within the potential critical habitat are not expected.

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<sup>119</sup>Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing E.O. 13211, M-01-27, Office of Management and Budget, July 13, 2001, <http://www.whitehouse.gov/omb/memoranda/m01-27.html>.

<sup>120</sup> Ibid.

## APPENDIX C | IMPACTS AT THREE PERCENT DISCOUNT RATE

### EXHIBIT C-1 PRE-DESIGNATION BASELINE IMPACTS

UNIT	DISCOUNTED AT 3%
Devils River	\$59,500
San Felipe Creek	\$286,000
Pinto Creek	\$39,400
Las Moras Creek	\$1,630
Sycamore Creek	\$1,630
<b>Total</b>	<b>\$388,000</b>

### EXHIBIT C-2 POST-DESIGNATION BASELINE IMPACTS

UNIT	DISCOUNTED AT 3%	ANNUALIZED COSTS AT 3%
Devils River	\$57,100	\$3,840
San Felipe Creek	\$306,000	\$20,600
Pinto Creek	\$34,400	\$2,310
Las Moras Creek	\$4,370	\$293
Sycamore Creek	\$4,370	\$293
<b>Total</b>	<b>\$406,000</b>	<b>\$27,300</b>

### EXHIBIT C-3 POST-DESIGNATION INCREMENTAL IMPACTS

UNIT	DISCOUNTED AT 3%	ANNUALIZED COSTS AT 3%
Devils River	\$9,120	\$613
San Felipe Creek	\$29,100	\$1,950
Pinto Creek	\$6,500	\$437
Las Moras Creek	\$1,460	\$98
Sycamore Creek	\$1,460	\$98
<b>Total</b>	<b>\$47,600</b>	<b>\$3,200</b>

## APPENDIX D | UNDISCOUNTED IMPACTS BY ACTIVITY AND UNIT

EXHIBIT D-1. UNDISCOUNTED ADMINISTRATIVE IMPACTS BY UNIT

YEAR	PROPOSED CRITICAL HABITAT				
	DEVILS RIVER	SAN FELIPE CREEK	PINTO CREEK	LAS MORAS CREEK	SYCAMORE CREEK
<b>Pre-Designation Impacts</b>					
1999	\$0	\$0	\$0	\$0	\$0
2000	\$0	\$9,500	\$0	\$0	\$0
2001	\$0	\$0	\$0	\$0	\$0
2002	\$1,500	\$12,500	\$0	\$0	\$0
2003	\$0	\$10,200	\$0	\$0	\$0
2004	\$1,490	\$10,990	\$18,490	\$1,490	\$1,490
2005	\$16,700	\$0	\$0	\$0	\$0
2006	\$0	\$19,500	\$0	\$0	\$0
2007	\$0	\$0	\$0	\$0	\$0
<b>Post-Designation Impacts (Baseline)</b>					
2008	\$0	\$8,260	\$0	\$0	\$0
2009	\$1,426	\$1,426	\$1,426	\$1,426	\$1,426
2010	\$7,130	\$8,260	\$0	\$0	\$0
2011	\$1,130	\$0	\$0	\$0	\$0
2012	\$0	\$8,260	\$0	\$0	\$0
2013	\$0	\$0	\$0	\$0	\$0
2014	\$1,426	\$9,686	\$8,556	\$1,426	\$1,426
2015	\$7,130	\$14,600	\$0	\$0	\$0
2016	\$0	\$8,260	\$0	\$0	\$0
2017	\$0	\$0	\$0	\$0	\$0
2018	\$0	\$8,260	\$0	\$0	\$0
2019	\$1,426	\$1,426	\$8,556	\$1,426	\$1,426
2020	\$8,260	\$8,260	\$0	\$0	\$0
2021	\$0	\$0	\$0	\$0	\$0
2022	\$0	\$8,260	\$0	\$0	\$0
2023	\$0	\$0	\$0	\$0	\$0
2024	\$1,426	\$24,286	\$8,556	\$1,426	\$1,426

YEAR	PROPOSED CRITICAL HABITAT				
	DEVILS RIVER	SAN FELIPE CREEK	PINTO CREEK	LAS MORAS CREEK	SYCAMORE CREEK
2025	\$7,130	\$0	\$0	\$0	\$0
2026	\$0	\$8,260	\$0	\$0	\$0
2027	\$0	\$0	\$0	\$0	\$0
<b>Post-Designation Impacts (Incremental)</b>					
2008	\$0	\$2,755	\$0	\$0	\$0
2009	\$476	\$476	\$476	\$476	\$476
2010	\$2,380	\$2,755	\$0	\$0	\$0
2011	\$375	\$0	\$0	\$0	\$0
2012	\$0	\$2,755	\$0	\$0	\$0
2013	\$0	\$0	\$0	\$0	\$0
2014	\$476	\$3,231	\$2,856	\$476	\$476
2015	\$2,380	\$4,880	\$0	\$0	\$0
2016	\$0	\$2,755	\$0	\$0	\$0
2017	\$0	\$0	\$0	\$0	\$0
2018	\$0	\$2,755	\$0	\$0	\$0
2019	\$476	\$476	\$2,856	\$476	\$476
2020	\$2,755	\$2,755	\$0	\$0	\$0
2021	\$0	\$0	\$0	\$0	\$0
2022	\$0	\$2,755	\$0	\$0	\$0
2023	\$0	\$0	\$0	\$0	\$0
2024	\$476	\$8,111	\$2,856	\$476	\$476
2025	\$2,380	\$0	\$0	\$0	\$0
2026	\$0	\$2,755	\$0	\$0	\$0
2027	\$0	\$0	\$0	\$0	\$0

## EXHIBIT D-2. UNDISCOUNTED WATER QUALITY IMPACTS BY UNIT

YEAR	PROPOSED CRITICAL HABITAT				
	DEVILS RIVER	SAN FELIPE CREEK	PINTO CREEK	LAS MORAS CREEK	SYCAMORE CREEK
<b>Pre-Designation Impacts</b>					
1999	\$0	\$0	\$0	\$0	\$0
2000	\$0	\$0	\$0	\$0	\$0
2001	\$0	\$51,275	\$0	\$0	\$0
2002	\$0	\$22,500	\$0	\$0	\$0
2003	\$0	\$5,625	\$0	\$0	\$0
2004	\$0	\$0	\$0	\$0	\$0
2005	\$0	\$14,360	\$0	\$0	\$0
2006	\$0	\$29,360	\$0	\$0	\$0
2007	\$0	\$8,600	\$0	\$0	\$0
<b>Post-Designation Impacts (Baseline)</b>					
2008	\$0	\$8,600	\$0	\$0	\$0
2009	\$0	\$8,600	\$0	\$0	\$0
2010	\$0	\$0	\$0	\$0	\$0
2011	\$0	\$0	\$0	\$0	\$0
2012	\$0	\$79,400	\$0	\$0	\$0
2013	\$0	\$0	\$0	\$0	\$0
2014	\$0	\$0	\$0	\$0	\$0
2015	\$0	\$15,000	\$0	\$0	\$0
2016	\$0	\$0	\$0	\$0	\$0
2017	\$0	\$0	\$0	\$0	\$0
2018	\$0	\$0	\$0	\$0	\$0
2019	\$0	\$0	\$0	\$0	\$0
2020	\$0	\$79,400	\$0	\$0	\$0
2021	\$0	\$0	\$0	\$0	\$0
2022	\$0	\$0	\$0	\$0	\$0
2023	\$0	\$0	\$0	\$0	\$0
2024	\$0	\$15,000	\$0	\$0	\$0
2025	\$0	\$0	\$0	\$0	\$0
2026	\$0	\$0	\$0	\$0	\$0
2027	\$0	\$0	\$0	\$0	\$0
<b>Post-Designation Impacts (Incremental)</b>					
2008	\$0	\$0	\$0	\$0	\$0
2009	\$0	\$0	\$0	\$0	\$0
2010	\$0	\$0	\$0	\$0	\$0
2011	\$0	\$0	\$0	\$0	\$0
2012	\$0	\$0	\$0	\$0	\$0
2013	\$0	\$0	\$0	\$0	\$0
2014	\$0	\$0	\$0	\$0	\$0

YEAR	PROPOSED CRITICAL HABITAT				
	DEVILS RIVER	SAN FELIPE CREEK	PINTO CREEK	LAS MORAS CREEK	SYCAMORE CREEK
2015	\$0	\$0	\$0	\$0	\$0
2016	\$0	\$0	\$0	\$0	\$0
2017	\$0	\$0	\$0	\$0	\$0
2018	\$0	\$0	\$0	\$0	\$0
2019	\$0	\$0	\$0	\$0	\$0
2020	\$0	\$0	\$0	\$0	\$0
2021	\$0	\$0	\$0	\$0	\$0
2022	\$0	\$0	\$0	\$0	\$0
2023	\$0	\$0	\$0	\$0	\$0
2024	\$0	\$0	\$0	\$0	\$0
2025	\$0	\$0	\$0	\$0	\$0
2026	\$0	\$0	\$0	\$0	\$0
2027	\$0	\$0	\$0	\$0	\$0



## EXHIBIT D-3. UNDISCOUNTED NON-NATIVE SPECIES IMPACTS BY UNIT

YEAR	PROPOSED CRITICAL HABITAT				
	DEVILS RIVER	SAN FELIPE CREEK	PINTO CREEK	LAS MORAS CREEK	SYCAMORE CREEK
<b>Pre-Designation Impacts</b>					
1999	\$903	\$903	\$452	\$0	\$0
2000	\$1,895	\$1,895	\$947	\$0	\$0
2001	\$1,605	\$1,605	\$802	\$0	\$0
2002	\$2,367	\$2,367	\$1,184	\$0	\$0
2003	\$974	\$974	\$487	\$0	\$0
2004	\$1,338	\$1,338	\$669	\$0	\$0
2005	\$317	\$317	\$158	\$0	\$0
2006	\$789	\$789	\$395	\$0	\$0
2007	\$971	\$30,971	\$485	\$0	\$0
<b>Post-Designation Impacts (Baseline)</b>					
2008	\$667	\$30,667	\$333	\$0	\$0
2009	\$667	\$667	\$333	\$0	\$0
2010	\$667	\$667	\$333	\$0	\$0
2011	\$667	\$667	\$333	\$0	\$0
2012	\$667	\$667	\$333	\$0	\$0
2013	\$667	\$667	\$333	\$0	\$0
2014	\$667	\$667	\$333	\$0	\$0
2015	\$667	\$667	\$333	\$0	\$0
2016	\$667	\$667	\$333	\$0	\$0
2017	\$667	\$667	\$333	\$0	\$0
2018	\$667	\$667	\$333	\$0	\$0
2019	\$667	\$667	\$333	\$0	\$0
2020	\$667	\$667	\$333	\$0	\$0
2021	\$667	\$667	\$333	\$0	\$0
2022	\$667	\$667	\$333	\$0	\$0
2023	\$667	\$667	\$333	\$0	\$0
2024	\$667	\$667	\$333	\$0	\$0
2025	\$667	\$667	\$333	\$0	\$0
2026	\$667	\$667	\$333	\$0	\$0
2027	\$667	\$667	\$333	\$0	\$0
<b>Post-Designation Impacts (Incremental)</b>					
2008	\$0	\$0	\$0	\$0	\$0
2009	\$0	\$0	\$0	\$0	\$0
2010	\$0	\$0	\$0	\$0	\$0
2011	\$0	\$0	\$0	\$0	\$0
2012	\$0	\$0	\$0	\$0	\$0
2013	\$0	\$0	\$0	\$0	\$0
2014	\$0	\$0	\$0	\$0	\$0

YEAR	PROPOSED CRITICAL HABITAT				
	DEVILS RIVER	SAN FELIPE CREEK	PINTO CREEK	LAS MORAS CREEK	SYCAMORE CREEK
2015	\$0	\$0	\$0	\$0	\$0
2016	\$0	\$0	\$0	\$0	\$0
2017	\$0	\$0	\$0	\$0	\$0
2018	\$0	\$0	\$0	\$0	\$0
2019	\$0	\$0	\$0	\$0	\$0
2020	\$0	\$0	\$0	\$0	\$0
2021	\$0	\$0	\$0	\$0	\$0
2022	\$0	\$0	\$0	\$0	\$0
2023	\$0	\$0	\$0	\$0	\$0
2024	\$0	\$0	\$0	\$0	\$0
2025	\$0	\$0	\$0	\$0	\$0
2026	\$0	\$0	\$0	\$0	\$0
2027	\$0	\$0	\$0	\$0	\$0

## EXHIBIT D-4. UNDISCOUNTED OTHER ACTIVITIES IMPACTS BY UNIT

YEAR	PROPOSED CRITICAL HABITAT				
	DEVILS RIVER	SAN FELIPE CREEK	PINTO CREEK	LAS MORAS CREEK	SYCAMORE CREEK
<b>Pre-Designation Impacts</b>					
1999	\$1,807	\$1,807	\$903	\$0	\$0
2000	\$3,790	\$3,790	\$1,895	\$0	\$0
2001	\$3,209	\$3,209	\$1,605	\$0	\$0
2002	\$4,734	\$4,734	\$2,367	\$0	\$0
2003	\$1,948	\$1,948	\$974	\$0	\$0
2004	\$2,675	\$2,675	\$1,338	\$0	\$0
2005	\$634	\$634	\$317	\$0	\$0
2006	\$1,578	\$1,578	\$789	\$0	\$0
2007	\$1,942	\$1,942	\$971	\$0	\$0
<b>Post-Designation Impacts (Baseline)</b>					
2008	\$1,333	\$1,333	\$667	\$0	\$0
2009	\$1,333	\$1,333	\$667	\$0	\$0
2010	\$1,333	\$1,333	\$667	\$0	\$0
2011	\$1,333	\$1,333	\$667	\$0	\$0
2012	\$1,333	\$1,333	\$667	\$0	\$0
2013	\$1,333	\$1,333	\$667	\$0	\$0
2014	\$1,333	\$1,333	\$667	\$0	\$0
2015	\$1,333	\$1,333	\$667	\$0	\$0
2016	\$1,333	\$1,333	\$667	\$0	\$0
2017	\$1,333	\$1,333	\$667	\$0	\$0
2018	\$1,333	\$1,333	\$667	\$0	\$0
2019	\$1,333	\$1,333	\$667	\$0	\$0
2020	\$1,333	\$1,333	\$667	\$0	\$0
2021	\$1,333	\$1,333	\$667	\$0	\$0
2022	\$1,333	\$1,333	\$667	\$0	\$0
2023	\$1,333	\$1,333	\$667	\$0	\$0
2024	\$1,333	\$1,333	\$667	\$0	\$0
2025	\$1,333	\$1,333	\$667	\$0	\$0
2026	\$1,333	\$1,333	\$667	\$0	\$0
2027	\$1,333	\$1,333	\$667	\$0	\$0
<b>Post-Designation Impacts (Incremental)</b>					
2008	\$0	\$0	\$0	\$0	\$0
2009	\$0	\$0	\$0	\$0	\$0
2010	\$0	\$0	\$0	\$0	\$0
2011	\$0	\$0	\$0	\$0	\$0
2012	\$0	\$0	\$0	\$0	\$0
2013	\$0	\$0	\$0	\$0	\$0
2014	\$0	\$0	\$0	\$0	\$0

YEAR	PROPOSED CRITICAL HABITAT				
	DEVILS RIVER	SAN FELIPE CREEK	PINTO CREEK	LAS MORAS CREEK	SYCAMORE CREEK
2015	\$0	\$0	\$0	\$0	\$0
2016	\$0	\$0	\$0	\$0	\$0
2017	\$0	\$0	\$0	\$0	\$0
2018	\$0	\$0	\$0	\$0	\$0
2019	\$0	\$0	\$0	\$0	\$0
2020	\$0	\$0	\$0	\$0	\$0
2021	\$0	\$0	\$0	\$0	\$0
2022	\$0	\$0	\$0	\$0	\$0
2023	\$0	\$0	\$0	\$0	\$0
2024	\$0	\$0	\$0	\$0	\$0
2025	\$0	\$0	\$0	\$0	\$0
2026	\$0	\$0	\$0	\$0	\$0
2027	\$0	\$0	\$0	\$0	\$0