



ECONOMIC ANALYSIS OF CRITICAL
HABITAT DESIGNATION FOR
PREBLE'S MEADOW JUMPING MOUSE IN
COLORADO

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prepared for:

U.S. Fish and Wildlife Service

4401 N. Fairfax Drive

Arlington, VA 22203

prepared by:

Industrial Economics, Incorporated

2067 Massachusetts Avenue

Cambridge, MA 02140

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ACRONYMS AND ABBREVIATIONS

Act	Endangered Species Act
CEQA	California Environmental Quality Act
CH	critical habitat
CHD	critical habitat designation
CODOT	Colorado Department of Transportation
COU	Rocky Flats Central Operating Unit
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DRCOG	Denver Regional Council of Governments
EIR	Environmental Impact Report
E.O.	Executive Order
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highways Administration
GIS	geographic information system
HCP	Habitat Conservation Plans
NWR	National Wildlife Refuge
OMB	U.S. Office of Management and Budget
PCEs	primary constituent elements
PMJM	Preble's Meadow Jumping Mouse
PPACG	Pikes Peak Area Council of Governments
RFA	Regulatory Flexibility Act
SBREFA	Small Business Regulatory Enforcement Fairness Act
Service	U.S. Fish and Wildlife Service
SPR	Significant Portion of the Range
SUPs	special use permits
TAZ	Transportation Analysis Zone
USACE	U.S. Army Corps of Engineers
USDOE	U.S. Department of Energy
USFS	U.S. Forest Service

EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential economic impacts associated with the proposed revised critical habitat designation for the Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*) in Colorado, (hereafter, "PMJM"). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service).

OVERVIEW OF THE PROPOSED RULE

2. On May 13, 1998, the Service issued a Final Rule listing the PMJM as threatened under the Endangered Species Act (Act).¹ On May 22, 2001, the Service adopted a final section 4(d) special rule for the PMJM that provides exemptions from section 9 take prohibitions for certain rodent control activities, ongoing agricultural activities, maintenance and replacement of existing landscaping, and existing uses of water.² On October 1, 2002, the Service amended this special rule to provide exemptions for certain noxious weed control and ditch maintenance activities. The special rule was made permanent on May 20, 2004.³ On July 17, 2002, the Service proposed critical habitat for the PMJM in portions of Colorado and Wyoming and on June 23, 2003, issued a Final Rule.⁴
3. Soon after the 2003 designation, the City of Greeley and the Mountain States Legal Foundation filed complaints in U.S. District Court challenging the validity of the information and the reasoning used to designate critical habitat for the PMJM.⁵ In July 2007, the Service announced that it would review the critical habitat designation, and later concluded that it was necessary to revise the critical habitat. On July 10, 2008, a final rule amended the portion of the range over which the PMJM was threatened, limiting it to the Significant Portion of the Range (SPR) in Colorado.⁶ At that point, the Service removed all critical habitat in Wyoming from designation. On April 16, 2009,

¹ 1998 Final Listing Rule, 63 FR 26517.

² 66 FR 28125.

³ 67 FR 61531 and 69 FR 29101.

⁴ 2002 Proposed Rule, 67 FR 41754 and 2003 Final Rule, 68 FR 37275.

⁵ On August 22, 2003, the City of Greeley filed a complaint in the U.S. District Court for the District of Colorado challenging the Service's designation of critical habitat for the PMJM (*City of Greeley, Colorado v. United States Fish and Wildlife Service et al.*, Case No. 03-CV-01607-AP). On December 9, 2003, the Mountain States Legal Foundation filed a complaint in the U.S. District Court for the District of Wyoming challenging the 1998 listing of the PMJM and designation of critical habitat for the PMJM (*Mountain States Legal Foundation v. Gale E. Norton et al.*, Case No. 03-CV-250-J) that was later expanded to include the 2008 final determination on the PMJM and transferred to the U.S. District Court for the District of Colorado (*Mountain States Legal Foundation v. Ken Salazar et al.*, Case No. 1:08-CV-2775-JLK).

⁶ 2008 Final Rule to Amend the Listing, 73 FR 39789.

the Service reached a settlement agreement with the City of Greeley in which the Service agreed to reconsider critical habitat designation for the PMJM, issue a proposed rule for revised critical habitat by September 30, 2009, and issue a final rule for revised critical habitat by September 30, 2010. On June 16, 2009, an order was issued granting the Mountain States Legal Foundation a motion to dismiss their claims on the 1998 listing and 2008 final determination without prejudice, and stayed their challenge to the 2003 critical habitat designation pursuant to the City of Greeley settlement.

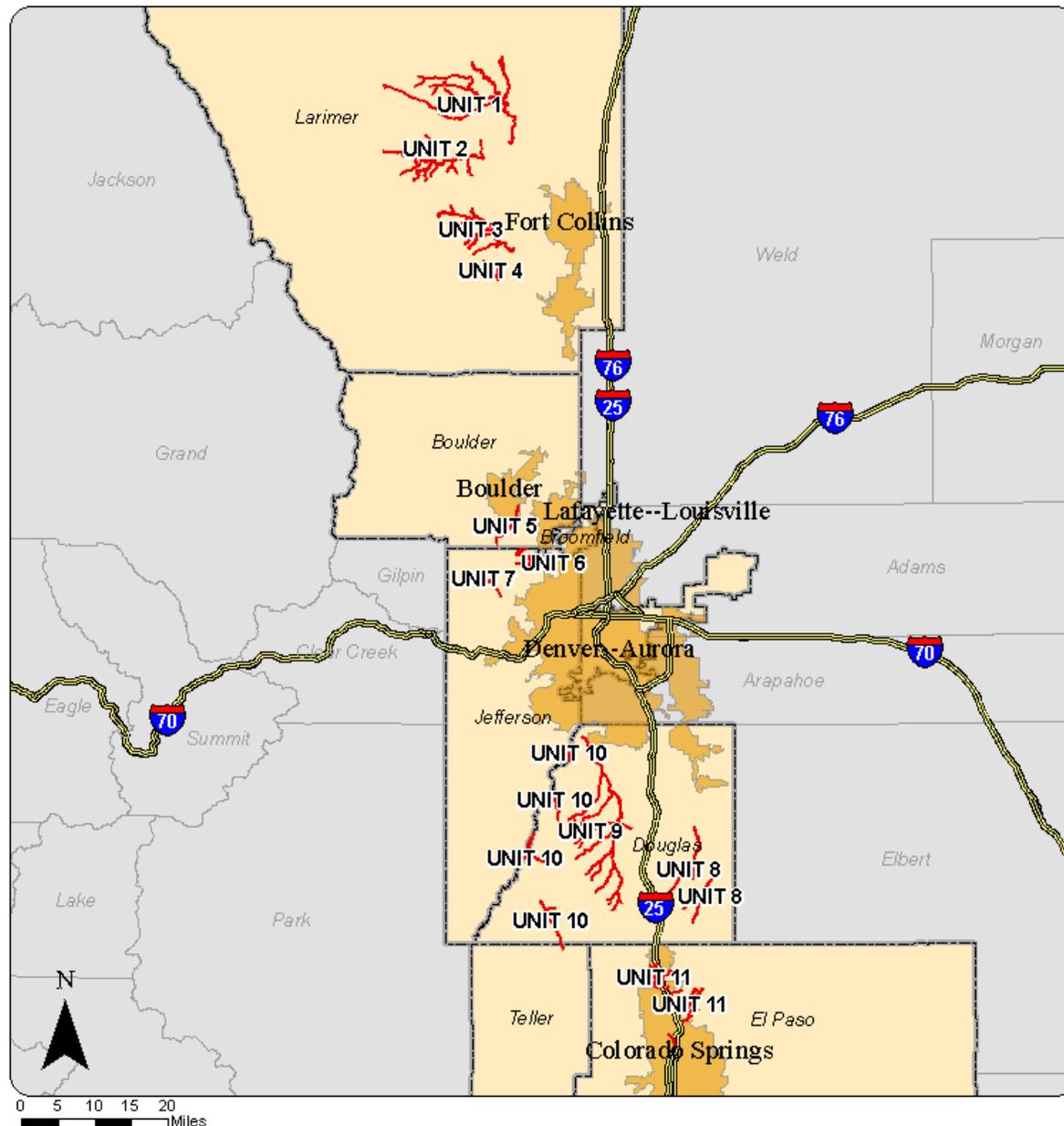
4. Most recently, the Service published a Proposed Rule on October 8, 2009 to revise the existing critical habitat designation for the PMJM in Colorado.⁷ This economic analysis evaluates the likely economic impacts of the October 8, 2009 Proposed Rule, assuming a baseline of no critical habitat for the PMJM. A map of the proposed revised critical habitat is presented in Exhibit ES-1.
5. Landownership in the currently proposed revised critical habitat units is split almost evenly between public and private entities; 45 percent of the land is owned or managed by Federal, State, or local entities, with the remaining 55 percent in private ownership.⁸ However, ownership type is not evenly distributed across the units. Units 2, 4, and 10 are primarily managed by the U.S. Forest Service (USFS) as part of the Arapaho & Roosevelt National Forests and Pike & San Isabel National Forests. Unit 6 is managed by the Service and U.S. Department of Energy (DOE) as the Rocky Flats National Wildlife Refuge (NWR) and Rocky Flats Central Operating Unit (COU), respectively. Units 1, 3, 8, 9, and 11 are mostly privately owned, especially in the more developed areas of Douglas and El Paso Counties.
6. This analysis considers economic impacts of PMJM conservation associated with the following entities or activities: 1) residential and commercial development, 2) road/bridge, utility, and bank stabilization construction and maintenance, 3) water supply development (reservoirs), 4) USFS lands management, 5) Rocky Flats, and 6) gravel mining. The analysis estimates economic impacts to these entities or activities from 2010 (expected year of final critical habitat designation) to 2029 (20 years from the expected critical habitat designation) as occurring “post-designation.” This 20-year analysis period reflects the maximum amount of time under which future activities and economic impacts associated with the Proposed Rule can be reliably projected, given the available data and information. The analysis also considers impacts that occurred before the expected 2010 final designation and after the species’ final listing in 1998 as “pre-designation” impacts (1998 - 2009), if they provide context for or substantiate the monetized post-designation impacts (2010 - 2029).
7. Forecast post-designation impacts are organized into two categories according to “without critical habitat” and “with critical habitat” scenarios. The “without critical habitat” scenario represents the baseline for the analysis, considering protections already accorded the PMJM; for example, under the Federal and State listing and other Federal,

⁷ 2009 Proposed Rule, 74 FR 52065. The existing critical habitat designation remains effective.

⁸ 2009 Proposed Rule, 74 FR 52065 and GIS data of proposed critical habitat areas provided by the Service.

State, and local regulations. However, as described below, the baseline scenario does not consider the existing critical habitat designation. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. That is, the reported incremental administrative and conservation efforts and associated economic impacts are those expected to occur specifically because of the designation of critical habitat for the PMJM. This economic analysis focuses on estimating these incremental impacts.

EXHIBIT ES-1 OVERVIEW OF PROPOSED REVISED CRITICAL HABITAT FOR THE PMJM



Proposed Critical Habitat:
Overview

Legend

- Proposed Critical Habitat
- Rivers & Streams
- Urban Areas
- Interstate Highways
- U.S. Highways
- State Highways

Area of Interest



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

IEC Map Projection: UTM Zone 13N
 Geodetic Reference System: NAD 1983
INDUSTRIAL ECONOMICS, INCORPORATED

8. Because the 2009 proposed rule designates or revises units of critical habitat that largely coincide with those previously evaluated for the 2002 proposed rule, this analysis draws on some of the economic cost information documented in the previous analyses (January and June 2003).⁹ However, this analysis represents a fundamental change in analytical approach from that followed in the 2003 economic analyses. Exhibit ES-2 summarizes how this analysis reflects new elements and analytical approaches that the Service has provided or adopted since the 2002 proposed rule:

EXHIBIT ES-2 CHANGES IN ANALYTICAL APPROACH FROM ECONOMIC ANALYSES PREPARED IN SUPPORT OF 2002 PROPOSED RULE

CHANGE IN ANALYTICAL APPROACH

- The Service now distinguishes the *incremental* costs of designation from baseline costs. The previous economic analyses evaluated all co-extensive costs (i.e., those resulting from both species listing (jeopardy) and critical habitat designation (adverse modification)). Thus, this analysis characterizes all projected costs as either baseline costs (i.e., those impacts expected to occur absent the designation of critical habitat) or incremental costs (i.e., those impacts expected to occur as a result of critical habitat designation);
- The Service provides guidance on distinguishing the incremental costs of the designation, as described in Section 2.3.2 of this report; and,
- This analysis considers and estimates the impacts of the rule as currently proposed and as if the existing 2003 critical habitat designation did not exist. In other words, this analysis considers and estimates the impacts associated with designating areas as critical habitat versus not designating these areas. This analysis is intended to assist the Secretary of the U.S. Department of the Interior (DOI) in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation. These particular areas also include those already designated as critical habitat under the 2003 designation and subject to re-examination by the Secretary. As a result, costs incurred as a result of the 2003 designation are not included or documented in this analysis, with the exception of those that provide context for forecasting or substantiating the monetized incremental impacts.

9. To develop monetary estimates of the impacts associated with critical habitat designation for the PMJM, this analysis first estimates the total post-designation baseline and incremental impacts for all affected projects and activities forecast to occur within the revised proposed critical habitat for the PMJM. To estimate the proportion of these total impacts that are incremental, unit-specific area-based factors are calculated that reflect expectations regarding where critical habitat will impose additional costs not expected

⁹ Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003.

under baseline conditions. These factors are then applied to distinguish instances where impacts to the PMJM and its habitat would generally be addressed absent critical habitat. Section 2.3.2 of this report provides more detail on this methodology.

10. In addition, the Service indicates that, with critical habitat, impacts to critical habitat would have to be offset by conservation measures or actions *within* the same unit. In units having limited opportunities to provide such measures or actions there may be significant changes to project scope and cost (e.g., higher mitigation costs, smaller projects developed), or higher costs of avoidance. However, given the data limitations, it is not possible to develop a reliable monetary measure of these impacts, and thus this analysis describes these potential incremental in-unit mitigation costs qualitatively by considering the relative quantity and quality of area available for conservation activities within each critical habitat unit.
11. Key findings of this analysis are presented in Exhibit ES-3. Potential post-designation incremental impacts are summarized in Exhibit ES-4. Potential post-designation incremental impacts for the low-end and high-end scenarios are presented by unit in Exhibits ES-5 and ES-6, respectively. Exhibits ES-7 and ES-8 rank the units by potential incremental impacts for the low-end and high-end scenarios, respectively.

EXHIBIT ES-3 KEY FINDINGS

POST-DESIGNATION INCREMENTAL IMPACTS, 2010 - 2029

Incremental Impacts: Potential incremental impacts associated with the proposed revised critical habitat designation are estimated to be \$29.0 million to \$71.7 million (approximately \$1.95 million to \$4.82 million on an annualized basis), assuming a three percent discount rate, or \$21.4 million to \$52.9 million (approximately \$2.02 million to \$4.99 million on an annualized basis), assuming a seven percent discount rate, over the next 20 years. These incremental impacts generally consist of the incremental administrative costs of conducting section 7 consultations with the Service and the additional costs of project modifications undertaken to avoid or minimize adverse modification of critical habitat.

Detailed Incremental Impacts: In the high-end scenario, potential impacts to residential and commercial development represent about 95 percent of total impacts, assuming a seven percent discount rate.

- **Residential and Commercial Development:** The incremental costs of residential and commercial development-related conservation activities range from \$20.0 million to \$50.4 million, assuming a seven percent discount rate. These costs primarily consist of forecast additional project modification (e.g., mitigation including setting aside conservation lands on- and off-site and habitat restoration and enhancement) and delay costs, which range from \$51,200 to \$115,000 per small-scale development project; \$3.72 million to \$10.1 million per large-scale development project in Units 8, 9, and 10; and \$770,000 to \$1.67 million per large-scale development project in Unit 11. For a variety of reasons (e.g., development likely lower than forecast, existing restrictions on development in critical habitat), discussed further in Chapter 3, these estimates likely overstate future costs associated with critical habitat designation for the PMJM. In addition, the amount of available land for in-unit mitigation for potential development in Unit 10 is limited and may restrict development or result in additional project costs. Best available information does not, however, allow for reliable estimation of such impacts. These costs may be borne by landowners, developers/sub-dividers, or builders engaged in development projects requiring Clean Water Act section 404 permits from the U.S. Army Corps of Engineers (USACE).
- **Road/Bridge, Utility, and Bank Stabilization Construction and Maintenance:** The incremental costs of road/bridge, utility, and bank stabilization construction and maintenance-related conservation activities range from \$567,000 to \$1.02 million, assuming a seven percent discount rate. The range of costs is generated by uncertainty regarding the potential project modification costs for road/bridge construction activities. These costs will primarily be borne by the USACE, Federal and state transportation departments, municipalities, and wastewater, sanitation, and metropolitan districts.
- **Water Supply Development (Reservoirs):** The incremental costs of water supply development-related conservation activities in Units 1, 9, and 10 range from \$324,000 to \$938,000, assuming a seven percent discount rate. This range of costs is generated by uncertainty regarding the mitigation ratios that might be applied and the per acre costs for purchasing conservation land or easements for mitigation. Available data, however, do not allow for reliable estimation of two other categories of potential impacts. First, the amount of available land for in-unit mitigation for potential water supply development in Unit 10 is limited and may restrict development or result in additional project costs. Second, faced with uncertainty imposed by PMJM critical habitat, project proponents may have to pursue alternative, possibly less preferable and more costly projects that are perceived or evaluated to have less environmental impact (e.g., not in critical habitat areas).
- **Other Activities:** Incremental costs are associated with section 7 consultations for USFS National Forest lands and Rocky Flats management. Because of limited data and information, this analysis could not monetize potential future project modification costs for these activities. Incremental impacts on gravel mining operations also could not be monetized at this time.

Critical Habitat Unit with Highest Impacts: Activities in Units 9 and 10, West Plum Creek and Upper South Platte River, are projected to bear the largest incremental impacts attributable to the Proposed Rule, representing about 38 and 34 percent of total incremental impacts, respectively. These units include land in Douglas County projected to undergo development, as well as a planned water supply expansion project at the Chatfield Reservoir.

EXHIBIT ES-4 SUMMARY OF TOTAL POST-DESIGNATION INCREMENTAL IMPACTS (PRESENT VALUE, 2009 DOLLARS)

VALUES	INCREMENTAL IMPACTS			
	3% DISCOUNT RATE		7% DISCOUNT RATE	
	LOW	HIGH	LOW	HIGH
Present Value of Impacts (2010 - 2029)	\$29,000,000	\$71,700,000	\$21,400,000	\$52,900,000
Annualized Impact Value	\$1,950,000	\$4,820,000	\$2,020,000	\$4,990,000
Notes: Totals may not sum due to rounding.				

EXHIBIT ES-5 POST DESIGNATION INCREMENTAL IMPACTS, BY UNIT AND ACTIVITY (PRESENT VALUE, 2009 DOLLARS, LOW ESTIMATE)

UNIT	RESIDENTIAL AND COMMERCIAL DEVELOPMENT	ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION	WATER SUPPLY DEVELOPMENT	USFS LANDS MANAGEMENT	ROCKY FLATS	GRAVEL MINING	UNIT SUBTOTAL
3 PERCENT DISCOUNT RATE							
1. N. Fork, Cache la Poudre River	\$207,000	\$92,100	\$22,100	\$64,500	\$0	\$0	\$386,000
2. Cache la Poudre River	\$152,000	\$51,900	\$0	\$189,000	\$0	\$0	\$393,000
3. Buckhorn Creek	\$156,000	\$85,700	\$0	\$123,000	\$0	\$0	\$365,000
4. Cedar Creek	\$40,400	\$2,420	\$0	\$26,100	\$0	\$0	\$68,900
5. South Boulder Creek	\$418,000	\$42,600	\$0	\$0	\$0	\$0	\$461,000
6. Rocky Flats NWR	\$0	\$21,600	\$0	\$0	\$96,300	\$0	\$118,000
7. Ralston Creek	\$515,000	\$13,700	\$0	\$0	\$0	\$0	\$528,000
8. Cherry Creek	\$2,880,000	\$61,000	\$0	\$0	\$0	\$0	\$2,940,000
9. West Plum Creek	\$10,000,000	\$146,000	\$115,000	\$40,500	\$0	\$0	\$10,300,000
10. Upper South Platte River	\$8,780,000	\$36,000	\$226,000	\$115,000	\$0	\$0	\$9,160,000
11. Monument Creek	\$4,020,000	\$215,000	\$0	\$2,030	\$0	\$0	\$4,240,000
Activity Subtotal	\$27,200,000	\$768,000	\$362,000	\$560,000	\$96,300	\$0	\$29,000,000
7 PERCENT DISCOUNT RATE							
1. N. Fork, Cache la Poudre River	\$153,000	\$67,900	\$20,700	\$47,600	\$0	\$0	\$289,000
2. Cache la Poudre River	\$112,000	\$38,300	\$0	\$139,000	\$0	\$0	\$290,000
3. Buckhorn Creek	\$115,000	\$63,200	\$0	\$90,700	\$0	\$0	\$269,000
4. Cedar Creek	\$29,800	\$1,790	\$0	\$19,300	\$0	\$0	\$50,900
5. South Boulder Creek	\$303,000	\$31,400	\$0	\$0	\$0	\$0	\$334,000
6. Rocky Flats NWR	\$0	\$15,900	\$0	\$0	\$78,200	\$0	\$94,100
7. Ralston Creek	\$372,000	\$10,100	\$0	\$0	\$0	\$0	\$383,000
8. Cherry Creek	\$2,090,000	\$45,000	\$0	\$0	\$0	\$0	\$2,130,000
9. West Plum Creek	\$7,260,000	\$108,000	\$102,000	\$29,900	\$0	\$0	\$7,500,000
10. Upper South Platte River	\$6,360,000	\$26,600	\$202,000	\$85,200	\$0	\$0	\$6,670,000
11. Monument Creek	\$3,230,000	\$159,000	\$0	\$1,490	\$0	\$0	\$3,390,000
Activity Subtotal	\$20,000,000	\$567,000	\$324,000	\$413,000	\$78,200	\$0	\$21,400,000
Notes: Totals may not sum due to rounding.							

EXHIBIT ES-6 POST DESIGNATION INCREMENTAL IMPACTS, BY UNIT AND ACTIVITY (PRESENT VALUE, 2009 DOLLARS, HIGH ESTIMATE)

UNIT	RESIDENTIAL AND COMMERCIAL DEVELOPMENT	ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION	WATER SUPPLY DEVELOPMENT	USFS LANDS MANAGEMENT	ROCKY FLATS	GRAVEL MINING	UNIT SUBTOTAL
3 PERCENT DISCOUNT RATE							
1. N. Fork, Cache la Poudre River	\$339,000	\$155,000	\$41,700	\$64,500	\$0	\$0	\$600,000
2. Cache la Poudre River	\$249,000	\$131,000	\$0	\$189,000	\$0	\$0	\$569,000
3. Buckhorn Creek	\$255,000	\$158,000	\$0	\$123,000	\$0	\$0	\$536,000
4. Cedar Creek	\$66,200	\$2,830	\$0	\$26,100	\$0	\$0	\$95,100
5. South Boulder Creek	\$685,000	\$104,000	\$0	\$0	\$0	\$0	\$789,000
6. Rocky Flats NWR	\$0	\$55,400	\$0	\$0	\$96,300	\$0	\$152,000
7. Ralston Creek	\$843,000	\$27,100	\$0	\$0	\$0	\$0	\$870,000
8. Cherry Creek	\$7,700,000	\$115,000	\$0	\$0	\$0	\$0	\$7,820,000
9. West Plum Creek	\$26,700,000	\$231,000	\$337,000	\$40,500	\$0	\$0	\$27,400,000
10. Upper South Platte River	\$23,500,000	\$84,100	\$671,000	\$115,000	\$0	\$0	\$24,300,000
11. Monument Creek	\$8,310,000	\$312,000	\$0	\$2,030	\$0	\$0	\$8,620,000
Activity Subtotal	\$68,700,000	\$1,380,000	\$1,050,000	\$560,000	\$96,300	\$0	\$71,700,000
7 PERCENT DISCOUNT RATE							
1. N. Fork, Cache la Poudre River	\$250,000	\$115,000	\$38,800	\$47,600	\$0	\$0	\$451,000
2. Cache la Poudre River	\$184,000	\$96,900	\$0	\$139,000	\$0	\$0	\$420,000
3. Buckhorn Creek	\$189,000	\$117,000	\$0	\$90,700	\$0	\$0	\$396,000
4. Cedar Creek	\$48,900	\$2,090	\$0	\$19,300	\$0	\$0	\$70,200
5. South Boulder Creek	\$496,000	\$77,200	\$0	\$0	\$0	\$0	\$573,000
6. Rocky Flats NWR	\$0	\$41,000	\$0	\$0	\$78,200	\$0	\$119,000
7. Ralston Creek	\$610,000	\$20,000	\$0	\$0	\$0	\$0	\$630,000
8. Cherry Creek	\$5,580,000	\$85,000	\$0	\$0	\$0	\$0	\$5,670,000
9. West Plum Creek	\$19,400,000	\$171,000	\$301,000	\$29,900	\$0	\$0	\$19,900,000
10. Upper South Platte River	\$17,000,000	\$62,100	\$598,000	\$85,200	\$0	\$0	\$17,700,000
11. Monument Creek	\$6,670,000	\$230,000	\$0	\$1,490	\$0	\$0	\$6,900,000
Activity Subtotal	\$50,400,000	\$1,020,000	\$938,000	\$413,000	\$78,200	\$0	\$52,900,000
Notes: Totals may not sum due to rounding.							

EXHIBIT ES-7 UNITS RANKED BY INCREMENTAL IMPACTS (PRESENT VALUE 2009 DOLLARS, LOW ESTIMATE)

UNIT	PRESENT VALUE IMPACTS (3% DISCOUNT RATE)	PERCENTAGE OF IMPACTS (3% DISCOUNT RATE)	PRESENT VALUE IMPACTS (7% DISCOUNT RATE)	PERCENTAGE OF IMPACTS (7% DISCOUNT RATE)
9. West Plum Creek	\$10,300,000	35.60%	\$7,500,000	35.03%
10. Upper South Platte River	\$9,160,000	31.61%	\$6,670,000	31.19%
11. Monument Creek	\$4,240,000	14.63%	\$3,390,000	15.82%
8. Cherry Creek	\$2,940,000	10.16%	\$2,130,000	9.97%
7. Ralston Creek	\$528,000	1.82%	\$383,000	1.79%
5. South Boulder Creek	\$461,000	1.59%	\$334,000	1.56%
2. Cache la Poudre River	\$393,000	1.36%	\$290,000	1.36%
1. N. Fork, Cache la Poudre River	\$386,000	1.33%	\$289,000	1.35%
3. Buckhorn Creek	\$365,000	1.26%	\$269,000	1.26%
6. Rocky Flats NWR	\$118,000	0.41%	\$94,100	0.44%
4. Cedar Creek	\$68,900	0.24%	\$50,900	0.24%
Total	\$29,000,000		\$21,400,000	
Notes: Totals may not sum due to rounding.				

EXHIBIT ES-8 UNITS RANKED BY INCREMENTAL IMPACTS (PRESENT VALUE 2009 DOLLARS, HIGH ESTIMATE)

UNIT	PRESENT VALUE IMPACTS (3% DISCOUNT RATE)	PERCENTAGE OF IMPACTS (3% DISCOUNT RATE)	PRESENT VALUE IMPACTS (7% DISCOUNT RATE)	PERCENTAGE OF IMPACTS (7% DISCOUNT RATE)
9. West Plum Creek	\$27,400,000	38.14%	\$19,900,000	37.63%
10. Upper South Platte River	\$24,300,000	33.91%	\$17,700,000	33.56%
11. Monument Creek	\$8,620,000	12.02%	\$6,900,000	13.05%
8. Cherry Creek	\$7,820,000	10.90%	\$5,670,000	10.72%
7. Ralston Creek	\$870,000	1.21%	\$630,000	1.19%
5. South Boulder Creek	\$789,000	1.10%	\$573,000	1.08%
1. N. Fork, Cache la Poudre River	\$600,000	0.84%	\$451,000	0.85%
2. Cache la Poudre River	\$569,000	0.79%	\$420,000	0.80%
3. Buckhorn Creek	\$536,000	0.75%	\$396,000	0.75%
6. Rocky Flats NWR	\$152,000	0.21%	\$119,000	0.23%
4. Cedar Creek	\$95,100	0.13%	\$70,200	0.13%
Total	\$71,700,000		\$52,900,000	
Notes: Totals may not sum due to rounding.				

SUMMARY OF INCREMENTAL IMPACTS

12. Incremental impacts associated with the proposed revised critical habitat designation are estimated to be \$29.0 million to \$71.7 million (approximately \$1.95 million to \$4.82 million annualized), assuming a three percent discount rate, or \$21.4 million to \$52.9 million (approximately \$2.02 million to \$4.99 million annualized), assuming a seven percent discount rate, over the next 20 years. The largest contributors to the high-end incremental costs is residential and commercial development in Units 9 and 10, where developers would be required to implement project modifications to mitigate impacts to and restore and enhance PMJM habitat. Development in Units 8 and 11 is also expected to contribute significant costs. Incremental costs are also expected related to road/bridge, utility, and bank stabilization construction and maintenance activities throughout the study area and water supply development in Units 1, 9, and 10.

RESIDENTIAL AND COMMERCIAL DEVELOPMENT

13. Based on regional housing forecast data, this analysis forecasts about 1,080 new housing units would be potentially affected by the critical habitat designation over the next 20 years. These new housing units are forecasted to be built as part of 41 large-scale and 65 small-scale residential development projects in the study area. The incremental cost expected for residential and related development primarily consists of additional project modification costs (e.g., for mitigation and habitat restoration and enhancement) that would be incurred as a result of the designation. Total forecast costs for mitigation and habitat restoration and enhancement are significant, given the large areas of conservation land or easements that would have to be set aside or purchased as mitigation (about 4,500 acres) for these development projects, especially large-scale developments projected in Douglas and El Paso Counties. As discussed above, other incremental impacts may occur if land available for in-unit mitigation is limited, which is apparently the case in Unit 10. Finally, the results of a regional economic model (IMPLAN) used to estimate the indirect and induced effects of potential losses in construction revenue indicate that the regional economic impacts will total \$2.66 million to \$4.42 million. However, in the likely event that the level of future residential and commercial development is below the level forecasted in this analysis, or development does not occur within the proposed critical habitat areas (due to existing regulations and habitat conservation planning), the actual incremental impacts for addressing the PMJM and its habitat will be less than forecast.

ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE

14. The incremental cost expected for road/bridge, utility, and bank stabilization construction and maintenance activities that typically require a section 404 permit from the U.S. Army Corps of Engineers (USACE) primarily consists of additional section 7 consultation and project modification costs (e.g., for mitigation and habitat restoration and enhancement) that would be incurred as a result of the designation. This analysis forecasts a total of approximately 70 informal and formal consultations for projects relating to these activities over the next 20 years.

WATER SUPPLY DEVELOPMENT

15. Three municipal water reservoir expansion projects are planned within the proposed critical habitat designation over the next 20 years: 1) Halligan Reservoir, 2) Milton-Seaman Reservoir, and 3) Chatfield Reservoir. The incremental cost expected for these water supply development projects primarily consists of the additional costs for mitigation that would be incurred as a result of the designation. Total forecast costs for mitigation are large given the areas of conservation land or easements that would have to be purchased as mitigation for the impacts of these large reservoir expansion projects (560 to 1,680 acres of mitigation). Other incremental impacts may also occur if land available for in-unit mitigation is limited, which is apparently the case in Unit 10, or if project proponents have to pursue alternative, possibly less preferable, and more costly projects. The designation of critical habitat within the proposed project areas may imply to the public greater environmental impacts than absent critical habitat, and therefore reduce the likelihood of approval in comparison to other alternatives perceived or evaluated to have less environmental impact (e.g., not in critical habitat areas). Available data, however, do not allow for reliable estimation of these other potential impacts.

OTHER ACTIVITIES

16. This analysis also estimates the incremental costs associated with section 7 consultations for affected land management activities conducted in national forests (Arapaho & Roosevelt National Forests and Pike & San Isabel National Forests) by the USFS and Rocky Flats by the Service and DOE. On National Forest lands, activities including forest management plan revisions, national fire plan projects, recreation, construction projects authorized under special use authorizations, exotic or invasive species control, and grazing may be impacted by the designation. At Rocky Flats, activities including invasive weed control, culvert crossing removals, gravel road removals, recreational trail construction and maintenance, and cleanup operations and maintenance may be impacted by the designation. This analysis forecasts approximately 90 informal and formal consultations for projects relating to these activities over the next 20 years. However, because of limited data and information, this analysis could not reliably monetize potential project modification costs. Finally, although gravel mining operations could be potentially affected by the designation, the incremental impacts on such operations could not be reliably monetized at this time.

SMALL BUSINESS AND ENERGY IMPACTS

17. The analysis considers the incremental impacts of the critical habitat designation on small entities involved in residential and commercial development and road/bridge, utility, and bank stabilization construction and maintenance activities. In the residential and commercial development sector, approximately 97 percent of the entities that may be impacted are small; however, the impact to these small developer entities is estimated to be on the order of less than 4.5 percent of a small developer entity's total annual sales revenue for those years in which the entity develops a project in critical habitat. It is

likely that a portion of the impact will be realized by landowners in the form of higher housing prices; however, their proportion of the total impact is unknown.

18. Of the entities involved in road/bridge, utility, and bank stabilization construction and maintenance activities that are potentially impacted (e.g., municipalities, wastewater and sanitation districts, and metropolitan districts), approximately 90 percent are small; however, the estimated impact to these small governments and districts is estimated to be on the order of \$9,250 to \$19,300 annually for each small entity.
19. The Proposed Rule is not anticipated to constitute a significant energy action. Incremental impacts may arise from the construction and maintenance of electrical and natural gas distribution and transmission systems, activities potentially occurring in the study area. However, estimating these impacts is beyond the scope of this analysis and is unlikely to increase the cost of energy distribution significantly.

CHAPTER 1 | BACKGROUND

1.1 INTRODUCTION

20. This chapter provides a brief introduction to the proposed revised critical habitat for the PMJM. It includes a summary of past publications and legal actions that relate to the current proposal, a summary of land ownership within the current proposal, maps of the proposed units, and a summary of threats to the proposed critical habitat. This information is intended to provide background information. All official definitions and boundaries should be taken from the Proposed Rule.¹⁰

1.2 PREVIOUS FEDERAL ACTIONS

21. On May 13, 1998, the Service issued a Final Rule listing the PMJM as threatened under the Act.¹¹ On May 22, 2001, the Service adopted a final section 4(d) special rule for the PMJM that provides exemptions from section 9 take prohibitions for certain rodent control activities, ongoing agricultural activities, maintenance and replacement of existing landscaping, and existing uses of water.¹² On October 1, 2002, the Service amended this special rule to provide exemptions for certain noxious weed control and ditch maintenance activities. The special rule was made permanent on May 20, 2004.¹³ On July 17, 2002, the Service proposed critical habitat for the PMJM in portions of Colorado and Wyoming and on June 23, 2003, issued a Final Rule.¹⁴

22. Soon after the 2003 designation, the City of Greeley and the Mountain States Legal Foundation filed complaints in U.S. District Court challenging the validity of the information and the reasoning used to designate critical habitat for the PMJM.¹⁵ In July 2007, the Service announced that it would review the critical habitat designation and later concluded that it was necessary to revise the critical habitat. On July 10, 2008, a final

¹⁰ 2009 Proposed Rule, 74 FR 52065.

¹¹ 1998 Final Listing Rule, 63 FR 26517.

¹² 66 FR 28125.

¹³ 67 FR 61531 and 69 FR 29101.

¹⁴ 2002 Proposed Rule, 67 FR 41754 and 2003 Final Rule, 68 FR 37275.

¹⁵ On August 22, 2003, the City of Greeley filed a complaint in the U.S. District Court for the District of Colorado challenging the Service's designation of critical habitat for the PMJM (*City of Greeley, Colorado v. United States Fish and Wildlife Service et al.*, Case No. 03-CV-01607-AP). On December 9, 2003, the Mountain States Legal Foundation filed a complaint in the U.S. District Court for the District of Wyoming challenging the 1998 listing of the PMJM and designation of critical habitat for the PMJM (*Mountain States Legal Foundation v. Gale E. Norton et al.*, Case No. 03-CV-250-J) that was later expanded to include the 2008 final determination on the PMJM and transferred to the U.S. District Court for the District of Colorado (*Mountain States Legal Foundation v. Ken Salazar et al.*, Case No. 1:08-CV-2775-JLK).

rule amended the portion of the range over which the PMJM was threatened, limiting it to the SPR in Colorado.¹⁶ At that point, the Service removed all critical habitat in Wyoming from designation. On April 16, 2009, the Service reached a settlement agreement with the City of Greeley in which the Service agreed to reconsider critical habitat designation for the PMJM, issue a proposed rule for revised critical habitat by September 30, 2009, and issue a final rule for revised critical habitat by September 30, 2010. On June 16, 2009, an order was issued granting the Mountain States Legal Foundation a motion to dismiss their claims on the 1998 listing and 2008 final determination without prejudice, and stayed their challenge to the 2003 critical habitat designation pursuant to the City of Greeley settlement.

23. Most recently, the Service published a Proposed Rule on October 8, 2009 to revise the existing critical habitat designation for the PMJM in Colorado.¹⁷ This economic analysis addresses the October 8, 2009 Proposed Rule to revise the critical habitat designation for the PMJM in Colorado.¹⁸

1.3 PROPOSED REVISED CRITICAL HABITAT DESIGNATION

24. The 2003 critical habitat rule for the PMJM in Colorado consisted of five units comprising a total of 234 stream miles and 20,680 acres. The proposed revision includes 11 units comprising a total of 418 stream miles and 39,142 acres. The increase in total acreage is primarily in areas (Units 5, 6, 8, 9, and 11) that had not been included in the 2003 final designation because of the potential benefits to PMJM habitat provided by Habitat Conservation Plans (HCPs) that were under development at the time, or pending transfer of land (Rocky Flats NWR) to the Service.¹⁹ In addition, PMJM occupancy of Unit 4 (Cedar Creek) had been confirmed since the time of the 2003 final critical habitat designation. The Service is also making minor areal adjustments to the units to correct for measurement and arithmetic errors made in the 2003 final critical habitat designation and to reflect a reevaluation of stream reaches.
25. Exhibit 1-1 provides a unit-by-unit comparison between the 2003 final critical habitat designation and the 2009 proposed revised critical habitat rule. Exhibits 1-2 through 1-8 present an overview of the locations of proposed revised critical habitat units.

¹⁶ 2008 Final Rule to Amend the Listing, 73 FR 39789.

¹⁷ 2009 Proposed Rule, 74 FR 52065. The existing critical habitat designation remains effective.

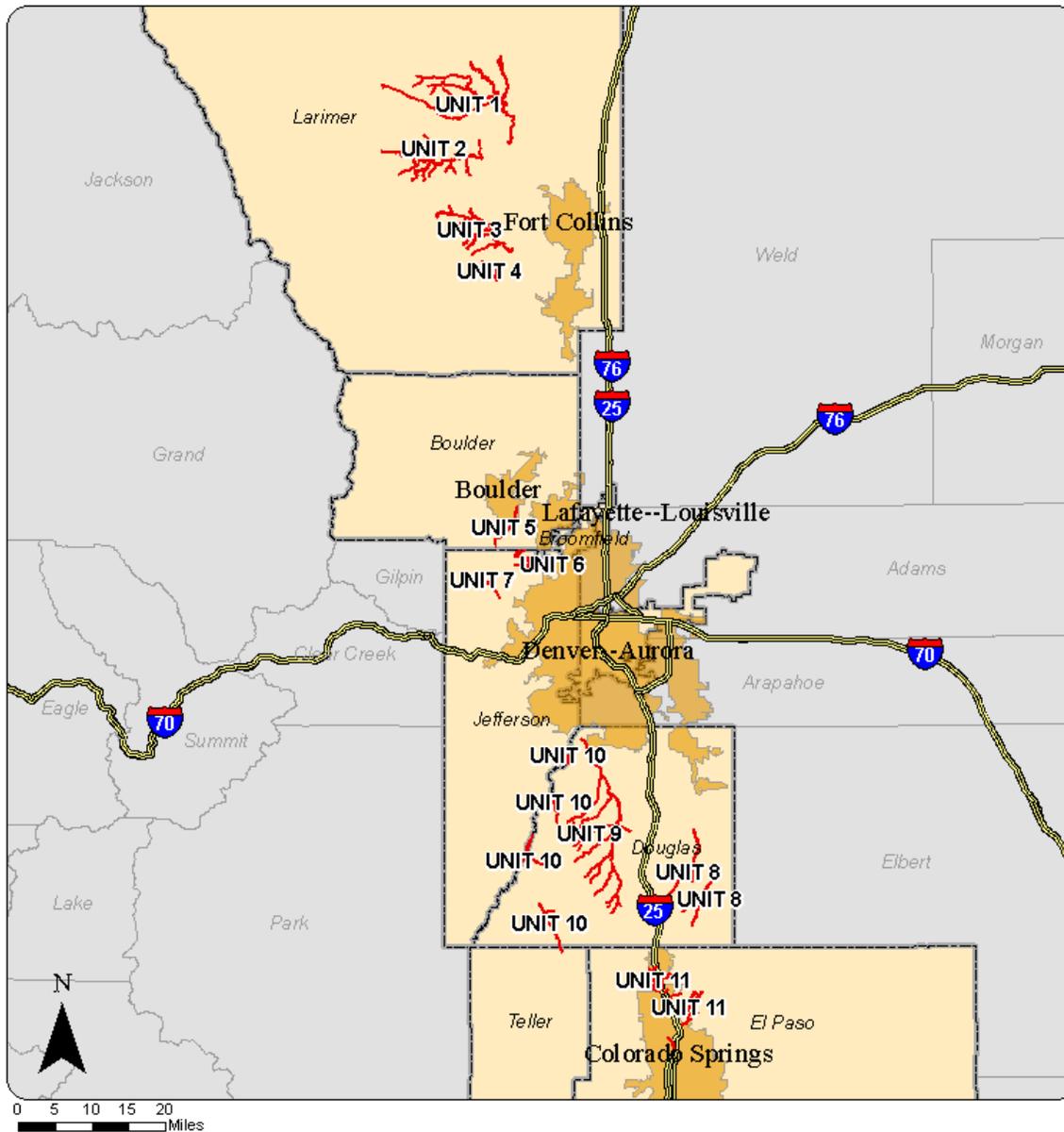
¹⁸ For purposes of this analysis, the impacts of the proposed revised critical habitat designation are considered and estimated as if the existing 2003 critical habitat designation did not exist. In other words, this analysis considers and estimates the impacts associated with designating areas as critical habitat versus not designating these areas. However, because the 2009 proposed rule designates or revises units of critical habitat that largely coincide with those previously evaluated for the 2002 proposed rule, this analysis draws on some of the economic cost information documented in the previous economic analyses (Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003).

¹⁹ 2009 Proposed Rule, 74 FR 52070.

EXHIBIT 1-1 EXISTING AND PROPOSED CRITICAL HABITAT FOR THE PMJM

UNIT	STREAM MILES AND ACRES PER UNIT	
	EXISTING	PROPOSED
1. N. Fork, Cache la Poudre River	88 miles 8,206 acres	88 miles 8,619 acres
2. Cache la Poudre River	51 miles 4,725 acres	51 miles 4,944 acres
3. Buckhorn Creek	43 miles 3,798 acres	46 miles 3,995 acres
4. Cedar Creek	0	8 miles 668 acres
5. South Boulder Creek	0	8 miles 856 acres
6. Rocky Flats NWR	0	13 miles 1,108 acres
7. Ralston Creek	8 miles 686 acres	9 miles 809 acres
8. Cherry Creek	0	30 miles 2,647 acres
9. West Plum Creek	0	94 miles 8,724 acres
10. Upper South Platte River	44 miles 3,265 acres	35 miles 3,353 acres
11. Monument Creek	0	39 miles 3,419 acres
TOTAL	234 miles 20,680 acres	418 miles 39,142 acres
Source: 2009 Proposed Rule, 74 FR 52070 Note: A small discrepancy was found in the acreages calculated from the proposed critical habitat areas depicted in the GIS data provided by the Service (38,441 acres, see Exhibits 1-9 and 2-4) versus those reported in the proposed rule (39,142 acres).		

EXHIBIT 1-2 OVERVIEW OF PROPOSED REVISED CRITICAL HABITAT FOR THE PMJM



Proposed Critical Habitat:

Overview

Legend

- Proposed Critical Habitat
- Rivers & Streams
- Urban Areas
- Interstate Highways
- U.S. Highways
- State Highways

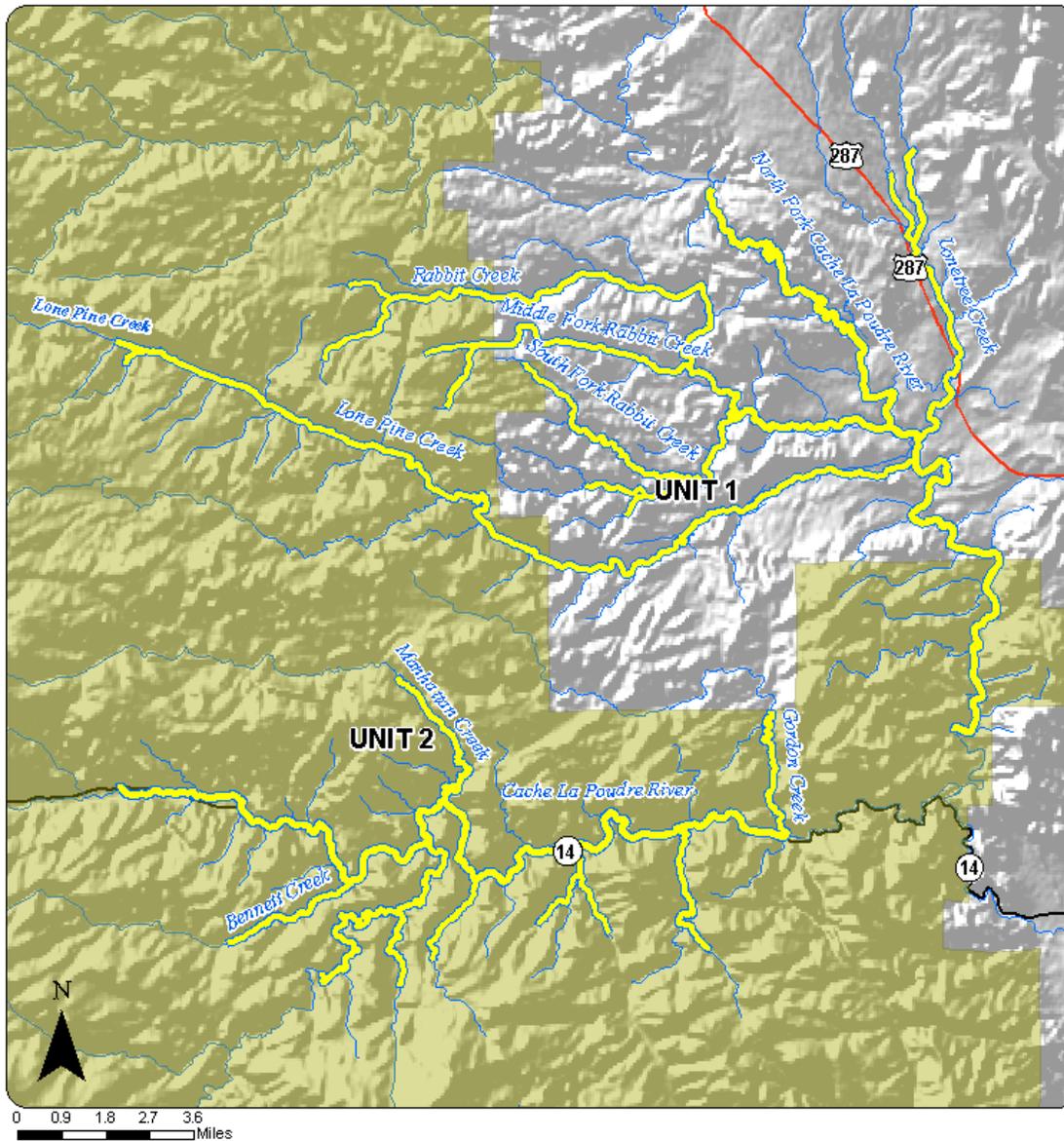
Area of Interest



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

IEC Map Projection: UTM Zone 13N
 Geodetic Reference System: NAD 1983
INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT 1-3 PROPOSED REVISED CRITICAL HABITAT FOR THE PMJM, UNITS 1 AND 2



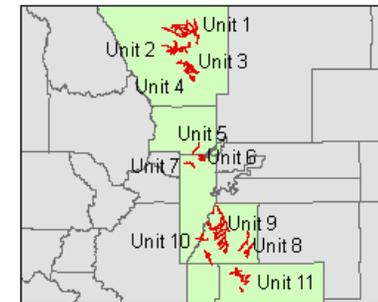
Proposed Critical Habitat:

- Unit 1 - North Fork Cache La Poudre River**
- Unit 2 - Cache la Poudre River**

Legend

- Proposed Critical Habitat
- Rivers & Streams
- Urban Areas
- Interstate Highways
- U.S. Highways
- State Highways
- Arapaho & Roosevelt N'tl Forests

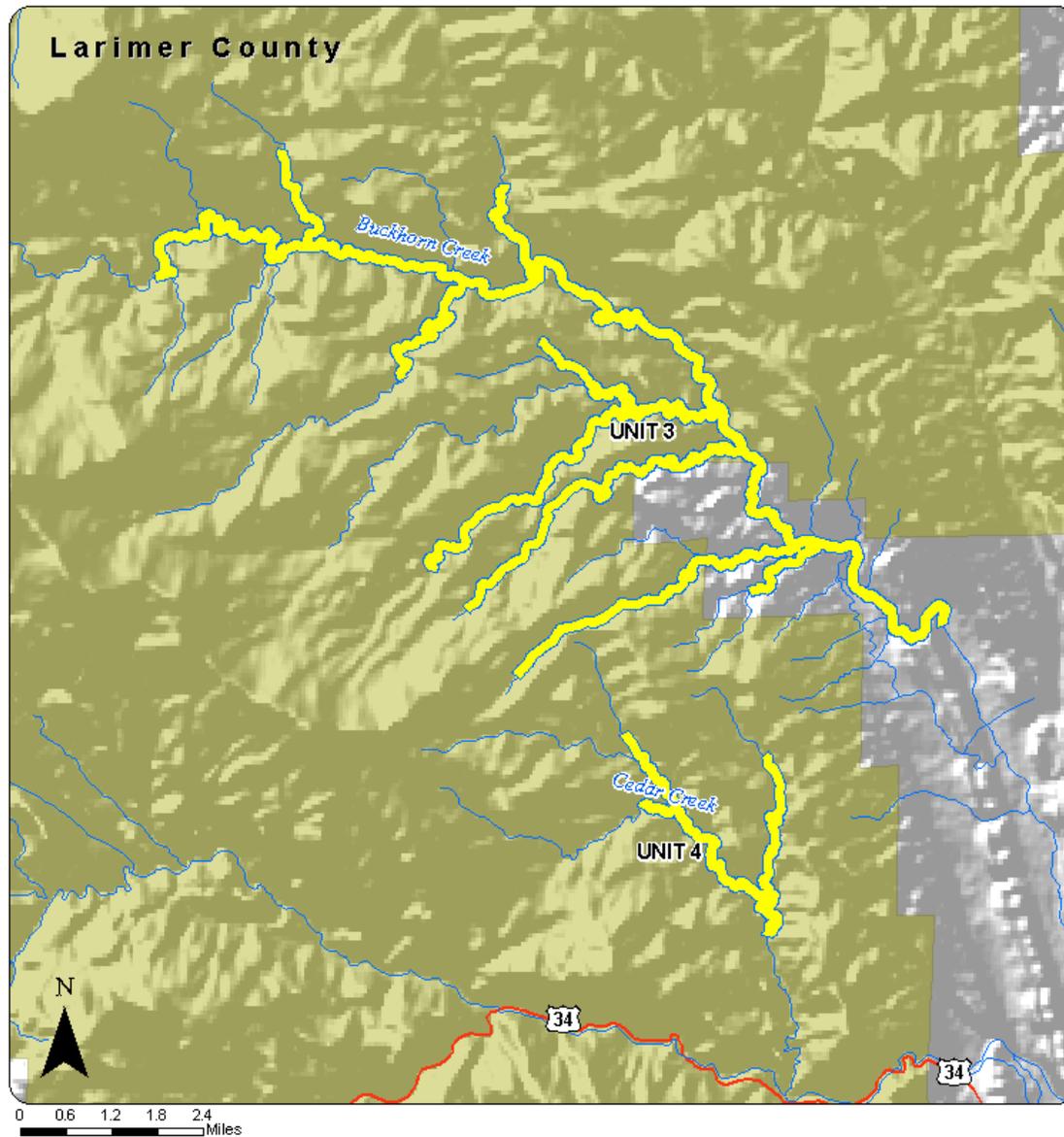
Study Area



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

IEC Map Projection: UTM Zone 13N
Geodetic Reference System: NAD 1983
INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT 1-4 PROPOSED REVISED CRITICAL HABITAT FOR THE PMJM, UNITS 3 AND 4

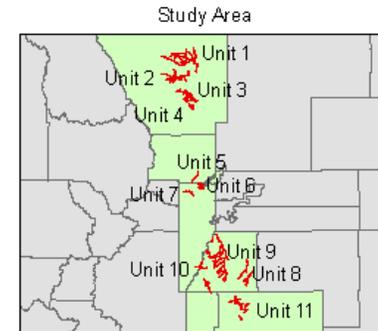


Proposed Critical Habitat:

- Unit 3 - Buckhorn Creek
- Unit 4 - Cedar Creek

Legend

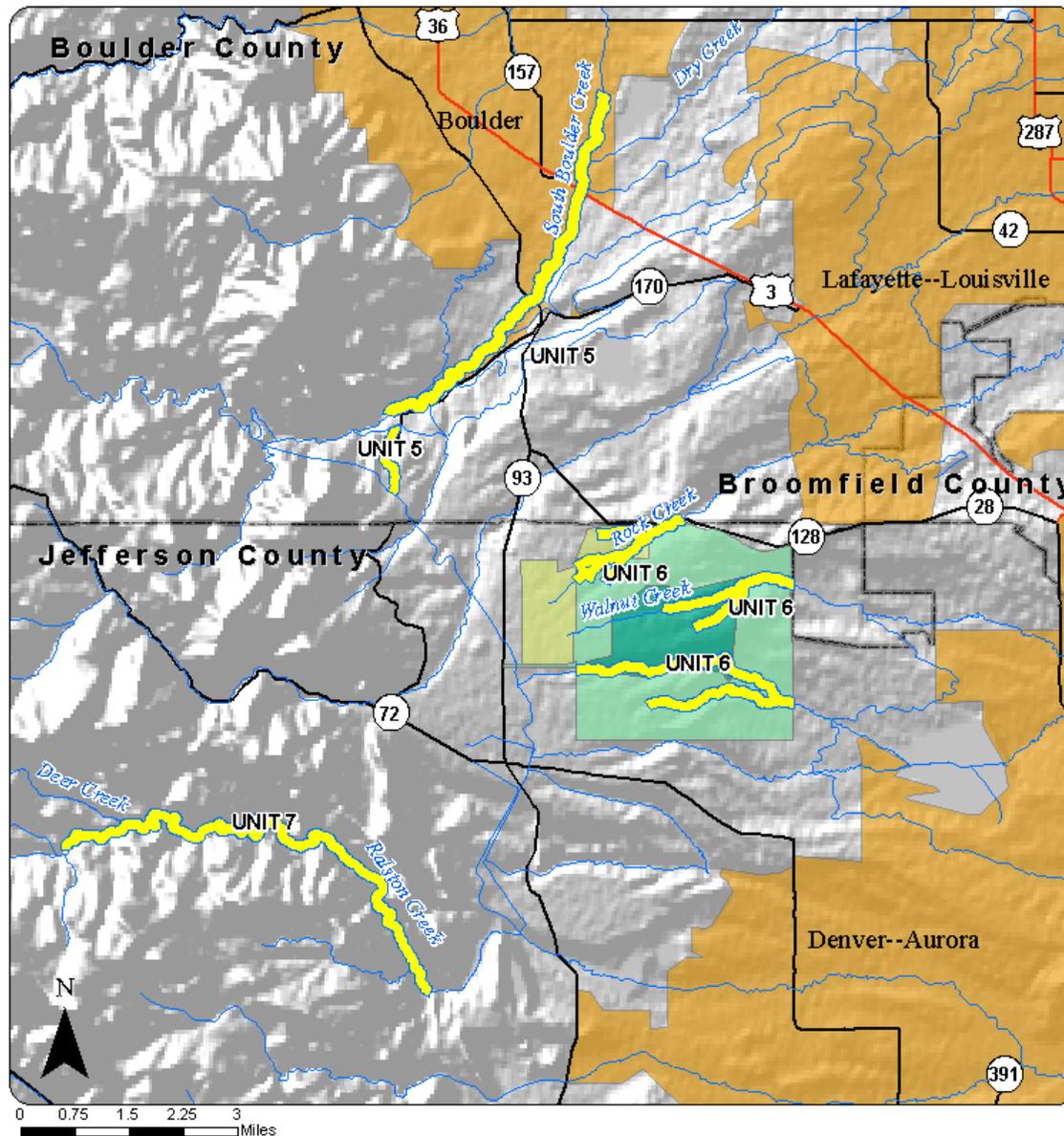
- Proposed Critical Habitat
- Rivers & Streams
- Urban Areas
- Interstate Highways
- U.S. Highways
- State Highways
- Arapaho & Roosevelt Ntl Forests



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

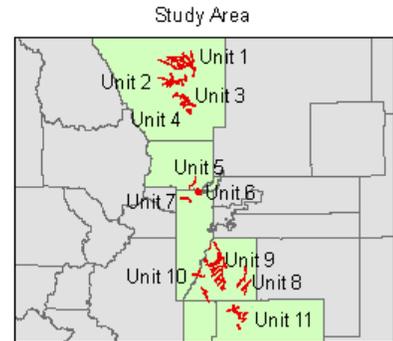
IEC Map Projection: UTM Zone 13N
 Geodetic Reference System: NAD 1983
INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT 1-5 PROPOSED REVISED CRITICAL HABITAT FOR THE PMJM, UNITS 5, 6, AND 7



Proposed Critical Habitat:
 Unit 5 - South Boulder Creek
 Unit 6 - Rocky Flats Nat'l Wildlife Refuge
 Unit 7 - Ralston Creek

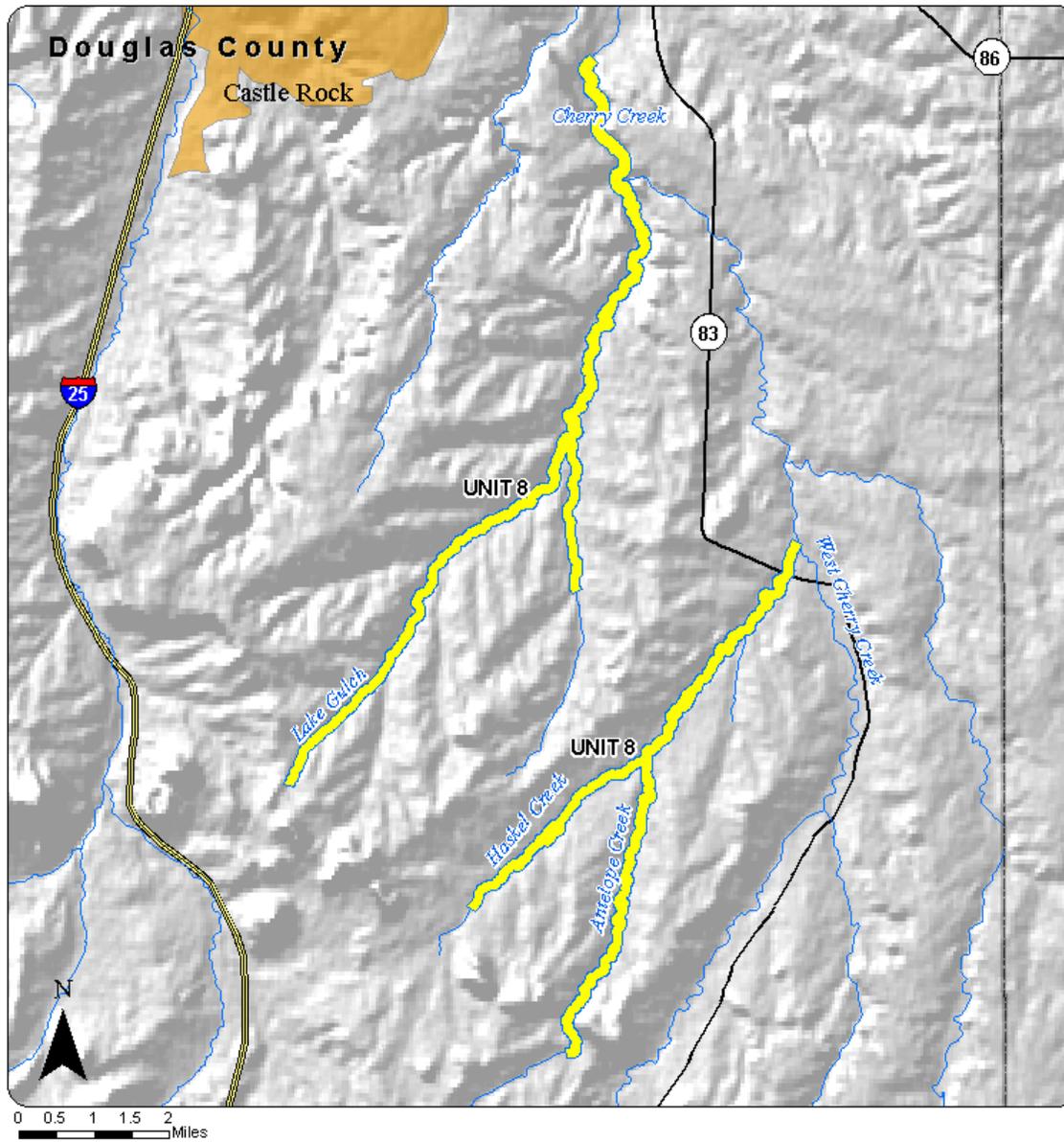
- Legend
- Proposed Critical Habitat
 - Rivers & Streams
 - Rocky Flats NWR
 - Awaiting Transfer to NWR
 - Rocky Flats - DOE Retained
 - Urban Areas
 - Interstate Highways
 - U.S. Highways
 - State Highways



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

IEC Map Projection: UTM Zone 13N
 Geodetic Reference System: NAD 1983
INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT 1-6 PROPOSED REVISED CRITICAL HABITAT FOR THE PMJM, UNIT 8



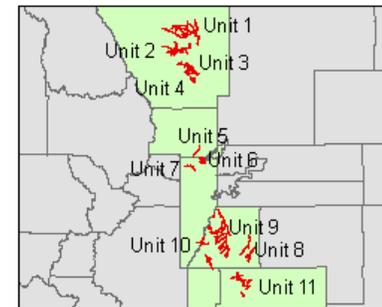
Proposed Critical Habitat:

Unit 8 - West Plum Creek

Legend

- Proposed Critical Habitat
- Rivers & Streams
- Urban Areas
- Interstate Highways
- U.S. Highways
- State Highways

Study Area

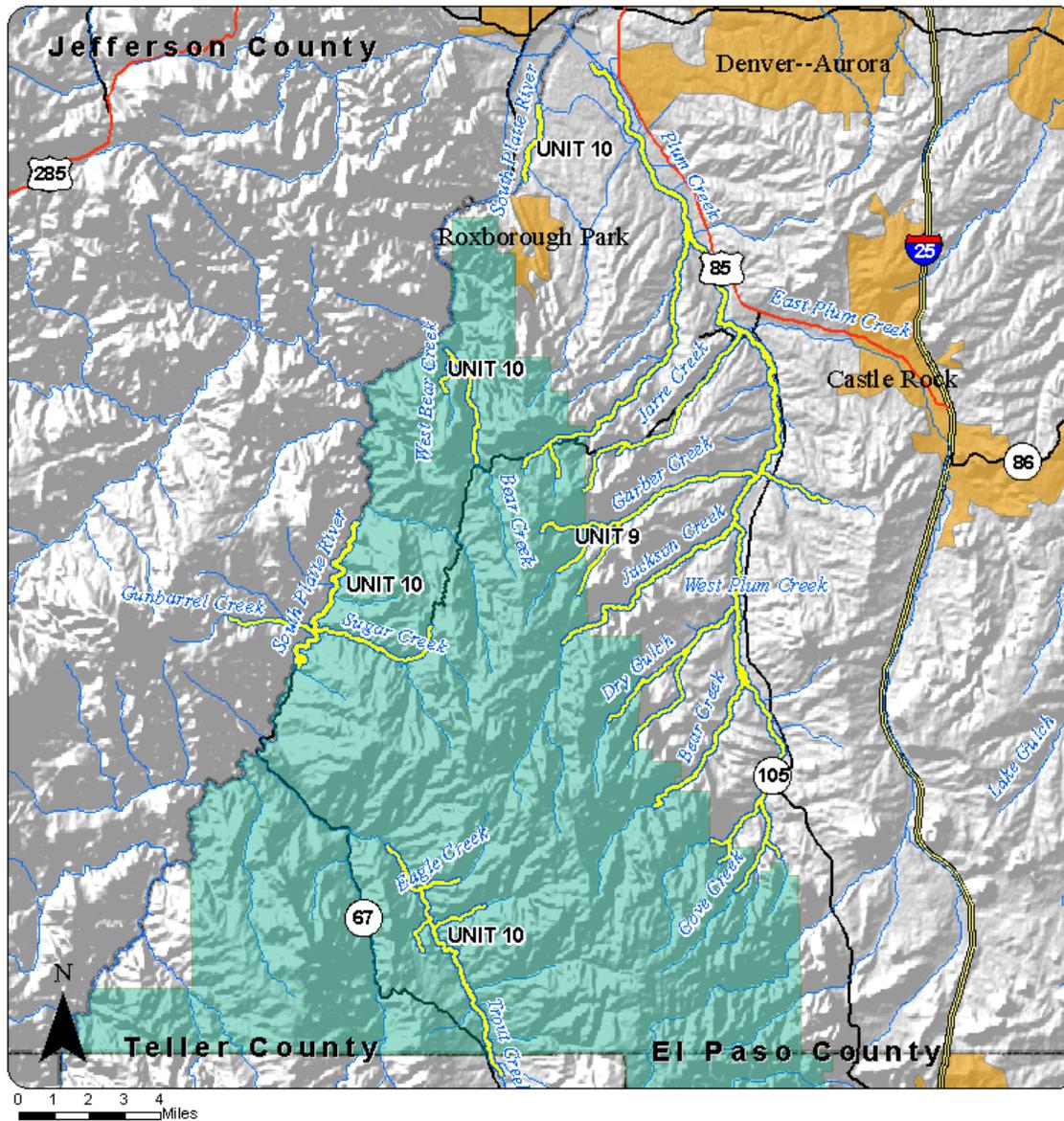


Sources:

- 1.) U.S. Fish and Wildlife Service
- 2.) Environmental Systems Research Institute, Inc.

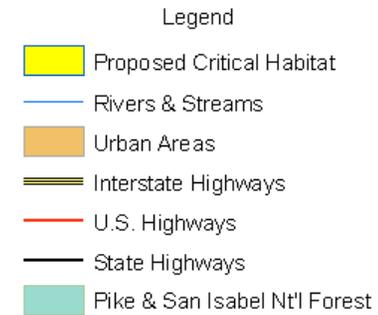
IEC Map Projection: UTM Zone 13N
 Geodetic Reference System: NAD 1983
INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT 1-7 PROPOSED REVISED CRITICAL HABITAT FOR THE PMJM, UNITS 9 AND 10



Proposed Critical Habitat:

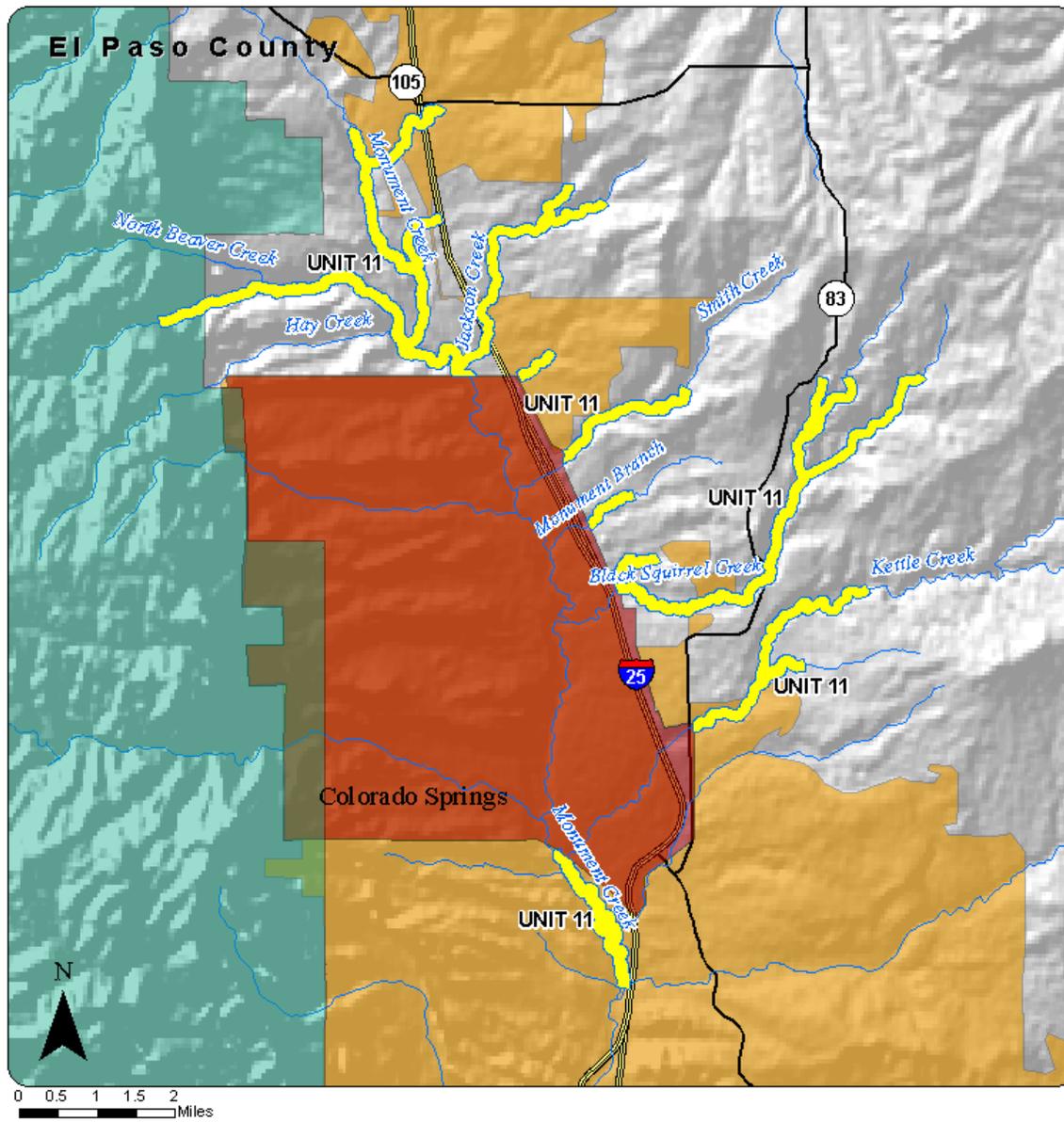
Unit 9 - West Plum Creek
 Unit 10 - Upper South Platte River



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

IEC Map Projection: UTM Zone 13N
 Geodetic Reference System: NAD 1983
INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT 1-8 PROPOSED REVISED CRITICAL HABITAT FOR THE PMJM, UNIT 11



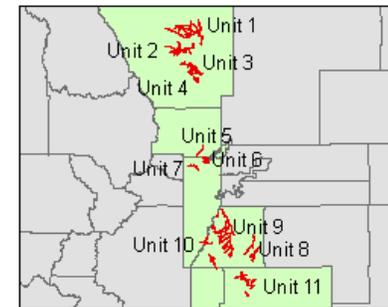
Proposed Critical Habitat:

Unit 11: Monument Creek

Legend

- Proposed Critical Habitat
- Rivers & Streams
- Urban Areas
- Interstate Highways
- U.S. Highways
- State Highways
- Pike & San Isabel Ntl Forest
- USAF Academy

Study Area



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

IEC Map Projection: UTM Zone 13N
 Geodetic Reference System: NAD 1983
INDUSTRIAL ECONOMICS, INCORPORATED

26. The proposed revised critical habitat is comprised of stream corridors and adjacent riparian vegetation located along the eastern edge of the Front Range of Colorado, from the Wyoming border south to Colorado Springs in Boulder, Broomfield, Douglas, El Paso, Jefferson, Larimer, and Teller Counties. In general, typical habitat for the PMJM is comprised of well-developed plains riparian vegetation with adjacent, relatively undisturbed grassland communities and a nearby water source.²⁰ For the proposed revised designation, the Service maintains consistency with their 2003 designation of critical habitat in delineating the upland extent of critical habitat boundaries at a set distance outward from the river or stream edge, varying with the size (order) of a river or stream (ranging from 361 feet outward from the edge of orders one and two streams to 459 feet outward from the edge of orders five and above streams).²¹
27. Exhibit 1-9 provides information concerning land ownership for the proposed revised habitat by unit. Areas explicitly considered for exclusion from designation in the Proposed Rule include lands covered by the Douglas County HCP, Livermore Area HCP, Larimer County's Eagle's Nest Open Space HCP, Denver Water HCP, Struther's Ranch HCP, and other HCPs; lands within El Paso County (countywide HCP currently under development); lands proposed within the proposed Seaman Reservoir expansion footprint; and lands within the Rocky Flats NWR. No lands proposed as critical habitat are under tribal authority or Department of Defense ownership, control, or use.²²

²⁰ 2009 Proposed Rule, 74 FR 52068.

²¹ 2009 Proposed Rule, 74 FR 52079.

²² The U.S. Air Force Academy (Academy) in El Paso County is the only Department of Defense property in the area of the proposed revised critical habitat. The Academy has completed an Integrated Natural Resources Management Plan (INRMP), a 1999 "Conservation and Management Plan for the Prebles Meadow Jumping Mouse at the U.S. Air Force Academy," and completed a 2000 programmatic section 7 consultation with the Service addressing certain activities that may affect the PMJM. The Service reviewed these measures and has concluded that they satisfy the INRMP criteria for PMJM and other natural resource conservation and management specified in the Sikes Act of 1997, thereby exempting the Academy from critical habitat designation under section 4(a)(3)(B)(i) of the Endangered Species Act (2009 Proposed Rule, 74 FR 52083-52084).

EXHIBIT 1-9 SUMMARY OF LANDOWNERSHIP IN PROPOSED REVISED CRITICAL HABITAT FOR THE PMJM, BY UNIT

UNIT	COUNTY	MAJOR LANDOWNER(S)/LAND MANAGER(S)	LANDOWNERS (ACRES)				
			FEDERAL	STATE	COUNTY AND OTHER LOCAL JURISDICTIONS	PRIVATE	TOTAL
1. N. Fork, Cache la Poudre River	Larimer	<ul style="list-style-type: none"> • Arapaho & Roosevelt National Forests • Lone Pine State Wildlife Area • The Nature Conservancy • Eagle's Nest Open Space (Larimer County) • Halligan Reservoir (City of Fort Collins) • Milton Seaman Reservoir (City of Greeley) • Private 	1,244	2,162	175	4,902	8,483
2. Cache la Poudre River	Larimer	<ul style="list-style-type: none"> • Arapaho & Roosevelt National Forests • Private 	4,702	83	12	124	4,921
3. Buckhorn Creek	Larimer	<ul style="list-style-type: none"> • Arapaho & Roosevelt National Forests • Private 	1,346	54	0	2,512	3,913
4. Cedar Creek	Larimer	<ul style="list-style-type: none"> • Arapaho & Roosevelt National Forests • Private 	510	0	0	131	641
5. South Boulder Creek	Boulder	<ul style="list-style-type: none"> • City of Boulder Open Space and Mountain Parks • Denver Water • Private 	0	0	512	289	801
6. Rocky Flats NWR	Jefferson and Broomfield	<ul style="list-style-type: none"> • USFWS • U.S. Department of Energy • Denver Water 	1,094	0	3	11	1,108
7. Ralston Creek	Jefferson	<ul style="list-style-type: none"> • Golden Gate Canyon State Park • White Ranch County Park • Private 	0	51	311	422	785

UNIT	COUNTY	MAJOR LANDOWNER(S)/LAND MANAGER(S)	LANDOWNERS (ACRES)				
			FEDERAL	STATE	COUNTY AND OTHER LOCAL JURISDICTIONS	PRIVATE	TOTAL
8. Cherry Creek	Douglas	<ul style="list-style-type: none"> • Castlewood Canyon State Recreation Area • Green Mountain Ranch (Douglas County) • Private 	0	259	125	2,205	2,589
9. West Plum Creek	Douglas	<ul style="list-style-type: none"> • Pike & San Isabel National Forests • Chatfield State Recreation Area (U.S. Army Corps of Engineers) • Woodhouse Ranch (Colorado Division of Wildlife) • Denver Water • Private 	907	334	366	6,923	8,530
10. Upper South Platte River	Douglas, Jefferson, and Teller	<ul style="list-style-type: none"> • Chatfield State Recreation Area (U.S. Army Corps of Engineers) • Pike & San Isabel National Forests • Denver Water • Private 	2,669	282	0	366	3,317
11. Monument Creek	El Paso	<ul style="list-style-type: none"> • Pike & San Isabel National Forests • Struther's Ranch • Private 	59	0	160	3,135	3,354
		TOTAL:	12,532	3,224	1,664	21,020	38,441
		Percent of Total:	32.6%	8.4%	4.3%	54.7%	100%
Source: 2009 Proposed Rule, 74 FR 52065 and GIS data of proposed critical habitat areas provided by the Service.							
Note: Totals may not sum due to rounding.							

1.4 THREATS TO CRITICAL HABITAT AREAS

28. The Proposed Rule identifies “habitat alteration, degradation, loss, and fragmentation resulting from urban development, flood control, water development, agriculture, and other human land uses as threats to the PMJM.”²³ This report describes and monetizes the potential economic impacts associated with the proposed revised critical habitat designation for the PMJM, in relation to the threats identified by the Service. Because several of these threats address broad impacts that could require project changes within a number of land uses, they were reclassified by potentially affected land use activity. Specifically, the report is organized into six primary sections (Chapters 3 through 8) that capture the threats as described in the rule: Residential and Commercial Development; Road/Bridge, Utility, and Bank Stabilization Construction and Maintenance; Water Supply Development (Reservoirs); USFS Lands Management; Rocky Flats; and Gravel Mining.

1.5 STRUCTURE OF THE REPORT

29. The remainder of this report is organized as follows:

- Chapter 2: Framework for the Analysis;
- Chapter 3: Residential and Commercial Development;
- Chapter 4: Road/Bridge, Utility, and Bank Stabilization Construction and Maintenance;
- Chapter 5: Water Supply Development (Reservoirs);
- Chapter 6: USFS Lands Management;
- Chapter 7: Rocky Flats;
- Chapter 8: Gravel Mining;
- Chapter 9: Economic Benefits;
- References;
- Appendix A: Small Business and Energy Impact Analysis;
- Appendix B: Impacts Calculated Using a Three Percent Discount Rate;
- Appendix C: Undiscounted Stream of Impacts; and
- Appendix D: Technical Assistance Costs.

²³ 2009 Proposed Rule, 74 FR 52072.

CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS

30. The purpose of this report is to estimate the economic impacts likely to occur due to the critical habitat designation. 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 PMJM; for example, under the Federal listing and other Federal, State, and local regulations. However, as described below, the baseline scenario does not consider the existing critical habitat designation. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental administrative and conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for the PMJM. Thus, this analysis forecasts the incremental impacts likely to occur due to critical habitat designation.
31. Because the 2009 proposed rule designates or revises units of critical habitat that largely coincide with those previously evaluated for the 2002 proposed rule, this analysis draws on some of the economic cost information documented in the previous analyses (January and June 2003).²⁴ However, this analysis represents a fundamental change in analytical approach from that followed in the previous economic analyses. Exhibit 2-1 summarizes how this analysis reflects new elements and analytical approaches that the Service has provided or adopted since the 2002 proposed rule:

²⁴ Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003.

EXHIBIT 2-1 CHANGES IN ANALYTICAL APPROACH FROM ECONOMIC ANALYSES PREPARED IN SUPPORT OF 2002 PROPOSED RULE

CHANGE IN ANALYTICAL APPROACH

- The Service now distinguishes the *incremental* costs of designation from baseline costs. The previous economic analyses evaluated all co-extensive costs (i.e., those resulting from both species listing (jeopardy) and critical habitat designation (adverse modification)). Thus, this analysis characterizes all projected costs as either baseline costs (i.e., those impacts expected to occur absent the designation of critical habitat) or incremental costs (i.e., those impacts expected to occur as a result of critical habitat designation);
- The Service provides guidance on distinguishing the incremental costs of the designation, as described in Section 2.3.2 of this report; and,
- This analysis considers and estimates the impacts of the rule as currently proposed and as if the existing 2003 critical habitat designation did not exist. In other words, this analysis considers and estimates the impacts associated with designating areas as critical habitat versus not designating these areas. This analysis is intended to assist the Secretary of the DOI in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation. These particular areas also include those already designated as critical habitat under the 2003 designation and subject to re-examination by the Secretary. As a result, costs incurred as a result of the 2003 designation are not included or documented in this analysis, with the exception of those that provide context for forecasting or substantiating the monetized incremental impacts.

32. The information presented in this report is intended to assist the Secretary of the U.S. Department of the Interior (DOI) in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.²⁵ In addition, this information allows the Service to address the requirements of Executive Orders (E.O.) 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).²⁶
33. This chapter describes the framework for the analysis. First, it describes the case law that led to the selection of the framework applied in this report. It then describes in economic terms the general categories of economic effects that are the focus of regulatory impact analysis, including a discussion of both efficiency and distributional effects. Next, this chapter defines the analytic framework used to measure these impacts in the context of critical habitat regulation, including the link between existing and critical habitat-related

²⁵ 16 U.S.C. §1533(b)(2).

²⁶ E.O. 12866, Regulatory Planning and Review, September 30, 1993 (as amended by E.O. 13258 (2002) and E.O. 13422 (2007)); E.O. 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.

protection efforts and potential impacts, and the consideration of benefits. It concludes with a presentation of the information sources relied upon in the analysis and the structure of the report.

2.1 BACKGROUND

34. 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."²⁷ 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.
35. In 2001, the U.S. Tenth Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed critical habitat, regardless of whether those impacts are attributable co-extensively to other causes.²⁸ Specifically, the court stated,
- “The statutory language is plain in requiring some kind of consideration of economic impact in the CHD [critical habitat designation] phase. Although 50 C.F.R. 402.02 is not at issue here, the regulation's definition of the jeopardy standard as fully encompassing the adverse modification standard renders any purported economic analysis done utilizing the baseline approach virtually meaningless. We are compelled by the canons of statutory interpretation to give some effect to the congressional directive that economic impacts be considered at the time of critical habitat designation.... Because economic analysis done using the FWS's [Fish and Wildlife Service's] baseline model is rendered essentially without meaning by 50 C.F.R. § 402.02, we conclude Congress intended that the FWS conduct a full analysis of all of the economic impacts of a critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes. Thus, we hold the baseline approach to economic analysis is not in accord with the language or intent of the ESA [Endangered Species Act].”²⁹
36. 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.³⁰ For example,

²⁷ OMB, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

²⁸ *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

²⁹ *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

³⁰ *Cape Hatteras Access Preservation Alliance v. Department of Interior*, 344 F. Supp. 2d 108 (D.D.C.); *Center for Biological Diversity v. United States Bureau of Land Management*, 422 F. Supp. 2d 1115 (N.D. Cal. 2006).

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

“The Court is not persuaded by the reasoning of *New Mexico Cattle Growers*, and instead agrees with the reasoning and holding of *Cape Hatteras Access Preservation Alliance v. U.S. Dep’t of the Interior*, 344 F. Supp 2d 108 (D.D.C. 2004). That case also involved a challenge to the Service’s baseline approach and the court held that the baseline approach was both consistent with the language and purpose of the 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.’”³¹

37. Based on this ruling, this economic analysis focuses on the estimated incremental impacts precipitated specifically by the designation of critical habitat for the species. This economic analysis also presents the baseline impacts of PMJM conservation where they provide context for forecasting or substantiating the monetized incremental impacts.
38. 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 may be imposed as a result of critical habitat designation over and above those associated with the listing.³² Specifically, in *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, the Ninth Circuit invalidated the Service’s regulation defining destruction or adverse modification of critical habitat, and the Service no longer relies on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat.³³ Under the statutory provisions of the Act, the Service determines destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional to serve its intended conservation role for the species. A detailed description of the methodology used to define baseline and incremental impacts is provided later in this section.

³¹ *Center for Biological Diversity et al, Plaintiffs, v. United States Bureau of Land Management et. al, Defendants and American Sand Association, et al, Defendant Intervenors*, Order re: Cross Motions for Summary Judgment, Case 3:03-cv-02509 Document 174 Filed 03/14/2006, pages 44-45.

³² 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.

³³ *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, No. 03-35279 (9th Circuit 2004).

2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

39. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the PMJM and its habitat. Economic efficiency effects generally reflect “opportunity costs” associated with the commitment of resources required to accomplish species and habitat conservation. For example, if the set of activities that may take place on a parcel of land is limited as a result of the designation or the presence of the species, and thus the market value of the land is reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly, the costs incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs of PMJM conservation efforts.
40. This analysis also addresses the distribution of impacts associated with the designation, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation efforts on small entities and the energy industry. This information may be used by decision-makers to assess whether the effects of species conservation efforts unduly burden a particular group or economic sector. For example, while conservation efforts may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience relatively greater impacts. The differences between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

2.2.1 EFFICIENCY EFFECTS

41. At the guidance of OMB and in compliance with E.O. 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 PMJM 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.³⁴
42. 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. Army Corps of Engineers (USACE), 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

³⁴ 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>.

service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.

43. Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, protection measures that reduce or preclude the development of large areas of land may shift the price and quantity of housing supplied in a region. In this case, changes in economic efficiency (i.e., social welfare) can be measured by considering changes in producer and consumer surplus in the market.
44. This analysis begins by measuring impacts associated with efforts undertaken to protect the PMJM 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. In the case of the PMJM, conservation efforts are not anticipated to significantly affect markets; therefore, this report focuses solely on compliance costs.

2.2.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

45. 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.³⁵ 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

46. This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the RFA, might be affected by future species conservation efforts.³⁶ In addition, in response to E.O. 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.³⁷

Regional Economic Effects

47. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation efforts. Specifically, regional economic impact analysis produces

³⁵ 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>.

³⁶ 5 U.S.C. §§601 *et seq.*

³⁷ E.O. 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

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 developers and builders) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to developers and builders). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.

48. 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 affected 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.
49. 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.
50. As described later in this report, impacts associated with PMJM conservation efforts primarily result in additional costs to developers and other related entities to mitigate impacts to and restore and enhance PMJM habitat. This impact may lead to some reduction in residential home construction and therefore affect regional economies. As a result, information is provided in Chapter 3 of this analysis on the potential regional effect of this change in activity.

2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

51. 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 or minimize such threats within the boundaries of the study area (the geographic boundaries of the study area are described later in this chapter). This section provides a description of the methodology used to separately identify baseline impacts and incremental impacts stemming from the proposed designation of critical habitat for the PMJM. This evaluation of impacts in a "with critical habitat designation" versus a "without critical habitat designation" framework effectively measures the net change in economic activity associated with the proposed rulemaking.

2.3.1 IDENTIFYING BASELINE IMPACTS

52. 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. This "without critical habitat designation" scenario also considers a wide range of additional factors beyond the compliance costs of regulations that provide protection to the listed species. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by the Service and other government entities, and trends in other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.
53. 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. Baseline administrative costs of section 7 consultation are summarized later in Exhibit 2-3.
 - 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."³⁸ The economic impacts associated with this section are manifested in sections 7 and 10.
 - Under section 10(a)(1)(B) of the Act, an entity (i.e., a landowner or local government) may develop an HCP for a listed 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.³⁹ The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately avoided or minimized. The development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be precipitated by the designation of critical habitat, or the designation influences stipulated conservation efforts under HCPs.

Enforcement actions taken in response to violations of the Act are not included in this analysis.⁴⁰

³⁸ 16 U.S.C. 1538 and 16 U.S.C. 1532.

³⁹ U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning." From: <http://endangered.fws.gov/hcp/>, as viewed on August 6, 2002.

⁴⁰ In other words, this analysis considers only those actions undertaken to comply with the Act. E.O. 12866 specifically prescribes the quantification, to the extent possible, of anticipated direct costs "both to the government in administering

54. In the case of the PMJM, critical habitat was previously designated in 2003.⁴¹ The impacts of historical efforts to conserve critical habitat, including the development and implementation of HCPs precipitated by the designation, are assigned to the baseline, as these costs have already been incurred and therefore are unaffected by the proposed rule. To the extent that the study area for this analysis overlaps with the formerly designated habitat, future impacts attributable solely to critical habitat designation are attributed to the proposed rule currently under consideration.
55. The protection of listed species and habitat is not limited to the Act. Other Federal agencies, as well as State and local governments, may also seek to protect the natural resources under their jurisdiction. If compliance with the Clean Water Act or State environmental quality laws, for example, protects habitat for the species, such protective efforts are considered to be baseline protections and costs associated with these efforts are categorized accordingly. Of note, however, is that such efforts may not be considered baseline in the case that they would not have been triggered absent the designation of critical habitat. In these cases, they are considered incremental impacts and are discussed below.

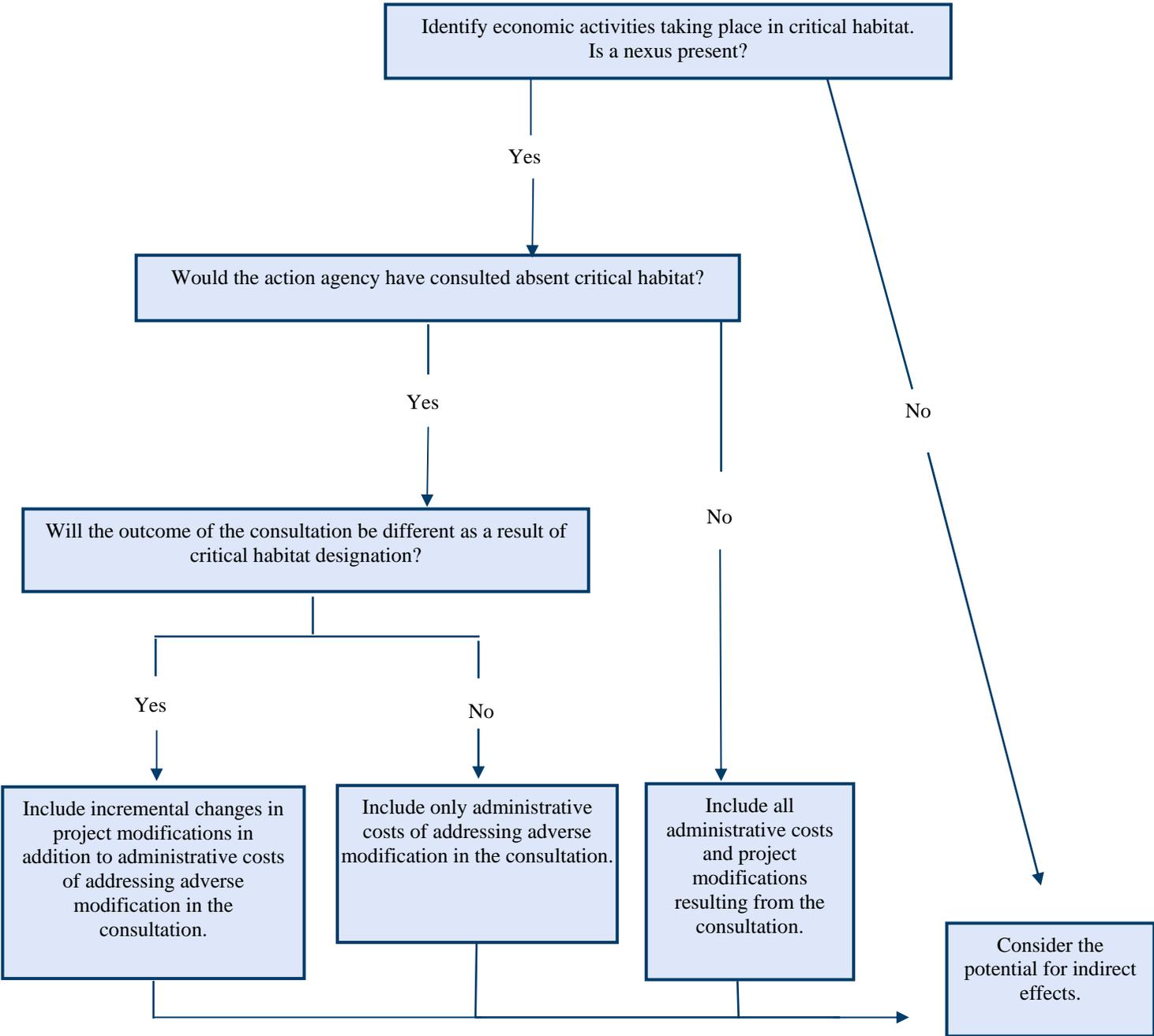
2.3.2 IDENTIFYING INCREMENTAL IMPACTS

56. 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.
57. 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.
58. Exhibit 2-2 depicts the decision analysis regarding whether an impact should be considered incremental. The following sections describe this decision tree in detail.

the regulation and to businesses and others in complying with the regulation" in regulatory analyses (Section 6(a)(3)(C)(ii), 58 FR 51741).

⁴¹ 2003 Final Rule, 68 FR 37275.

EXHIBIT 2-2 IDENTIFYING INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION



59. 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 baseline scenario. Additionally, incremental impacts may include indirect impacts resulting from reaction to the potential designation of critical habitat (e.g., developing HCPs in an effort to avoid designation of critical habitat), triggering of additional requirements under State or local laws intended to protect sensitive habitat, and uncertainty and perceptual effects on markets.

Direct Impacts

60. 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 or minimize potential destruction or adverse modification of critical habitat.

Administrative Section 7 Consultation Costs

61. Parties involved in section 7 consultations include the Service, a Federal "action agency," and in some cases, a private entity involved in the project or land use activity. The action agency (i.e., the Federal nexus necessitating the consultation) serves as the liaison with the Service. While consultations are required for activities that involve a Federal nexus and may affect a species regardless of whether critical habitat is designated, the designation may increase the effort for consultations in the case that the project or activity in question may adversely modify critical habitat. Administrative efforts for consultation may therefore result in both baseline and incremental impacts.
62. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:
1. **Scenario 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 those measures required by the listing. In this case, only the additional administrative effort required to consider critical habitat is considered an incremental impact of the designation.
 2. **Scenario 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. **Scenario 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 or “not regularly used” by the species. All associated administrative and project modification costs of incremental consultations are considered incremental impacts of the designation.

In the case of the PMJM, the Service issued a memorandum describing two specific instances in which incremental impacts resulting from the designation could occur:⁴²

- i) The Service would require section 7 consultations and project modifications for activities being undertaken within critical habitat, even though uncertainty may exist over whether a PMJM population is currently present at a particular site. Specifically, the Service states, “...within CH [critical habitat] units impacts to habitat supporting one or more of the PCEs [primary constituent elements] would require section 7 consultation regardless of documentation of site-specific occupancy or relative quality of upland habitats.” In the absence of the critical habitat designation, project proponents could dispute occupancy and thereby avoid costs (e.g., by conducting surveys showing no occupancy or adverse effect to the PMJM).
 - ii) The Service would require section 7 consultations and project modifications for activities being undertaken within critical habitat, even though particular project sites may be located in habitat “not regularly used” by PMJM, such as areas located relatively far from streams or areas of marginal quality. In the absence of the critical habitat designation, in some cases the Service may conclude that certain projects would not adversely affect the PMJM based on habitat use or quality.
63. The administrative costs of these consultations vary depending on the specifics of the project. One way to address this variability is to show a range of possible costs of consultation, as it may not be possible to predict the precise outcome of each future consultation in terms of level of effort. Review of consultation records and discussions with Service field offices resulted in a range of estimated administrative costs of consultation. For simplicity, the average of the range of costs in each category is applied in this analysis.

⁴² U.S. Fish and Wildlife Service, “Comments on how DEA Should Estimate Incremental Costs for the Preble’s Meadow Jumping Mouse Revised Critical Habitat Designation,” November 23, 2009.

64. Exhibit 2-3 provides estimated administrative 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.
- The greatest effort will be associated with consultations that consider both jeopardy and adverse modification. Depending on whether the consultation is precipitated by the listing or the critical habitat designation, part or all of the costs, respectively, will be attributed to the proposed rule.
 - Efficiencies exist when 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 precipitated by the listing result in the least incremental effort, roughly one-quarter, or 25 percent, of the cost of the entire consultation. The remaining three-quarters of the costs are attributed to consideration of the jeopardy standard in the baseline scenario. This latter amount also represents the cost of a consultation that only considers adverse modification (e.g., an incremental consultation for activities in unoccupied critical habitat areas) and is attributed wholly to critical habitat.
 - Incremental costs of the re-initiation of a previously completed consultation because of the critical habitat designation are assumed to be approximately half the cost of a consultation considering both jeopardy and adverse modification. 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. However, because the previously completed effort must be re-opened, they are more costly than simply adding consideration of critical habitat to a consultation already underway.

EXHIBIT 2-3 RANGE OF ADMINISTRATIVE CONSULTATION COSTS (2009 DOLLARS)

BASELINE ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT	TOTAL COSTS
NEW CONSULTATION CONSIDERING JEOPARDY (DOES NOT INCLUDE CONSIDERATION OF ADVERSE MODIFICATION)					
Technical Assistance	\$420	n/a	\$1,237	n/a	\$1,657
Informal	\$1,837	\$2,325	\$1,537	\$1,500	\$7,120
Formal	\$4,090	\$4,500	\$2,625	\$3,600	\$15,000
Programmatic	\$12,300	\$10,290	n/a	\$4,200	\$26,790
INCREMENTAL ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT	TOTAL COSTS
NEW CONSULTATION RESULTING ENTIRELY FROM CRITICAL HABITAT DESIGNATION (TOTAL COST OF A CONSULTATION CONSIDERING BOTH JEOPARDY AND ADVERSE MODIFICATION)					
Technical Assistance	\$560	n/a	\$1,500	n/a	\$1,500
Informal	\$2,450	\$3,100	\$2,050	\$2,000	\$9,500
Formal	\$5,450	\$6,150	\$3,500	\$4,800	\$20,000
Programmatic	\$16,400	\$13,700	n/a	\$5,600	\$35,700
NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION (UNOCCUPIED HABITAT)					
Technical Assistance	\$420	n/a	\$788	n/a	\$1,130
Informal	\$1,840	\$2,330	\$1,540	\$1,500	\$7,130
Formal	\$4,090	\$4,610	\$2,630	\$3,600	\$15,000
Programmatic	\$12,300	\$10,200	n/a	\$4,200	\$26,700
RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION					
Technical Assistance	\$280	n/a	\$525	n/a	\$750
Informal	\$1,230	\$1,550	\$1,030	\$1,000	\$4,750
Formal	\$2,730	\$3,080	\$1,750	\$2,400	\$10,000
Programmatic	\$8,200	\$6,830	n/a	\$2,800	\$17,800
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION (ADDITIVE WITH BASELINE COSTS ABOVE OF CONSIDERING JEOPARDY)					
Technical Assistance	\$140	n/a	\$263	n/a	\$375
Informal	\$613	\$775	\$513	\$500	\$2,380
Formal	\$1,360	\$1,540	\$875	\$1,200	\$5,000
Programmatic	\$4,100	\$3,410	n/a	\$1,400	\$8,910
Source: IEC analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2009, 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

65. 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 or minimize 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. **Scenario 1: Additional effort to address adverse modification in a new consultation** - Only project modifications above and beyond what would be requested to avoid or minimize jeopardy are considered incremental.
2. **Scenario 2: Re-initiation of consultation to address adverse modification** - Only project modifications above and beyond what was requested to avoid or minimize jeopardy are considered incremental.
3. **Scenario 3: Incremental consultation resulting entirely from critical habitat designation** - Impacts of all project modifications are considered incremental.

In the case of the PMJM, the Service indicates that, with critical habitat, impacts to critical habitat would have to be offset by conservation measures or actions *within* the same unit. In units having limited opportunities to provide such measures or actions there may be significant changes to project scope and cost, or higher costs of avoidance.⁴³

PMJM-Specific Approach to Estimating Direct Incremental Impacts

66. In the case of the PMJM, available information and data do not readily allow for the assignment of projects or activities to each of the three different consultation scenarios discussed above. As a result, the total consultation and project modification costs for all projects and activities forecasted to occur within critical habitat for the PMJM are first calculated, assuming that both jeopardy and adverse modification will be considered. To estimate the proportion of these total consultation and project modification costs that result entirely from the critical habitat designation (Scenario 3 above), unit-specific area-based factors are then applied to distinguish between those instances where consultations would or would not be required absent critical habitat. These area-based factors are based on the respective geographical areas where potential impacts to the PMJM and its habitat would generally need to be addressed, with or without the critical habitat designation. The area over which impacts might occur in the absence of the critical habitat designation is based on guidance that project proponents and action agencies currently follow to determine whether potential impacts to the PMJM and its habitat

⁴³ U.S. Fish and Wildlife Service, "Comments on how DEA Should Estimate Incremental Costs for the Preble's Meadow Jumping Mouse Revised Critical Habitat Designation," November 23, 2009.

would generally need to be addressed, such as conservation zones established by existing HCPs and the Service’s guidelines by which the presence or absence of the PMJM and its habitat is surveyed and assessed (i.e., within 300 feet of 100-year floodplains).⁴⁴ Exhibit 2-4 presents the calculation of these area-based factors by unit.

EXHIBIT 2-4 AREA-BASED FACTORS BY UNIT

UNIT	TOTAL AREA OVER WHICH POTENTIAL IMPACTS TO THE PMJM AND ITS HABITAT WOULD GENERALLY NEED TO BE ASSESSED OR ADDRESSED		FACTOR (DIFFERENCE IN AREAS AS A PERCENTAGE OF CRITICAL HABITAT AREA)
	WITHOUT CRITICAL HABITAT ¹ (ACRES)	WITH CRITICAL HABITAT ² (ACRES)	
1. N. Fork, Cache la Poudre River	8,432	8,483	1%
2. Cache la Poudre River	4,104	4,921	17%
3. Buckhorn Creek	3,217	3,913	18%
4. Cedar Creek	515	641	20%
5. South Boulder Creek	757	801	5%
6. Rocky Flats NWR	884	1,108	20%
7. Ralston Creek	737	785	6%
8. Cherry Creek	2,446	2,589	6%
9. West Plum Creek	7,730	8,530	9%
10. Upper South Platte River	2,777	3,317	16%
11. Monument Creek	3,061	3,354	9%
TOTAL	34,660	38,441	10%
Sources: 2009 Proposed Rule, 74 FR 52070, HCPs, and U.S. Fish and Wildlife Service, "Preble's Meadow Jumping Mouse Survey Guidelines," revised April 2004.			
Notes:			
¹ Assessment areas without critical habitat are based on the conservation zones established by existing HCPs and the Service’s guidelines by which the presence or absence of the PMJM and its habitat is surveyed and assessed (i.e., within 300 feet of 100-year floodplains).			
² A small discrepancy was found in the acreages calculated from the proposed critical habitat areas depicted in the GIS data provided by the Service (38,441 acres) versus those reported in the proposed rule (39,142 acres, see Exhibit 1-1).			

⁴⁴ U.S. Fish and Wildlife Service, "Preble's Meadow Jumping Mouse Survey Guidelines," revised April 2004.

67. To estimate the proportion of the remaining total consultation and project modification costs that reflects the additional effort to address adverse modification in new consultations (Scenario 1), the fractions of the total administrative consultation costs assumed previously as baseline or incremental are then applied.
68. The following simple example illustrates use of this methodology to estimate the direct incremental impacts of this rulemaking:

Example Calculation of Direct Incremental Impacts:

- i) 10 projects forecasted within critical habitat, each project requiring formal consultation costing \$20,000 (will consider both jeopardy and adverse modification) and project modifications costing \$100,000
- ii) 10 projects * (\$20,000 per formal consultation + \$100,000 per project modification) = \$1.2 million
- iii) \$1.2 million * Area Factor of 0.05 (see Exhibit 2-4 for area factors, by unit) = **\$60,000** in incremental administrative consultation and project modification costs resulting entirely from the critical habitat designation
- iv) Remaining \$1,140,000 * 25% fraction that is incremental = **\$285,000** in incremental administrative consultation and project modification costs reflecting the additional effort to address adverse modification
- v) Total incremental administrative consultation and project modification costs = \$60,000 + \$285,000 = **\$345,000**

69. Finally, as discussed above, the incremental costs associated with implementing conservation measures *within* versus outside the critical habitat units are evaluated. However, given the data limitations, these incremental in-unit mitigation costs can only be described qualitatively, considering the relative quantity and quality of area available for conservation activities within each critical habitat unit.

Indirect Impacts

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

71. Under section 10 of the Act, an entity (i.e., a landowner or local government) seeking an incidental take permit must develop an HCP to counterbalance the potential harmful effects that an otherwise lawful activity may have on a species. As such, the purpose of the habitat conservation planning process is to ensure that the effects of incidental take are adequately avoided or minimized. Thus, HCPs are developed to ensure compliance with section 9 of the Act and to meet the requirements of section 10 of the Act.
72. Application for an incidental take permit and completion of an HCP are not required or necessarily recommended by a critical habitat designation. However, in certain situations the new information provided by the proposed critical habitat rule may prompt an entity to apply for an incidental take permit. For example, a landowner may have been previously unaware of the potential presence of the species on his or her property, and expeditious completion of an HCP may offer the landowner regulatory relief in the form of exclusion from the final critical habitat designation. In this case, the effort involved in creating the HCP and undertaking associated conservation actions are considered an incremental effect of designation.
73. In the case of the PMJM, several HCPs were developed in response to the 1998 species listing or 2003 critical habitat designation, including the Douglas Country Habitat Conservation Plan, Livermore Area Conservation Plan, Eagle's Nest Open Space Habitat Conservation Plan, Denver Water Habitat Conservation Plan, Struther's Ranch Habitat Conservation Plan, Lefever Property, and Dahl Property. No specific plans to update these HCPs or prepare new HCPs in response to this proposed designation were identified.

Other State and Local Laws

74. 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.
75. As an example, in California, 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 (EIR) 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. Evidence of additional impacts triggered by State and local laws is not available for this designation.⁴⁵

Additional Indirect Impacts

76. 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. The impact of time delays is estimated in Chapter 3 of this report.
 - **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. In this specific analysis, information is not available to monetize this category of effect.
 - **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. Data limitations prevent the consideration of stigma effects resulting from PMJM conservation efforts.

⁴⁵ CEQA is provided as an example of State law that may be triggered by critical habitat, it should be noted that no such regulations exist in Colorado.

2.3.3 BENEFITS

77. Under E.O. 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.⁴⁶ 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.⁴⁷
78. 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 E.O. 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research.⁴⁸ *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.*
79. Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the PCEs 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. The potential ancillary benefits of critical habitat designation are described qualitatively in a separate chapter at the end of this report.

2.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

80. The geographic scope of the analysis includes all areas currently identified as proposed critical habitat in the October 2009 proposed rule, including the areas considered for possible exclusion from the final designation. Note that economic activities affecting critical habitat may be sited outside of the boundaries of the study area (e.g., upstream activities); these activities are considered relevant to this analysis because they or their impacts or releases may potentially result in the destruction or adverse modification of critical habitat.

⁴⁶ E.O. 12866, Regulatory Planning and Review, September 30, 1993.

⁴⁷ 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>.

⁴⁸ Ibid.

81. Results are presented by proposed critical habitat unit in most tables. Where significant impacts result from specific parcels within units, these parcels and the associated costs are identified in the text and summary tables included in the Executive Summary.

2.3.5 ANALYTIC TIME FRAME

82. 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 2010 (expected year of final critical habitat designation) to 2029 (20 years later). This 20-year analysis period reflects the maximum amount of time under which future activities and economic impacts associated with the Proposed Rule can be reliably projected, given the available data and information. The analysis also considers impacts that occurred before the expected 2010 final designation and after the species' final listing in 1998 as pre-designation impacts (1998 - 2009), if they provide context for or substantiate the monetized post-designation impacts (2010 - 2029).⁴⁹

2.4 INFORMATION SOURCES

83. 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. Some of this information and data is provided in public comment letters submitted in response to the Proposed Rule.⁵⁰ In addition, this analysis relies upon the Service's section 7 consultation records and existing habitat management and conservation plans that consider the PMJM. Finally, this analysis also relies on still pertinent information and data from the 2003 draft economic analyses prepared in support of the 2002 proposed critical habitat rule.⁵¹ Due to the high number of entities contacted, the complete list of contacted stakeholders is located within the reference section at the end of this document.

⁴⁹ As described in the Proposed Rule, the Service first designated critical habitat for this species in 2003 (68 FR 37275). "Pre-designation" and "post-designation" in this report refer to the revised final critical habitat designation expected in 2010.

⁵⁰ Available at <http://www.regulations.gov>, docket number FWS-R6-ES-2009-0013.

⁵¹ Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003.

CHAPTER 3 | RESIDENTIAL AND COMMERCIAL DEVELOPMENT

3.1 INTRODUCTION

84. This chapter considers potential economic impacts to residential and commercial development within the proposed revised critical habitat. In the Proposed Rule, the Service states that pressure for expanded suburban and rural development exists on non-Federal lands within several units.⁵² Nearly 80 percent of the forecast total economic impact reported in the Economic Analysis prepared for the 2002 proposed designation stemmed from administrative consultation and project modification costs associated with residential and related development projects.⁵³ However, local governments indicate that substantial development has not been occurring and is unlikely to occur within the bounds of critical habitat.⁵⁴ This apparent lack of future development in critical habitat areas, at least in the near term, is partly due to the recent economic recession which had substantially decreased the forecast demand for housing and increased the amount of available housing stock. Moreover, significant protection of habitat in areas where such development is planned or allowed is already likely due to existing HCPs and local ordinances and permitting processes that require large buffer or setback areas away from habitat and consultation with the Service to address potential impacts to the PMJM.⁵⁵ As a result, the impacts forecasted for the 2002 proposed designation likely overstated the actual impacts.

⁵² 2009 Proposed Rule, 74 FR 52080-52082.

⁵³ Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003.

⁵⁴ Douglas and El Paso Counties indicated that development is occurring mostly outside of PMJM habitat (Personal communication, C. Matthews and A. Hough, Douglas County, and S. Dougherty, ERO Resources Corp., December 8, 2009, and K. Andrew and N. Prieve, El Paso County, December 9, 2009). Larimer County indicated that not much development is occurring (Personal communication R. Helmick, Larimer County, December 16, 2009). Boulder County indicated that most areas within critical habitat in their county is already developed and built-out (P. Fogg, Boulder County, January 11, 2010).

⁵⁵ For example, "any project going through the County's [El Paso] review and/or permitting processes having ground-disturbing activities occurring within 300 feet of the 100-year floodplain or stream centerline, whichever is greater, is sent to the Service for consultation regarding the PMJM" (Bensberg, J., Chairman, El Paso County Board of Commissioners, "Comments on Revised Critical Habitat for the Preble's Meadow Jumping Mouse in Colorado," December 3, 2009, p.3). In another example, the Douglas County HCP encourages "direct impact avoidance as part of project development, which means fewer impacts to Preble's habitat and fewer reviews of proposed development and their effects on Preble's habitat by the Service." More specifically, the County requires avoidance of the HCP's riparian conservation zones and other important wildlife habitat areas or corridors. The County often requires buffering or screening such as earthwork berms or woody plantings adjacent to the riparian conservation zone and other habitat. (ERO Resources Corp. on behalf of Douglas County, "Comment on FWS-R6-ES-2009-0013," December 7, 2009, p. 5 and Attachment 1, p. 3).

85. Nonetheless, future impacts associated with residential and commercial development are estimated given the likelihood that the housing market will recover within the 20-year analysis period. This analysis relies on the most currently available housing projection data for the counties in which the Proposed Rule is designating critical habitat, as well as information provided in the biological opinions issued to residential and commercial development projects following section 7 consultations with the Service. Further, because these housing projection data indicate that the level of expected development in Unit 11 (Monument Creek) is much higher compared to the other units, this analysis also uses parcel-specific data and information obtained from the El Paso County Assessor's Office to refine the estimates developed for this unit. Future incremental impacts are primarily due to project modifications that developers would be required to implement to mitigate impacts to and restore and enhance PMJM habitat. These impacts are summarized in Exhibit 3-1 and discussed in detail below.

**EXHIBIT 3-1 SUMMARY OF IMPACTS TO DEVELOPMENT, BY UNIT
(2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)**

UNIT	PRESENT VALUE IMPACTS	
	LOW ESTIMATE	HIGH ESTIMATE
Post-Designation Incremental Impacts (2010 - 2029)		
1. N. Fork, Cache la Poudre River	\$153,000	\$250,000
2. Cache la Poudre River	\$112,000	\$184,000
3. Buckhorn Creek	\$115,000	\$189,000
4. Cedar Creek	\$29,800	\$48,900
5. South Boulder Creek	\$303,000	\$496,000
6. Rocky Flats NWR	\$0	\$0
7. Ralston Creek	\$372,000	\$610,000
8. Cherry Creek	\$2,090,000	\$5,580,000
9. West Plum Creek	\$7,260,000	\$19,400,000
10. Upper South Platte River	\$6,360,000	\$17,000,000
11. Monument Creek	\$3,230,000	\$6,670,000
Total	\$20,000,000	\$50,400,000
Notes: Totals may not sum due to rounding.		

3.2 BACKGROUND INFORMATION

3.2.1 DEVELOPMENT PRESSURES IN THE PROPOSED REVISED CRITICAL HABITAT

86. To estimate the future impacts of PMJM critical habitat designation on future residential housing development, this analysis first estimates the number of housing units presently anticipated to be built in critical habitat areas over the next 20 years. These estimates are based on geographic information system (GIS) models provided by the Pikes Peak Area Council of Governments (PPACG, 2007) and the Denver Regional Council of Governments (DRCOG, 2009), which project future population and housing units in five-year increments for county and local transportation planners.⁵⁶ These models project the number of housing units by Transportation Analysis Zone (TAZ) polygons, which are typically subsets of census tracts or block groups. GIS maps of the proposed revised PMJM critical habitat areas provided by the Service were then overlaid on these TAZ polygons, and the number of housing units anticipated to occur within the boundaries of proposed critical habitat was determined.
87. For Larimer County (Units 1, 2, 3, and 4), projections more recent than those used in the economic analyses prepared in support of the 2002 proposed critical habitat rule were not available. This analysis therefore applies the annual projections used in those analyses for the 20-year analysis period.
88. Based on this data, the models predict about 2,000 units will be built in PMJM critical habitat in the next 20 years, as presented in Exhibit 3-2 on a unit-by-unit basis. Almost 85 percent (or 1,700) of the projected 2,000 units are in Unit 11 (Monument Creek). This unit includes unincorporated lands in El Paso County and incorporated lands within the Town of Monument and City of Colorado Springs that are adjacent to the U.S. Air Force Academy.
89. Because expected activity level is much higher in Unit 11 than in the other units, this analysis uses parcel-specific information provided by El Paso County to estimate the number of developable parcels (and housing units) that would potentially impact the proposed revised PMJM critical habitat in this unit.⁵⁷ Based on this more detailed information, this analysis estimates about 780 units will be built in PMJM critical habitat in Unit 11, which is less than half the number of units forecasted for development using the PPACG projection model (1,700). To derive this estimate from the parcel data, this analysis assumes that non-governmental, unoccupied parcels of 100 acres or more in area are likely to be developed and subject to a section 7 consultation.⁵⁸ As discussed later in

⁵⁶ Pikes Peak Area Council of Governments, Population and Housing Model, 2007 and Denver Regional Council of Governments, Population and Housing Model, 2009.

⁵⁷ Parcel data provided by El Paso County Assessor's Office, March 17, 2010.

⁵⁸ To estimate the number of housing units likely to be developed within the proposed revised PMJM critical habitat in Unit 11, GIS maps of the proposed revised PMJM critical habitat were first overlaid on a map of all land parcels in El Paso County. Next, for those parcels that intersect proposed critical habitat, parcel-specific data was obtained such as their acreage, primarily land use, zoning code, ownership, and buildings. This analysis then assumes that the following three types of parcels are not likely to be developed under a federal nexus and therefore will not require a section 7 consultation: 1) those parcels under county or government ownership, 2) those parcels occupied by existing buildings, and

this Chapter, the section 7 consultation history for residential development projects in the study area indicates that parcels having these attributes are more likely to be developed under a federal nexus and therefore require a section 7 consultation. In total, this analysis therefore estimates about 1,080 housing units will be built in PMJM critical habitat in the next 20 years, as presented in Exhibit 3-2.

3) those parcels under 100 acres in area (i.e., their size is not consistent with “typical” large-scale projects developed in El Paso County that undergo section 7 consultation as discussed later in this Chapter). The maximum allowable density of housing units was then applied to each of the remaining parcels based on the zoning code(s) assigned to them. Finally, using GIS analysis, about 22 percent of the estimated total number of developable units within the proposed revised PMJM critical habitat were subtracted, based on existing restrictions on development within the 100-year floodplain. Maximum number of units per zoning code obtained from the El Paso County Land Development Code, accessed at <http://adm2.elpasoco.com/Planning/LDC/default.asp> in March 2010; Municipal Code for Monument, Colorado, accessed at http://library2.municode.com/default-test/home.htm?infobase=16718&doc_action=whatsnew in March 2010; and, Colorado Springs, Colorado City Code, accessed at <http://www.sterlingcodifiers.com/CO/Colorado%20Springs/index.htm> in March 2010. Personal communication with Tim Condit, Floodplain Administrator, Pikes Peak Regional Building Department, March 9, 2010. See also Floodplain Code, Regional Building Code Section 313, accessible at http://www.pprbd.org/codes/2008RBC_Revised.pdf#page=115&pagemode=Bookmarks.

EXHIBIT 3-2 PROJECTED NUMBER OF NEW HOUSING UNITS IN PMJM CRITICAL HABITAT, BY UNIT

UNIT	EXPECTED VALUE OF NUMBER OF NEW HOUSING UNITS (ANNUAL, BY PERIOD)				TOTAL NUMBER OF NEW HOUSING UNITS (2010-2029)
	2010-2014	2015-2019	2020-2024	2025-2029	
1. N. Fork, Cache la Poudre River	0.8	0.8	0.8	0.8	16
2. Cache la Poudre River	0.4	0.4	0.4	0.4	8
3. Buckhorn Creek	0.4	0.4	0.4	0.4	8
4. Cedar Creek	0.1	0.1	0.1	0.1	2
5. South Boulder Creek	1.2	1.4	1.5	1.6	28.7
6. Rocky Flats NWR	-	-	-	-	0
7. Ralston Creek	1.5	1.7	1.9	1.9	34.9
8. Cherry Creek	1.3	1.5	1.7	1.7	31.1
9. West Plum Creek	4.2	4.8	5.2	5.5	98.3
10. Upper South Platte River	3.2	3.6	3.9	4.1	74.3
Subtotal, Units 1 - 10 (2010 - 2029)					301
11. Monument Creek (based on PPACG model)	133	113	58	36.4	1,700
11. Monument Creek (based on El Paso County Assessor parcel data)	60.7	51.5	26.5	16.6	776
Total, All Units (2010 - 2029), using PPACG model for Unit 11					2,002
Total, All Units (2010 - 2029), using El Paso County Assessor parcel data for Unit 11					1,078
<p>Sources: Pikes Peak Area Council of Governments (2007) and Denver Regional Council of Governments (2009) population and housing models. The sources for Units 1, 2, 3, and 4 are the North Front Range Metropolitan Planning Organization Population and Housing Models, USACE, and Larimer County Planning Department, as described in Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003. The additional source for Unit 11 is parcel data from the El Paso County Assessor's Office (2010).</p> <p>Notes: The numbers of new housing units are calculated on an annual basis for each five-year increment, as provided by the forecast data. This analysis assumes that development within a TAZ will be distributed equally, with the exception of Unit 6 (Rocky Flats NWR), where it is assumed that no new housing units will be built. To account for the irregular shapes of the TAZ and critical habitat polygons, TAZ housing projections for zones that fell partially within the boundaries of the proposed critical habitat were multiplied by the ratio of the amount of land falling in versus out of the zone. For Larimer County (Units 1, 2, 3, and 4), this analysis assumes the constant development rates used in the 2003 economic analysis (Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003). For Unit 11 (Monument Creek) using parcel data, this analysis assumes maximum allowable building density for non-governmental, undeveloped parcels of greater than 100 acres, and that all developable land is developed during the 20-year period of this analysis. This analysis assigns the total estimated number of new housing units to years based on the relative 5-year growth rates provided in the PPACG population and housing model.</p>					

3.2.2 SECTION 7 CONSULTATION HISTORY

90. The Service has conducted 11 formal consultations for residential development projects since the 2003 critical habitat designation. Nine of these formal consultations have been with the USACE related to section 404 permits for construction activities.⁵⁹ One of these formal consultations involved the issuance of an incidental take permit under section 10(a)(1)(B) of the Act for potential disturbance to, and loss of, habitat used by the PMJM.⁶⁰ Additionally, 16 formal consultations were conducted for other development-related activities, such as development of commercial properties, residential driveways, churches, and water wells and outfall structures for existing developments.
91. The Service required a variety of project modifications for protection of the PMJM and its habitat as part of these past formal consultations for residential developments. Exhibit 3-3 summarizes these modifications.

EXHIBIT 3-3 PROJECT MODIFICATIONS REQUIRED BY THE SERVICE TO AVOID AND MINIMIZE DEVELOPMENT-RELATED IMPACTS TO THE PMJM AND ITS HABITAT

PROJECT MODIFICATIONS
<ul style="list-style-type: none"> • Restrict grazing and mowing activities to enhance open spaces • Install fencing to delineate Preble’s habitat and prevent pedestrian traffic • No outdoor cats permitted; dogs require leashes • Signage for wildlife areas • Actively address drainage-wide stormwater runoff and creek flow issues • Restore and enhance habitat consisting of native tree and shrub plantings and weed management • Annual reporting on succession progress of re-vegetated areas

3.3 ESTIMATING IMPACTS TO DEVELOPMENT

92. The available information and data do not readily allow for the identification and estimation of incremental costs due to the proposed revised critical habitat designation. As a result, the methodology described in Chapter 2 is followed to estimate: 1) that proportion of the total forecast consultation and project modification costs which results entirely from the critical habitat designation, and 2) the proportion of the remaining costs

⁵⁹ U.S. Fish and Wildlife Service, biological opinions issued for formal section 7 consultations conducted for projects affecting the PMJM and its habitat, January 2003 through June 2009.

⁶⁰ Intra-Service Section 7 Consultation and Biological Opinion on Issuance of an Incidental Take Permit to Struthers Ranch Development, LLC for the Struthers Ranch Property, El Paso County, Colorado (TE-073390), December 12, 2003 (U.S. Fish and Wildlife Service, biological opinions issued for formal section 7 consultations conducted for projects affecting the PMJM and its habitat, January 2003 through June 2009).

that reflects the additional effort to address adverse modification in new consultations. Expected impacts to development include added costs for administrative consultations and required modifications to development project scope or design, including mitigation (e.g., setting aside conservation lands, habitat restoration and enhancement,) and project delays. The methods and assumptions used for estimating these impacts and the results are presented below.

3.3.1 DEVELOPMENT PROJECT CHARACTERISTICS

93. This analysis is based on a hypothetical “typical” residential development project, as evidenced by the 11 residential development projects that have completed the formal consultation process for the PMJM. Pertinent information and data and the key characteristics for these projects are summarized in Exhibit 3-4. Two types of development projects were identified. In the more urban areas (El Paso and Douglas Counties) of the proposed designation, development is characterized by large residential projects, often with commercial components. In rural areas or areas with more stringent growth regulations (Boulder, Jefferson, and Larimer Counties), development is characterized by small-scale residential projects or “ranchettes”. For large-scale developments, average project characteristics are developed from the biological opinions issued for section 7 consultations conducted between January 2003 and June 2009 as well as the parcel-specific data and information from El Paso County discussed previously. For small-scale developments, because of data limitations (i.e., only two formal consultations conducted from January 2003 through June 2009), this analysis relies on the assumptions used in the economic analyses prepared in support of the 2002 proposed critical habitat rule.⁶¹ The assumptions used to characterize these two types of “typical” development projects include:

- **Large-Scale Development in Douglas County (Units 8, 9, and 10)** – Large-scale residential and related development projects are defined as any project greater than 10 units in size. A typical large-scale development project is assumed to consist of 346 units (covering approximately 1,150 acres of land), with each project disturbing about 29 acres (or approximately 2.6 percent of the development area) of PMJM habitat. Based on the average proportion of the project area for which mitigation, including restoration and enhancement, is required, this analysis assumes that these projects are required to provide about 167 acres of mitigation, of which about 113 acres of PMJM habitat is to be restored and enhanced.⁶²
- **Large-Scale Development in El Paso County (Unit 11)** – This analysis uses parcel-specific data to identify large, non-governmental, and undeveloped parcels

⁶¹ Industrial Economics, Inc., “Draft Economic Analysis of Critical Habitat Designation for the Preble’s Meadow Jumping Mouse,” January 2003, and “Addendum to Economic Analysis of Critical Habitat Designation for the Preble’s Meadow Jumping Mouse,” June 3, 2003.

⁶² As shown in Exhibit 3-4, across all projects for which a formal consultation was completed, mitigation was required for an average of about 14.6 percent of project area. Of these mitigation acres, about 68 percent also required habitat restoration and enhancement (U.S. Fish and Wildlife Service, biological opinions issued for formal section 7 consultations conducted for projects affecting the PMJM and its habitat, January 2003 through June 2009).

that would likely be developed. The aggregate area of these parcels is approximately 3,000 acres, of which about 12.2 percent is within the proposed revised PMJM critical habitat. Given the lack of prospective development information for these specific parcels, this analysis assumes that each project will consist of 346 units (see above), which results in each project covering approximately 163 acres of land (and therefore with about 2.1 units per acre) and disturbing about 20 acres of PMJM habitat.⁶³ Applying the same proportion of project area required for mitigation and habitat restoration and enhancement, this analysis assumes that these projects are required to provide about 24 acres of mitigation, of which about 16 acres of PMJM habitat is to be restored and enhanced.

- **Small-Scale Development (Units 1 through 7, excluding Unit 6 (Rocky Flats NWR))** - Small-scale residential and related development projects are defined as any project less than 10 units in size. A typical small-scale development project consists of one or two units (covering 35 acres of land), with each project disturbing two acres of PMJM habitat. This analysis assumes that these projects are required to provide 3.4 acres of mitigation, of which 1.8 acres of PMJM habitat is to be restored and enhanced.

⁶³ 776 units forecasted in Unit 11 divided by 12.2 percent equals about 6,360 total units to be developed in the large parcels identified in this analysis as intersecting critical habitat. 6,360 units divided by 346 units per development equals 18.4 development projects. 3,000 acres divided by 18.4 equals 163 acres per development project.

EXHIBIT 3-4 SUMMARY OF AREA-RELATED INFORMATION FOR PAST DEVELOPMENTS SUBJECTED TO FORMAL CONSULTATIONS FOR THE PMJM

DEVELOPMENT	PROJECT SIZE (ACRES AND UNITS)	HABITAT IMPACTED (ACRES)	MITIGATION (ACRES)	MITIGATION AS A PERCENT OF PROJECT AREA	RESTORATION AND ENHANCEMENT (ACRES) ²	RESTORATION AND ENHANCEMENT AS A PERCENT OF MITIGATION
Large-Scale Developments						
Struther's Ranch	107 acres; 173 units	16.4	35.5	33.2%	35.5	100%
Parker at Stroh Site	n/a acres; n/a units	5	10.6	n/a	10.6	100%
Liberty Village	1,260 acres; 1,245 units	4.8	21.5	1.71%	21.5	100%
Sandstone Ranch	2,022 acres; 115 units	14.9	84.2	4.17%	45.5	54.0%
Allison Valley Project	476 acres; n/a units	59.5	119.2	25.05%	88.3	74.0%
Reata South Residential and Golf Project	1,707 acres; 134 units	19.1	163	9.55%	19.6	12.0%
Solitude Colorado Project	1,011 acres; 64 units	4.3	56.2	5.56%	0.2	0.43%
Briargate Development	2,180 acres; n/a units	83.9	358.6	16.45%	N/A	N/A
Homeplace Ranch	430 acres; n/a units	56.8	90.1	20.95%	90.1	100%
Small-Scale Developments						
Bernardi Home	1 acres; 1 units	0.31	Unspecified	31%	0.13	41.9%
Riverbend Estates	n/a acres; n/a units	4.8	37.8	n/a	4.8	12.7%
Summary:						
Range	1 to 2,180 acres; 1 to 1,245 units	0.31 to 83.9	10.6 to 358.6	1.71% to 33.2%	0.24 to 90.1	0.43% to 100%
Average (Large-Scale)	1,149 acres; 346 units	29.4 (2.6% of project area)	104.3	14.6%	38.9	67.6%
Average (Small-Scale) ¹	35 acre; 1.5 units	1.75	3.4	n/a	1.8	n/a
Source: U.S. Fish and Wildlife Service, biological opinions issued for formal section 7 consultations conducted for projects affecting the PMJM and its habitat, January 2003 through June 2009.						
Notes:						
¹ Due to the small number of consultations conducted for small-scale development projects, this analysis uses the assumptions used in the economic analysis prepared in support of the 2002 proposed critical habitat rule (Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003).						
² Acres counted as "Restoration and Enhancement" are not counted in addition to mitigation acres, rather, this is the number of mitigation acres to which restoration and enhancement also apply.						

3.3.2 SECTION 7 CONSULTATION COSTS

94. USACE permitting under section 404 of the Clean Water Act constitutes the primary Federal nexus for consultation regarding private development. Under this program, the USACE issues permits for private activities that involve modifying navigable waterways and/or wetlands for construction and maintenance of structures.

95. By assuming that an average large-scale development has 346 units, of which 2.6 percent are located within critical habitat in Units 8, 9, and 10, or 12.2 percent are within critical habitat in Unit 11, this analysis estimates that approximately 2.1 formal consultations on large-scale development projects will be conducted every year, or about 41 formal consultations over 20 years.
96. For the remaining units (Units 1 through 7, excluding Unit 6 (Rocky Flats NWR)), this analysis assumes that future housing in these units (about 98 new housing units) will be developed as part of small-scale development. By assuming that an average small-scale development will consist of 1.5 units, this analysis estimates that there will be approximately three and one-quarter formal consultations per year, or 65 formal consultations over 20 years. Exhibit 3-5 presents the estimated number of formal consultations for both large- and small-scale developments expected each year.

EXHIBIT 3-5 ESTIMATED NUMBER OF FORMAL CONSULTATIONS, 2010 - 2029

PERIOD	ANNUAL NO. OF FORMAL CONSULTATIONS FOR LARGE-SCALE DEVELOPMENTS	ANNUAL NO. OF FORMAL CONSULTATIONS FOR SMALL-SCALE DEVELOPMENTS
2010 - 2014	2.4	3.0
2015 - 2019	2.3	3.2
2020 - 2024	1.8	3.4
2025 - 2029	1.7	3.5
Total (2010 - 2029)	41	65
Note: Totals may not sum due to rounding.		

97. The administrative record for consultations, however, does not allow for the categorization and estimation of technical assistance and informal consultations by activity or project type, including development. As a result, this analysis uses the data presented in the economic analyses prepared in support of the 2002 proposed critical habitat rule to estimate the number of informal consultations involving development projects. That analysis had ratios of about 1.4 informal consultations per formal consultation for large-scale development projects and approximately 0.25 informal consultations per formal consultation for small-scale development projects. Finally, this analysis assigns costs for technical assistance to activities and units after all other activity costs are estimated and assembled (see Appendix D).
98. The estimated number of formal and informal consultations is then multiplied by the per-consultation unit costs presented in Exhibit 2-3. Exhibit 3-6 presents the estimated total number and costs of future consultations by unit for the 20-year period of the analysis (2010 – 2029).

EXHIBIT 3-6 ESTIMATED NUMBER AND COSTS OF ADMINISTRATIVE CONSULTATIONS FOR DEVELOPMENT-RELATED PROJECTS, BY UNIT (2010 - 2029)

UNIT	INFORMAL CONSULTATIONS		FORMAL CONSULTATIONS		TOTAL CONSULTATIONS	
	NUMBER	UNDISCOUNTED COST	NUMBER	UNDISCOUNTED COST	NUMBER	UNDISCOUNTED COST
1. N. Fork, Cache la Poudre River	2.9	\$27,600	10.7	\$213,000	13.6	\$241,000
2. Cache la Poudre River	1.5	\$13,800	5.3	\$107,000	6.8	\$120,000
3. Buckhorn Creek	1.5	\$13,800	5.3	\$107,000	6.8	\$120,000
4. Cedar Creek	0.4	\$3,450	1.3	\$26,700	1.7	\$30,100
5. South Boulder Creek	5.2	\$49,600	19.1	\$383,000	24.4	\$432,000
6. Rocky Flats NWR	-	-	-	-	-	-
7. Ralston Creek	6.3	\$60,200	23.2	\$465,000	29.6	\$525,000
8. Cherry Creek	4.8	\$45,100	3.5	\$69,200	8.2	\$114,000
9. West Plum Creek	15.0	\$143,000	10.9	\$219,000	25.9	\$361,000
10. Upper South Platte River	11.3	\$108,000	8.3	\$165,000	19.6	\$273,000
11. Monument Creek	25.3	\$240,000	18.4	\$368,000	43.7	\$608,000
Total	74.1	\$704,000	106	\$2,120,000	180	\$2,830,000
Notes: Does not include technical assistance costs. Totals may not sum due to rounding						

3.3.3 MITIGATION

99. Mitigation consists of conservation measures or project modifications undertaken to avoid, minimize, and compensate for a project’s potential impacts to the PMJM and its habitat. Mitigation may include setting aside conservation lands on- and off-site, which may reduce the number of housing units in each project; purchasing conservation easements; creating, restoring, and enhancing habitat; erecting construction fencing; and undertaking programs for weed control, trapping, monitoring construction and revegetation, pet control, and education.
100. The administrative record for consultations does not include information and data on costs for mitigation. This analysis therefore uses the unit costs developed in the economic analyses prepared in support of the 2002 proposed critical habitat rule, adjusted for inflation to 2009 dollars.⁶⁴ The cost of mitigation for a large-scale development project ranges from \$17,900 to \$47,700 per acre mitigated, or \$2.99 million to \$7.98 million per project in Units 8, 9, and 10 (assuming 167 acres of mitigation per project) and \$424,000 to \$1.13 million per project in Unit 11 (assuming 24 acres of mitigation per

⁶⁴ Industrial Economics, Inc., “Draft Economic Analysis of Critical Habitat Designation for the Preble’s Meadow Jumping Mouse,” January 2003, and “Addendum to Economic Analysis of Critical Habitat Designation for the Preble’s Meadow Jumping Mouse,” June 3, 2003. Inflation factors obtained from the U.S. Bureau of Economic Analysis, GDP Implicit Price Deflators, as viewed at <http://www.bea.gov/national/nipaweb/index.asp>.

project). For small-scale development projects, the cost of mitigation can range from \$11,900 to \$27,400 per acre mitigated, or \$40,500 to \$93,200 per project (assuming 3.4 acres of mitigation per project).

101. In addition, the economic analyses prepared in support of the 2002 proposed critical habitat rule provides separate unit costs to restore, enhance, and revegetate impacted habitat. For large-scale development projects, these costs can range from \$5,960 to \$17,900 per acre restored and enhanced, or \$674,000 to \$2.02 million per project in Units 8, 9, and 10 (assuming about 113 acres restored or enhanced per project) and \$95,400 to \$286,000 per project in Unit 11 (assuming 16 acres restored or enhanced per project). For small-scale developments, these costs can range from \$5,960 to \$11,900 per acre, or \$10,700 to \$21,500 per project (assuming 1.8 acres restored or enhanced per project).

3.3.4 DELAY COSTS

102. Development delay costs reflect the opportunity cost of not being able to develop for some period of time due to the consultation process. Based on the unit costs developed in the economic analyses prepared in support of the 2002 proposed critical habitat rule, these costs are approximately \$5,960 per housing unit built within critical habitat within a large-scale development project. For Douglas County, delay costs are approximately \$52,800 per project and for El Paso County, delay costs are about \$251,000 per project.⁶⁵ Exhibit 3-7 summarizes the per-development project modification costs for mitigation, habitat restoration and enhancement, and delay. Exhibit 3-8 presents the total project modification costs by unit.

⁶⁵ This estimate assumes that approximately 2.6 percent of the developable acreage in a large-scale development in Douglas County will impact critical habitat. Thus, about 8.9 units (2.6 percent of 346 units) would each experience a delay cost of about \$6,000 (cost of delay from 2003 economic analysis, inflated to 2009 dollars) (Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003). For El Paso County, 12.2 percent of the developable acreage will impact habitat; thus, about 42.2 units would each experience the delay cost.

EXHIBIT 3-7 ESTIMATED PER-DEVELOPMENT PROJECT MODIFICATION COSTS (2009 DOLLARS)

PROJECT MODIFICATION	LARGE-SCALE DEVELOPMENT (UNITS 8, 9, AND 10)		LARGE-SCALE DEVELOPMENT (UNIT 11)		SMALL-SCALE DEVELOPMENT (UNITS 1 THROUGH 7, EXCEPT 6)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH
Mitigation	\$2,990,000	\$7,980,000	\$424,000	\$1,130,000	\$40,500	\$93,200
Habitat Restoration and Enhancement	\$674,000	\$2,020,000	\$95,400	\$286,000	\$10,700	\$21,500
Delay	\$52,800	\$52,800	\$251,000	\$251,000	\$0	\$0
Total	\$3,720,000	\$10,100,000	\$770,000	\$1,670,000	\$51,200	\$115,000

Sources: Economic analysis prepared in support of the 2002 proposed critical habitat rule (Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003), adjusted for inflation to 2009 dollars.

Note: Calculations based on information provided in formal biological opinions issued for formal section 7 consultations conducted for projects affecting the PMJM and its habitat, January 2003 through June 2009, as well as parcel-specific data provided by El Paso County Assessor's Office.

EXHIBIT 3-8 ESTIMATED DEVELOPMENT-RELATED PROJECT MODIFICATION COSTS, BY UNIT (2010 - 2029)

UNIT	NO. OF AFFECTED DEVELOPMENT PROJECTS (2010 - 2029)		UNDISCOUNTED PROJECT MODIFICATION COSTS	
	LARGE-SCALE	SMALL-SCALE	LOW	HIGH
1. N. Fork, Cache la Poudre River	0.0	10.7	\$547,000	\$1,220,000
2. Cache la Poudre River	0.0	5.3	\$273,000	\$611,000
3. Buckhorn Creek	0.0	5.3	\$273,000	\$611,000
4. Cedar Creek	0.0	1.3	\$68,300	\$153,000
5. South Boulder Creek	0.0	19.1	\$981,000	\$2,190,000
6. Rocky Flats NWR	-	-	-	-
7. Ralston Creek	0.0	23.2	\$1,190,000	\$2,660,000
8. Cherry Creek	3.5	0.0	\$12,900,000	\$34,800,000
9. West Plum Creek	10.9	0.0	\$40,700,000	\$110,000,000
10. Upper South Platte River	8.3	0.0	\$30,700,000	\$83,000,000
11. Monument Creek	18.4	0.0	\$14,200,000	\$30,700,000
Total	41.1	65.0	\$102,000,000	\$266,000,000

Notes: Number of affected development projects based on the estimated number of those projects forecasted to undergo formal consultation. Totals may not sum due to rounding.

3.4 ESTIMATING INCREMENTAL IMPACTS TO DEVELOPMENT

103. As previously described, the methodology described in Chapter 2 is followed to estimate: 1) that proportion of the total forecast consultation and project modification costs which results entirely from the critical habitat designation, and 2) the proportion of the remaining costs that reflect the additional effort to address adverse modification in new consultations. Exhibit 3-9 presents the total consultation and project modification costs. Exhibits 3-10 and 3-11 present the calculated incremental costs, without and with technical assistance costs, respectively.

EXHIBIT 3-9 POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS TO DEVELOPMENT, BY UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	TOTAL NO. OF PROJECTS	LOW-END SCENARIO			HIGH-END SCENARIO		
		UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	10.7	\$788,000	\$446,000	\$42,100	\$1,460,000	\$830,000	\$78,300
2. Cache la Poudre River	5.3	\$394,000	\$223,000	\$21,100	\$732,000	\$415,000	\$39,200
3. Buckhorn Creek	5.3	\$394,000	\$223,000	\$21,100	\$732,000	\$415,000	\$39,200
4. Cedar Creek	1.3	\$98,400	\$55,800	\$5,270	\$183,000	\$104,000	\$9,790
5. South Boulder Creek	19.1	\$1,410,000	\$773,000	\$73,000	\$2,630,000	\$1,440,000	\$136,000
6. Rocky Flats NWR	-	-	-	-	-	-	-
7. Ralston Creek	23.2	\$1,720,000	\$938,000	\$88,500	\$3,190,000	\$1,740,000	\$165,000
8. Cherry Creek	3.5	\$13,000,000	\$7,100,000	\$670,000	\$34,900,000	\$19,100,000	\$1,800,000
9. West Plum Creek	10.9	\$41,000,000	\$22,400,000	\$2,120,000	\$110,000,000	\$60,300,000	\$5,690,000
10. Upper South Platte River	8.3	\$31,000,000	\$16,900,000	\$1,600,000	\$83,300,000	\$45,500,000	\$4,290,000
11. Monument Creek	18.4	\$14,800,000	\$9,770,000	\$922,000	\$31,300,000	\$20,700,000	\$1,950,000
Total	106		\$58,900,000	\$5,560,000		\$151,000,000	\$14,200,000

Notes: Does not include technical assistance costs. Totals may not sum due to rounding.

**EXHIBIT 3-10 POST-DESIGNATION INCREMENTAL IMPACTS TO DEVELOPMENT, WITHOUT
TECHNICAL ASSISTANCE COSTS, BY UNIT (2010 - 2029, 2009 DOLLARS
ASSUMING A SEVEN PERCENT DISCOUNT RATE)**

UNIT	LOW-END SCENARIO			HIGH-END SCENARIO		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	\$200,000	\$114,000	\$10,700	\$373,000	\$211,000	\$19,900
2. Cache la Poudre River	\$147,000	\$83,600	\$7,890	\$274,000	\$155,000	\$14,700
3. Buckhorn Creek	\$151,000	\$85,600	\$8,080	\$281,000	\$159,000	\$15,000
4. Cedar Creek	\$39,100	\$22,200	\$2,090	\$72,700	\$41,200	\$3,890
5. South Boulder Creek	\$411,000	\$225,000	\$21,200	\$764,000	\$418,000	\$39,500
6. Rocky Flats NWR	-	-	-	-	-	-
7. Ralston Creek	\$506,000	\$277,000	\$26,100	\$941,000	\$515,000	\$48,600
8. Cherry Creek	\$3,780,000	\$2,070,000	\$195,000	\$10,200,000	\$5,560,000	\$525,000
9. West Plum Creek	\$13,100,000	\$7,190,000	\$678,000	\$35,300,000	\$19,300,000	\$1,820,000
10. Upper South Platte River	\$11,500,000	\$6,300,000	\$594,000	\$31,000,000	\$16,900,000	\$1,600,000
11. Monument Creek	\$4,670,000	\$3,080,000	\$291,000	\$9,880,000	\$6,520,000	\$616,000
Total		\$19,400,000	\$1,840,000		\$49,800,000	\$4,700,000

Notes: Does not include technical assistance costs. Totals may not sum due to rounding.

EXHIBIT 3-11 POST-DESIGNATION INCREMENTAL IMPACTS TO DEVELOPMENT, WITH TECHNICAL ASSISTANCE COSTS, BY UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	LOW-END SCENARIO			HIGH-END SCENARIO		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River		\$153,000	\$14,400		\$250,000	\$23,600
2. Cache la Poudre River		\$112,000	\$10,600		\$184,000	\$17,400
3. Buckhorn Creek		\$115,000	\$10,900		\$189,000	\$17,800
4. Cedar Creek		\$29,800	\$2,820		\$48,900	\$4,620
5. South Boulder Creek		\$303,000	\$28,600		\$496,000	\$46,800
6. Rocky Flats NWR		-	-		-	-
7. Ralston Creek		\$372,000	\$35,200		\$610,000	\$57,600
8. Cherry Creek		\$2,090,000	\$197,000		\$5,580,000	\$527,000
9. West Plum Creek		\$7,260,000	\$685,000		\$19,400,000	\$1,830,000
10. Upper South Platte River		\$6,360,000	\$600,000		\$17,000,000	\$1,600,000
11. Monument Creek		\$3,230,000	\$304,000		\$6,670,000	\$629,000
Total		\$20,000,000	\$1,890,000		\$50,400,000	\$4,760,000

Notes: This analysis assigns technical assistance costs (on a present value basis) to activities and units after all other activity costs are estimated and assembled (see Appendix D). Totals may not sum due to rounding.

104. As shown in Exhibit 3-9, the total forecast costs of administrative requirements and project modifications associated with residential development are estimated to range from \$58.9 million to \$151.0 million, including both forecast baseline costs (i.e., associated with the listing of the species), and forecast incremental (added) costs incurred due to the additional requirements associated with the designation of critical habitat.
105. As shown in Exhibits 3-10 and 3-11, the incremental costs of designating critical habitat are slightly less than one third the total baseline and incremental costs. Including technical assistance costs, incremental costs range from \$20 million to \$50.4 million. Due to the larger number of forecast development projects and amount of required mitigation in Douglas County, the highest costs occur in Units 9 and 10. In general, the units in which large-scale development is forecasted to occur (Units 8, 9, 10, and 11) have higher costs, and, in total, account for about 96 percent of the total incremental costs.
106. The overall impact of the incremental costs associated with critical habitat, however, is small. As shown in Exhibit 3-12, about 0.008 percent of anticipated future development within the counties where critical habitat is being proposed will be impacted. In sum,

these economic impacts comprise an insignificant percentage of each county’s expected residential construction activity and revenues because potential development near to or within critical habitat areas is small relative to development opportunities in areas outside of critical habitat.

EXHIBIT 3-12 INCREMENTAL IMPACT OF PMJM CRITICAL HABITAT DESIGNATION ON DEVELOPMENT

COUNTY	PERCENTAGE OF FUTURE HOMES IMPACTED	COST OF CRITICAL HABITAT (AS A PERCENT OF COUNTY REVENUES)
Boulder	0.001%	0.000%
Douglas	0.014%	0.125%
El Paso	0.019%	0.003%
Jefferson	0.001%	0.000%
Larimer	0.002%	0.000%
Total	0.008%	0.006%

Sources: For Boulder, Douglas, El Paso, and Jefferson Counties, impacts estimates are based on DRCOG and PPACG housing forecast data and TAZ models. For Larimer County, housing estimates are derived from State Demography data, accessed on February 2, 2009 at http://dola.colorado.gov/dlg/demog/pop_totals.html, as well as the economic analyses prepared in support of the 2002 proposed critical habitat rule. County revenues are from U.S. Economic Census 2002, accessed on February 2, 2009 at <http://www.census.gov/econ/census02/>.
 Note: Mining, Utilities, and Construction revenues are not available at the county level; therefore, total revenues used only account for part of each county’s annual sales and receipts.

- 107. As described in the economic analysis in support of the 2002 proposed critical habitat rule, given the very small percentage of units impacted by critical habitat in Boulder, Jefferson, and Larimer Counties, there are abundant substitute housing sites available in the region.⁶⁶ Therefore, total residential development in those counties (i.e., the number of new housing units constructed) is not likely to decline as a result of critical habitat designation for the PMJM.
- 108. Another incremental impact of the proposed revised critical habitat designation is the requirement for mitigation to occur within (and not outside) the unit being impacted. However, given the data limitations, these incremental in-unit mitigation costs are assessed qualitatively by discussing the area available for conservation activities relative to the required conservation actions within each critical habitat unit (Exhibit 3-13). As

⁶⁶ Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble’s Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble’s Meadow Jumping Mouse," June 3, 2003.

shown, the amount of available land for in-unit mitigation for potential development in Unit 10 (Upper South Platte River) is limited and may restrict development or result in additional project cost (e.g., higher mitigation costs, smaller projects developed). In all other cases, the area required for mitigation is no more than about 27 percent of available land. Thus, availability of mitigation lands is not expected to be a factor in determining the future cost of conservation in the other units.

EXHIBIT 3-13 ESTIMATE OF ACRES AVAILABLE FOR IN-UNIT MITIGATION, BY UNIT

UNIT	ACRES NEEDED FOR MITIGATION			AVAILABLE IN-UNIT ACRES FOR MITIGATION
	LARGE-SCALE DEVELOPMENTS	SMALL-SCALE DEVELOPMENTS	TOTAL	
1. N. Fork, Cache la Poudre River	0	36	36	4,902
2. Cache la Poudre River	0	18	18	124
3. Buckhorn Creek	0	18	18	2,512
4. Cedar Creek	0	5	5	131
5. South Boulder Creek	0	65	65	289
6. Rocky Flats NWR	0	0	0	11
7. Ralston Creek	0	79	79	422
8. Cherry Creek	580	0	580	2,205
9. West Plum Creek	1,830	0	1,830	6,923
10. Upper South Platte River	1,382	0	1,382	366
11. Monument Creek	436	0	436	3,135
Total	4,228	221	4,450	21,020
Notes: Assumes 167 acres mitigated per large-scale development project in Units 8, 9, and 10; 24 acres mitigated per large-scale development project in Unit 11; and 3.4 acres mitigated per small-scale development project in Units 1 through 7. Available in-unit acres for mitigation based on estimated area of privately-owned land within each unit, as presented in Exhibit 1-9. Totals may not sum due to rounding.				

3.5 REGIONAL ECONOMIC IMPACTS

109. The designation of critical habitat, however, may lead to some reduction in residential home construction in Douglas and El Paso Counties relative to the baseline (i.e. a reduction in growth that would have occurred in the absence of critical habitat designation). This decrease in construction revenues will result in secondary effects on related sectors of the region's economy. Some of these related sectors may be closely associated with the construction industry, such as the carpentry and home furnishings industries. However, other affected sectors may be less closely associated with the construction industry, such as the radio and communications and banking industries.

110. Regional economic modeling accounts for the interconnectedness of industries within a geographic area – that is, industries not only supply good and services to consumers, but also to each other. Thus, spending in one economic sector tends to have a larger impact on the regional economy as a whole. This concept is commonly referred to as the “multiplier” effect. IMPLAN is a regional economic model used to quantify the dollar value of goods and services produced, and employment generated, by consumer expenditures. Commonly used by State and Federal agencies for policy planning and evaluation purposes, IMPLAN translates estimates of trip expenditures into changes in demand for inputs to affected industries.⁶⁷ The IMPLAN model draws upon data from several Federal and State agencies, including the Bureau of Economic Analysis and the Bureau of Labor Statistics. Changes in output and employment are calculated for all industries and then aggregated to determine the regional economic contribution of residential development use to the relevant counties.
111. IMPLAN translates expenditures into changes in demand for inputs to affected industries. These effects can be described as direct, indirect, or induced, depending on the nature of the change:
- *Direct effects* represent changes in output attributable to a change in demand or a supply shock. These are specified initially by the modeler (e.g., the change in expenditures in the residential construction industry);
 - *Indirect effects* are changes in output industries that supply goods and services to those that are directly affected by the initial change in expenditures; and,
 - *Induced effects* reflect changes in household consumption, arising from changes in employment (which in turn are the result of direct and indirect effects). For example, changes in employment in a region may affect the consumption of certain goods and services.
112. There is one important caveat to the interpretation of IMPLAN model estimates. The model is static in nature and measures only those effects resulting from a specific policy change (or the functional equivalent specified by the modeler) at one point in time. Thus IMPLAN does not account for posterior adjustments that may occur, such as the subsequent re-employment of workers displaced by the original policy change. In this analysis, this caveat suggests that the long-run net output and employment effects resulting from changes in PMJM critical habitat are smaller than those estimated in the model, which will lead to an upward bias in the estimates.
113. As discussed previously, based on current housing projections from DRCOG and PPACG this analysis estimates that approximately 980 units will be built in the areas proposed as critical habitat in Douglas and El Paso Counties (Units 8, 9, 10, and 11). Based on the data presented in the economic analyses prepared in support of the 2002 proposed critical habitat rule, critical habitat designation may lead to 15 to 25 percent of these houses not

⁶⁷ The IMPLAN model is owned and maintained by the Minnesota IMPLAN Group, Inc. (MIG). For more information see: IMPLAN Professional, Social Accounting and Impact Analysis Software, User’s Guide, Analysis Guide, Data Guide, Minnesota IMPLAN Group, Inc.

being built, resulting in approximately 147 to 245 units that may not be built over the next 20 years.⁶⁸ This loss is equivalent to about 0.4 to 0.7 units per 346-unit large-scale development project. A review of current home prices suggests that these homes would cost approximately \$300,000, on average.⁶⁹ Of this total; however, approximately 25 percent is accounted for by the value of the land (home lot). Therefore, approximately \$225,000 (the structure cost) is lost for each unit not built. Multiplying this cost by the annual decrease in construction activity (7 to 12 units) results in an estimate of \$1.65 to \$2.76 million in lost annual construction revenue due to critical habitat designation.

114. This change in construction revenue will ripple through the economy, leading to a number of indirect and induced effects (Exhibit 3-14). This analysis estimates that the decline in revenue of industries indirectly linked to the residential construction industry is likely to lead to the reduction of between \$346,000 and \$576,000 in expenditures. In addition, the changes in direct and indirect expenditures will lead to a decline of approximately \$655,000 to \$1.09 million in household consumption (induced effects). Thus, the total annual impact of the reduction in residential construction in the study area will be between \$2.66 million and \$4.42 million. Finally, this analysis shows that there will be a total loss of about 24 to 40 jobs due to critical habitat designation.

EXHIBIT 3-14 REGIONAL ECONOMIC IMPACT OF A REDUCTION IN RESIDENTIAL HOME CONSTRUCTION IN DOUGLAS AND EL PASO COUNTIES (ANNUAL IN MILLIONS OF 2009 DOLLARS)

REGION	DIRECT EFFECT ON EXPENDITURES		INDIRECT EFFECT ON EXPENDITURES		INDUCED EFFECT ON EXPENDITURES		TOTAL REGIONAL ECONOMIC IMPACT	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Job Loss	15	25	3	6	6	10	24	40
Monetized Impact Estimates	\$1,650,000	\$2,760,000	\$346,000	\$576,000	\$655,000	\$1,090,000	\$2,660,000	\$4,420,000

Note: Totals may not sum due to rounding.

⁶⁸ Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003.

⁶⁹ Based on current retail price of new homes in La Plata Development (accessed on February 4, 2010 at <http://www.laplatalc.com>) and Northgate and Struthers Ranch developments (accessed on February 4, 2010 at <http://www.colorado-springs-home-buyer.com/colorado-springs-realtor-homes-for-sale-buyers-agent.php?s=40>). Also based on U.S. Census "Median value of owner-occupied housing unit", accessed on February 2, 2010 at <http://quickfacts.census.gov/qfd/states/08/08035.html> (Douglas County) and <http://quickfacts.census.gov/qfd/states/08/08041.html> (El Paso County).

3.6 SOURCES OF UNCERTAINTY

115. There are several sources of uncertainty related to residential and commercial development activity that may affect the results of this analysis.

- The forecast cost estimates presented here could overstate costs that will result from critical habitat designation due to pre-existing limits to development within each county. This analysis assumes that the projected number of new housing units is evenly distributed geographically, whereas it is likely that, due to existing regulations and HCPs, development close to or within critical habitat areas will be limited or discouraged.
- For El Paso County (Unit 11, Monument Creek), the projected number of new housing units is based on applying a number of assumptions to the data provided by the County Assessor for those specific parcels intersecting the proposed revised critical habitat for the PMJM. First, this analysis assumes that the following three types of parcels are not likely to be developed or will not require a section 7 consultation: 1) those parcels under county or government ownership, 2) those parcels occupied by existing buildings, and 3) those parcels less than 100 acres in area. This analysis then applied the maximum allowable density of housing units to each of the remaining parcels based on the zoning code(s) assigned to them. Finally, this analysis assumes that each development project would consist of 346 units, based on the consultation history.

These assumptions could understate or overstate the incremental impacts to development in El Paso County. Parcels removed from further consideration (those under county or government ownership, occupied by existing buildings, or less than 100 acres in area) could eventually be developed under a federal nexus and therefore require a section 7 consultation and mitigation. On the other hand, it is likely that the large-scale development projects forecasted in El Paso County would not be built to the maximum allowable density assumed in this analysis because portions of the total development area are typically used for supporting infrastructure and other systems and facilities and set aside as open space. Lower density developments would likely have less potential impact on the PMJM and its habitat and therefore require less mitigation. In addition, development projects that are larger in scope than forecast (i.e., contain more than 346 units per development) would decrease the total number of development projects that would undergo section 7 consultations and therefore the incremental costs due to additional administrative requirements. Finally, this analysis assumes that all of the large, non-governmental, and unoccupied parcels would be developed within the timeframe of this analysis (i.e., within the next 20 years), which could overstate incremental impacts.

- This analysis is completed under the assumption that the economy, and in particular the housing market, will recover in a timely fashion. The housing projection data used does not take into account the effects of the recent economic

recession such as the relatively high amount of housing inventory that may be still available in the market.

- This analysis does not take into account the potential for reduced costs for projects falling under existing HCPs. For example, projects having a federal nexus that are constructed or implemented within the riparian conservation zones established by the Douglas County HCP likely will have reduced administrative and project modification costs. Project proponents may rely on HCPs to provide the necessary habitat mitigation for potential impacts to the PMJM and its habitat. However, the available data and information are insufficient to reliably project the number of projects that may fall under existing HCPs and estimate the associated cost reductions.
- This analysis assumes that the average development project is delayed one year due to the consultation process; however, actual length of consultation varies from project to project based on the level of complexity, as well as other factors.
- Potential financial benefits to developers and homeowners associated with preserving land on- and off-site near housing units are not quantified in this cost analysis. Chapter 9 of this report contains a discussion of these and related potential benefits.

CHAPTER 4 | ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE

4.1 INTRODUCTION

116. This chapter considers the potential economic impacts to construction and maintenance of roads, bridges, utilities, and banks. These project categories are grouped in this chapter for purposes of discussion and estimating incremental costs because they all typically require a section 404 permit from the USACE. Forecast incremental impacts are primarily due to the added cost of addressing adverse modification in section 7 consultations as well as implementing project modifications to mitigate impacts to and restore and enhance PMJM habitat. These impacts are summarized in Exhibits 4-1 and 4-2 and discussed in detail below.

EXHIBIT 4-1 SUMMARY OF IMPACTS TO ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE ACTIVITIES, BY UNIT (2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE IMPACTS	
	LOW ESTIMATE	HIGH ESTIMATE
Post-Designation Incremental Impacts (2010 - 2029)		
1. N. Fork, Cache la Poudre River	\$67,900	\$115,000
2. Cache la Poudre River	\$38,300	\$96,900
3. Buckhorn Creek	\$63,200	\$117,000
4. Cedar Creek	\$1,790	\$2,090
5. South Boulder Creek	\$31,400	\$77,200
6. Rocky Flats NWR	\$15,900	\$41,000
7. Ralston Creek	\$10,100	\$20,000
8. Cherry Creek	\$45,000	\$85,000
9. West Plum Creek	\$108,000	\$171,000
10. Upper South Platte River	\$26,600	\$62,100
11. Monument Creek	\$159,000	\$230,000
Total	\$567,000	\$1,020,000
Notes: Totals may not sum due to rounding.		

EXHIBIT 4-2 SUMMARY OF IMPACTS TO ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE, BY ACTIVITY (2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

ACTIVITY	PRESENT VALUE IMPACTS	
	LOW ESTIMATE	HIGH ESTIMATE
Post-Designation Incremental Impacts (2010 - 2029)		
Road/Bridge	\$249,000	\$644,000
Utility	\$254,000	\$309,000
Bank Stabilization	\$63,800	\$63,800
Total	\$567,000	\$1,020,000
Note: Totals may not sum due to rounding.		

4.2 ROAD/BRIDGE CONSTRUCTION AND MAINTENANCE

4.2.1 BACKGROUND INFORMATION

117. Potential road/bridge projects include construction and maintenance of access roads to dams, pipelines, and other infrastructure, expansion or improvement of the existing public road network, and construction or improvement of private roads. Recent projects occurring within critical habitat included replacing a bridge over Gunbarrel Creek in Jefferson County and the emergency repair of four miles of State Highway 67 due to flood damage along West Creek in Douglas County.⁷⁰

4.2.2 SECTION 7 CONSULTATION COSTS

118. The typical Federal nexuses for road/bridge projects are either funding from the Federal Highways Administration (FHWA) for Colorado Department of Transportation (CODOT) projects and/or Clean Water Act section 404 permitting from the USACE for projects with potential to discharge dredged or fill materials into navigable waters of the United States. This analysis relies on an estimate of the projected number of road and bridge construction and maintenance projects provided by CODOT.⁷¹ CODOT estimates a total of between 30 and 40 projects requiring informal and formal consultations in the next 20 years, based on an approximate areal overlay of the proposed critical habitat areas on existing state and federal roads, routes, and highways (e.g., the number of locations where roads intersect critical habitat areas).⁷² The estimated number of consultations is

⁷⁰ Personal communication, A. Michael (FWS) and J. Peterson (CODOT), December 15, 2009.

⁷¹ Personal communication, A. Michael (FWS) and J. Peterson (CODOT), December 15, 2009. This analysis assumes that the projected number of road and bridge projects reported by CODOT already includes the number that would be reported by the USACE (USACE could not provide projections). This analysis also assumes that the planned expansion of the Northwest Parkway discussed in Chapter 7 (Rocky Flats) is included in this estimate.

⁷² The number of formal versus informal consultations is determined by using the ratio of formal to informal consultations in the economic analyses prepared in support of the 2002 proposed critical habitat rule (Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003). This analysis

then multiplied by the per-consultation unit costs presented in Exhibit 2-3. Exhibit 4-3 presents the estimated total number and costs of future consultations by unit for the 20-year period of the analysis (2010 - 2029). These consultation costs will be borne by the Service, the Action Agency (e.g. USACE, FHWA, and U.S. Department of Transportation), and a third party, such as CODOT.

also assigns costs for technical assistance to activities and units after all other activity costs are estimated and assembled (see Appendix D).

EXHIBIT 4-3 ESTIMATED TOTAL NUMBER AND COSTS OF ADMINISTRATIVE CONSULTATIONS FOR ROAD/BRIDGE CONSTRUCTION AND MAINTENANCE ACTIVITIES, BY UNIT (2010 - 2029, IN 2009 DOLLARS)

UNIT	INFORMAL CONSULTATIONS		FORMAL CONSULTATIONS		TOTAL CONSULTATIONS	
	NUMBER	UNDISCOUNTED COSTS	NUMBER	UNDISCOUNTED COSTS	NUMBER	UNDISCOUNTED COSTS
1. N. Fork, Cache la Poudre River	1.5 to 2.1	\$14,600 to \$19,500	2.3 to 3.1	\$46,200 to \$61,500	3.9 to 5.1	\$60,800 to \$81,000
2. Cache la Poudre River	1.5 to 2.1	\$14,600 to \$19,500	2.3 to 3.1	\$46,200 to \$61,500	3.9 to 5.1	\$60,800 to \$81,000
3. Buckhorn Creek	1.2 to 1.6	\$11,700 to \$15,600	1.9 to 2.5	\$36,900 to \$49,200	4.1/3.1	\$48,600 to \$64,800
4. Cedar Creek	0	\$0	0	\$0	0	\$0
5. South Boulder Creek	1.5 to 2.1	\$14,600 to \$19,500	2.3 to 3.1	\$46,200 to \$61,500	3.9 to 5.1	\$60,800 to \$81,000
6. Rocky Flats NWR	0.6 to 0.8	\$5,850 to \$7,790	0.9 to 1.2	\$18,500 to \$24,600	2.1/1.5	\$24,300 to \$32,400
7. Ralston Creek	0.3 to 0.4	\$2,920 to \$3,900	0.5 to 0.6	\$9,230 to \$12,300	1/0.8	\$12,200 to \$16,200
8. Cherry Creek	1.2 to 1.6	\$11,700 to \$15,600	1.9 to 2.5	\$36,900 to \$49,200	4.1/3.1	\$48,600 to \$64,800
9. West Plum Creek	1.5 to 2.1	\$14,600 to \$19,500	2.3 to 3.1	\$46,200 to \$61,500	3.9 to 5.1	\$60,800 to \$81,000
10. Upper South Platte River	0.9 to 1.2	\$8,770 to \$11,700	1.4 to 1.9	\$27,700 to \$36,900	3.1/2.3	\$36,500 to \$48,600
11. Monument Creek	1.5 to 2.1	\$14,600 to \$19,500	2.3 to 3.1	\$46,200 to \$61,500	3.9 to 5.1	\$60,800 to \$81,000
Total	12 to 16	\$114,000 to \$152,000	18 to 24	\$360,000 to \$480,000	30 to 40	\$474,000 to \$632,000

Notes: Number of consultations apportioned to units based on the proportion of private land in each unit to the total area of private land in all units. Does not include technical assistance costs. Totals may not sum due to rounding.

4.2.3 PROJECT MODIFICATION AND MITIGATION COSTS

119. Common project modifications for road and bridge construction projects that impact Preble's habitat include directional boring (to minimize ground-level disturbance), providing connectivity of habitat across highways by installing ledges in piping and culverts, purchasing mitigation land, activity timing restrictions, on-site monitoring of construction activities, and habitat restoration and enhancement. However, CODOT indicates that many of these modifications do not represent a significant cost component and do not affect project implementation.⁷³
120. The administrative record for consultations does not include information and data on costs of mitigation. This analysis therefore uses the unit costs developed in the economic analyses prepared in support of the 2002 proposed critical habitat rule, adjusted for inflation to 2009 dollars.⁷⁴ The cost of mitigation ranges from \$3,580 to \$35,800 per acre mitigated, or \$8,940 to \$89,400 per project requiring formal consultation (assuming 2.5 acres of mitigation per project). Exhibit 4-4 presents the range of mitigation costs by unit. The majority of project modification costs will be borne by a third party, such as CODOT.⁷⁵

⁷³ Personal communication, A. Michael, FWS, and J. Peterson, CODOT, December 15, 2009.

⁷⁴ Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003. Inflation factors obtained from the U.S. Bureau of Economic Analysis, GDP Implicit Price Deflators, as viewed at <http://www.bea.gov/national/nipaweb/index.asp>.

⁷⁵ The Service notes that funding for CODOT projects includes funds provided by the FHWA (Personal communication, A. Michael, FWS, March 2, 2010).

EXHIBIT 4-4 ESTIMATED MITIGATION COSTS FOR ROAD/BRIDGE CONSTRUCTION AND MAINTENANCE ACTIVITIES, BY UNIT (2010 - 2029, IN 2009 DOLLARS)

UNIT	NUMBER OF FORMAL ROAD/ BRIDGE CONSULTATIONS		UNDISCOUNTED MITIGATION COSTS	
	LOW	HIGH	LOW	HIGH
1. N. Fork, Cache la Poudre River	2.3	3.1	\$20,600	\$275,000
2. Cache la Poudre River	2.3	3.1	\$20,600	\$275,000
3. Buckhorn Creek	1.9	2.5	\$16,500	\$220,000
4. Cedar Creek	0.0	0.0	\$0	\$0
5. South Boulder Creek	2.3	3.1	\$20,600	\$275,000
6. Rocky Flats NWR	0.9	1.2	\$8,250	\$110,000
7. Ralston Creek	0.5	0.6	\$4,130	\$55,000
8. Cherry Creek	1.9	2.5	\$16,500	\$220,000
9. West Plum Creek	2.3	3.1	\$20,600	\$275,000
10. Upper South Platte River	1.4	1.9	\$12,400	\$165,000
11. Monument Creek	2.3	3.1	\$20,600	\$275,000
Total	18	24	\$161,000	\$2,150,000

Notes: Totals may not sum due to rounding.

4.3 UTILITIES CONSTRUCTION AND MAINTENANCE

4.3.1 BACKGROUND INFORMATION

121. Potential utilities projects include installation, construction, and maintenance activities associated with sewer pipelines, water transmission mains, natural gas pipelines, fiber optic cable, and other services related to development. Recent utilities projects occurring within critical habitat include the installation of a water pipeline in Chatfield State Park, and issuance of an Incidental Take Permit for activities necessary for Denver Water to operate the organization's water system.⁷⁶

⁷⁶ U.S. Fish and Wildlife Service, biological opinions issued for formal section 7 consultations conducted for projects affecting the PMJM and its habitat, January 2003 through June 2009.

4.3.2 SECTION 7 CONSULTATION COSTS

122. The primary Federal nexus for utility projects is the USACE, which authorizes Clean Water Act section 404 permits for projects with the potential to discharge dredged or fill material into navigable water of the United States. Another possible nexus for utility related projects is project licensing issued by the Federal Energy Regulatory Commission (FERC). To estimate the number of future consultations, this analysis relies on the consultation history provided by the USACE for Larimer, Jefferson, Boulder and Douglas Counties, and the economic analyses completed in support of the 2002 proposed critical habitat rule for El Paso County.⁷⁷
123. The estimated number of formal consultations is then multiplied by the per-consultation unit costs presented in Exhibit 2-3. Exhibit 4-5 presents the estimated total number of future consultations by unit for the 20-year period of the analysis (2010 - 2029).⁷⁸ The majority of the consultation costs will be borne by the Service, the Action Agency (USACE), and a third party, such as local sanitation districts or wastewater authorities. As shown in Exhibit 4-5, this analysis estimates 27 formal consultations for utility-related activities that occur within proposed PMJM critical habitat over the next 20 years.

⁷⁷ Personal communication, M. Montgomery, USACE Denver Regulatory Office, January 11, 2010. USACE could not provide estimates for El Paso County. Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003.

⁷⁸ This analysis assigns costs for technical assistance to activities and units after all other activity costs are estimated and assembled (see Appendix D).

EXHIBIT 4-5 ESTIMATED TOTAL NUMBER AND COSTS OF ADMINISTRATIVE CONSULTATIONS FOR UTILITY-RELATED ACTIVITIES, BY UNIT (2010 - 2029, IN 2009 DOLLARS)

UNIT	INFORMAL CONSULTATIONS		FORMAL CONSULTATIONS		TOTAL CONSULTATIONS	
	NUMBER	UNDISCOUNTED COSTS	NUMBER	UNDISCOUNTED COSTS	NUMBER	UNDISCOUNTED COST
1. N. Fork, Cache la Poudre River	0.0	0.0	4.4	\$87,700	4.4	\$87,700
2. Cache la Poudre River	0.0	0.0	0.1	\$2,220	0.1	\$2,220
3. Buckhorn Creek	0.0	0.0	2.3	\$44,900	2.3	\$44,900
4. Cedar Creek	0.0	0.0	0.1	\$2,340	0.1	\$2,340
5. South Boulder Creek	0.0	0.0	0.3	\$5,170	0.3	\$5,170
6. Rocky Flats NWR	0.0	0.0	0.0	\$202	0.0	\$202
7. Ralston Creek	0.0	0.0	0.4	\$7,560	0.4	\$7,560
8. Cherry Creek	0.0	0.0	2.0	\$39,500	2.0	\$39,500
9. West Plum Creek	0.0	0.0	6.2	\$124,000	6.2	\$124,000
10. Upper South Platte River	0.0	0.0	0.3	\$6,550	0.3	\$6,550
11. Monument Creek	0.0	0.0	11.0	\$220,000	11.0	\$220,000
Total	0.0	0.0	27	\$540,000	27	\$540,000

Notes: Number of consultations apportioned to units based on the proportion of private land in each unit to the total area of private land in all units. Does not include technical assistance costs. Totals may not sum due to rounding.

4.3.3 PROJECT MODIFICATION COSTS

124. Utility-related projects requiring formal consultations will also require project modifications. Historic modification requirements include habitat restoration and enhancement, purchasing mitigation land, activity timing restrictions, and on-site monitoring of construction activities. The administrative record for consultations does not include information and data on costs for mitigation. This analysis, therefore, uses the unit costs developed in the economic analyses prepared in support of the 2002 proposed critical habitat rule, adjusted for inflation to 2009 dollars, where the average utility project was assumed to disturb about four acres of habitat.⁷⁹ The cost of mitigation ranges from \$11,900 to \$27,400 per acre mitigated, or \$2,380 to \$5,480 per project requiring formal consultation (assuming 0.2 acres of mitigation per project). The cost of habitat restoration ranges from \$5,960 to \$11,900 per acre, or \$8,340 to \$16,700 per project (assuming 1.4 acres restored per project). The total project modification costs

⁷⁹ Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003. Inflation factors obtained from the U.S. Bureau of Economic Analysis, GDP Implicit Price Deflators, as viewed at <http://www.bea.gov/national/nipaweb/index.asp>.

therefore range from \$10,700 to \$22,200 per project. Exhibit 4-6 presents the range of project modification costs, by unit. Most of the project modification costs will be borne by a third party, such as local sanitation districts and wastewater authorities.

EXHIBIT 4-6 ESTIMATED PROJECT MODIFICATION COSTS FOR UTILITY-RELATED ACTIVITIES, BY UNIT (2010 - 2029, IN 2009 DOLLARS)

UNIT	NUMBER OF FORMAL UTILITY CONSULTATIONS		UNDISCOUNTED MITIGATION COSTS	
	LOW	HIGH	LOW	HIGH
1. N. Fork, Cache la Poudre River	4.4	4.4	\$47,000	\$97,200
2. Cache la Poudre River	0.1	0.1	\$1,190	\$2,460
3. Buckhorn Creek	2.3	2.3	\$24,100	\$49,800
4. Cedar Creek	0.1	0.1	\$1,250	\$2,590
5. South Boulder Creek	0.3	0.3	\$2,770	\$5,730
6. Rocky Flats NWR	0.0	0.0	\$108	\$223
7. Ralston Creek	0.4	0.4	\$4,050	\$8,370
8. Cherry Creek	2.0	2.0	\$21,200	\$43,700
9. West Plum Creek	6.2	6.2	\$66,400	\$137,000
10. Upper South Platte River	0.3	0.3	\$3,510	\$7,260
11. Monument Creek	11.0	11.0	\$118,000	\$244,000
Total	27	27	\$290,000	\$598,000
Notes: Totals may not sum due to rounding.				

4.4 BANK STABILIZATION

4.4.1 BACKGROUND INFORMATION

125. Typical bank stabilization activities include flood control and damage reduction efforts that range from small, local protection projects, such as construction of levees and non-structural flood control measures, to major dams. Erosion control and bank stabilization activities are typically associated with dredging and marsh creation.

4.4.2 SECTION 7 CONSULTATION COSTS

126. The primary Federal nexus for bank stabilization activities within the proposed critical habitat is the USACE, which authorizes section 404 permits for projects with the potential to discharge dredged or fill material into navigable waters of the United States. To estimate the number of future consultations, this analysis relies on the consultation history provided by the USACE for Larimer, Jefferson, Boulder and Douglas Counties,

and the economic analyses completed in support of the 2002 proposed critical habitat rule for El Paso County.⁸⁰

127. The estimated number of formal consultations is then multiplied by the per-consultation unit costs presented in Exhibit 2-3. Exhibit 4-7 presents the estimated total number and cost of future consultations by unit for the 20-year period of the analysis (2010 - 2029).⁸¹ The majority of consultation costs will be borne by the Service, the Action Agency (e.g. USACE), and a third party, such as CODOT. As shown in Exhibit 4-7, this analysis estimates that 8.5 formal consultations for bank stabilization activities will occur within proposed PMJM critical habitat over the next 20 years.

EXHIBIT 4-7 ESTIMATED TOTAL NUMBER AND COSTS OF ADMINISTRATIVE CONSULTATIONS FOR BANK STABILIZATION ACTIVITIES, BY UNIT (2010 - 2029, IN 2009 DOLLARS)

UNIT	INFORMAL CONSULTATIONS		FORMAL CONSULTATIONS		TOTAL CONSULTATIONS	
	NUMBER	UNDISCOUNTED COSTS	NUMBER	UNDISCOUNTED COSTS	NUMBER	UNDISCOUNTED COST
1. N. Fork, Cache la Poudre River	0.0	0.0	1.5	\$30,100	1.5	\$30,100
2. Cache la Poudre River	0.0	0.0	0.0	\$763	0.0	\$763
3. Buckhorn Creek	0.0	0.0	0.8	\$15,500	0.8	\$15,500
4. Cedar Creek	0.0	0.0	0.0	\$803	0.0	\$803
5. South Boulder Creek	0.0	0.0	0.1	\$1,780	0.1	\$1,780
6. Rocky Flats NWR	0.0	0.0	0.0	\$69	0.0	\$69
7. Ralston Creek	0.0	0.0	0.1	\$2,600	0.1	\$2,600
8. Cherry Creek	0.0	0.0	0.7	\$13,600	0.7	\$13,600
9. West Plum Creek	0.0	0.0	2.1	\$42,600	2.1	\$42,600
10. Upper South Platte River	0.0	0.0	0.1	\$2,250	0.1	\$2,250
11. Monument Creek	0.0	0.0	3.0	\$60,000	3.0	\$60,000
Total	0.0	0.0	8.5	\$170,000	8.5	\$170,000

Notes: Number of consultations apportioned to units based on the proportion of private land in each unit to the total area of private land in all units. Does not include technical assistance costs. Totals may not sum due to rounding.

⁸⁰ Personal communication, M. Montgomery, USACE Denver Regulatory Office, January 11, 2010. USACE could not provide estimates for El Paso County. Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003.

⁸¹ This analysis assigns costs for technical assistance to activities and units after all other activity costs are estimated and assembled (see Appendix D).

4.4.3 PROJECT MODIFICATION COSTS

128. Bank stabilization projects requiring formal consultations may require project modifications. Typical project modifications assigned in previous biological opinions issued by the Service include specifying “gentle” grades for regraded slopes, converting uplands to habitat, revegetating disturbed areas, and hiring a qualified ecologist to be available for consultation during construction.⁸² The costs of these project modifications, however, are not monetized in this analysis due to a lack of sufficient information. The majority of project modification costs will be realized by the third party, such as CODOT.

4.5 SUMMARY OF ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE COSTS

129. Exhibit 4-8 presents a summary of the baseline and incremental costs for road/bridge, bank stabilization, and utilities construction and maintenance activities.

EXHIBIT 4-8 POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS TO ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE ACTIVITIES, BY UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	\$246,000	\$140,000	\$13,200	\$571,000	\$324,000	\$30,600
2. Cache la Poudre River	\$85,600	\$48,500	\$4,580	\$361,000	\$205,000	\$19,300
3. Buckhorn Creek	\$150,000	\$84,800	\$8,000	\$395,000	\$224,000	\$21,100
4. Cedar Creek	\$4,390	\$2,490	\$235	\$5,730	\$3,250	\$306
5. South Boulder Creek	\$91,100	\$51,600	\$4,870	\$369,000	\$209,000	\$19,700
6. Rocky Flats NWR	\$32,900	\$18,700	\$1,760	\$143,000	\$81,000	\$7,650
7. Ralston Creek	\$30,500	\$17,300	\$1,630	\$89,700	\$50,900	\$4,800
8. Cherry Creek	\$139,000	\$78,900	\$7,450	\$382,000	\$216,000	\$20,400
9. West Plum Creek	\$314,000	\$178,000	\$16,800	\$660,000	\$374,000	\$35,300
10. Upper South Platte River	\$61,200	\$34,700	\$3,270	\$230,000	\$130,000	\$12,300
11. Monument Creek	\$479,000	\$272,000	\$25,600	\$880,000	\$499,000	\$47,100
Total		\$926,000	\$87,400		\$2,320,000	\$219,000

Notes: Does not include technical assistance costs. Totals may not sum due to rounding.

⁸² U.S. Fish and Wildlife Service, biological opinions issued for formal section 7 consultations conducted for projects affecting the PMJM and its habitat, January 2003 through June 2009.

130. Because of limited information and data with which to identify and estimate the forecast incremental costs due to the designation, the methodology described in Chapter 2 is followed to estimate: 1) that proportion of the total forecast consultation and project modification costs which results entirely from the critical habitat designation, and 2) the proportion of the remaining costs that reflects the additional effort to address adverse modification in new consultations. Exhibits 4-9 and 4-10 present a summary of the incremental costs for road/bridge, bank stabilization, and utilities construction and maintenance activities, without and with technical assistance costs, respectively.

EXHIBIT 4-9 POST-DESIGNATION INCREMENTAL IMPACTS TO ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE ACTIVITIES, WITHOUT TECHNICAL ASSISTANCE COSTS, BY UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	\$62,700	\$35,500	\$3,350	\$145,000	\$82,400	\$7,770
2. Cache la Poudre River	\$32,000	\$18,200	\$1,710	\$135,000	\$76,700	\$7,240
3. Buckhorn Creek	\$57,400	\$32,500	\$3,070	\$151,000	\$85,800	\$8,100
4. Cedar Creek	\$1,750	\$989	\$93	\$2,280	\$1,290	\$122
5. South Boulder Creek	\$26,500	\$15,000	\$1,420	\$107,000	\$60,800	\$5,740
6. Rocky Flats NWR	\$13,200	\$7,500	\$708	\$57,400	\$32,600	\$3,070
7. Ralston Creek	\$9,000	\$5,100	\$481	\$26,500	\$15,000	\$1,420
8. Cherry Creek	\$40,600	\$23,000	\$2,170	\$111,000	\$63,000	\$5,950
9. West Plum Creek	\$101,000	\$57,100	\$5,390	\$211,000	\$120,000	\$11,300
10. Upper South Platte River	\$22,800	\$12,900	\$1,220	\$85,500	\$48,500	\$4,570
11. Monument Creek	\$151,000	\$85,700	\$8,090	\$278,000	\$157,000	\$14,900
Total		\$293,000	\$27,700		\$743,000	\$70,200

Notes: Does not include technical assistance costs. Totals may not sum due to rounding.

EXHIBIT 4-10 POST-DESIGNATION INCREMENTAL IMPACTS TO ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE ACTIVITIES, WITH TECHNICAL ASSISTANCE COSTS, BY UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River		\$67,900	\$6,410		\$115,000	\$10,800
2. Cache la Poudre River		\$38,300	\$3,610		\$96,900	\$9,140
3. Buckhorn Creek		\$63,200	\$5,970		\$117,000	\$11,000
4. Cedar Creek		\$1,790	\$169		\$2,090	\$197
5. South Boulder Creek		\$31,400	\$2,970		\$77,200	\$7,290
6. Rocky Flats NWR		\$15,900	\$1,500		\$41,000	\$3,870
7. Ralston Creek		\$10,100	\$951		\$20,000	\$1,890
8. Cherry Creek		\$45,000	\$4,240		\$85,000	\$8,020
9. West Plum Creek		\$108,000	\$10,200		\$171,000	\$16,100
10. Upper South Platte River		\$26,600	\$2,510		\$62,100	\$5,860
11. Monument Creek		\$159,000	\$15,000		\$230,000	\$21,700
Total		\$567,000	\$53,500		\$1,020,000	\$95,900

Notes: This analysis assigns technical assistance costs (on a present value basis) to activities and units after all other activity costs are estimated and assembled (see Appendix D). Totals may not sum due to rounding.

131. As shown in Exhibit 4-10, total forecast incremental costs range from \$567,000 to \$1.02 million. The large range is primarily due to the large range in per-acre mitigation costs for road/bridge projects, which varies by a factor of ten. The costs are distributed relatively evenly across units (around \$41,000 to \$230,000 per unit) with the exception of the lower costs estimated for Unit 4 (Cedar Creek) and Unit 7 (Ralston Creek). These two units are located in areas with little urban development, and therefore are expected to have few road/bridge, utility, or bank stabilization activity.

4.6 SOURCES OF UNCERTAINTY

132. There are several sources of uncertainty related to road/bridge, utilities, and bank stabilization activities that may affect the results of this analysis:

- For road/bridge construction activities, the wide range of potential project modification costs represents a source of uncertainty. For bank stabilization activities, the unknown magnitude of project modification costs represents another source of uncertainty.
- The estimated number of consultations for utility-related and bank stabilization activities forecasted for El Paso County, which is based on the economic analyses completed in support of the 2002 proposed critical habitat rule, is significantly higher than the estimates based on the consultation history provided more recently by the USACE for Larimer, Jefferson, Boulder, and Douglas Counties (eight times higher for utilities and three times higher for bank stabilization). The lack of more recent estimates of consultation activity in El Paso County may lead to an overestimate of the actual administrative costs of addressing adverse modification due to the proposed critical habitat designation.
- Information was not available regarding the specific timing (i.e. year in which the project will occur) or location of utility-related and bank stabilization activities. As a result, this analysis allocates an equal proportion of the total number of consultations (and therefore project modifications) to each year in the 20-year analysis period. With the exception of El Paso County (Unit 11), this analysis also apportions the total number of consultations (and project modifications) across units based on the proportion of private land in each critical habitat unit, assuming areas having more private land will encounter more construction and maintenance activities of the types discussed in this chapter.⁸³ These assumptions may understate or overstate actual consultation and project modification costs.

⁸³ The methodology for apportioning consultations across units (i.e., based on the proportion of private land in each unit) was used in the economic analysis completed in support of the 2002 proposed critical habitat rule (Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003). For El Paso County, consultation projections were reported separately, and were therefore identifiable by location since all consultations occurring in that county occur in Unit 11.

CHAPTER 5 | WATER SUPPLY DEVELOPMENT

5.1 INTRODUCTION

133. This chapter considers potential economic impacts to water supply development within the proposed revised critical habitat. The Service is aware of three proposed municipal water reservoir expansion projects located within the proposed critical habitat designation: 1) Halligan Reservoir, 2) Milton-Seaman Reservoir, and 3) Chatfield Reservoir. Each of these projects will require a section 404 permit from the USACE.
134. These three reservoir expansion projects are in various stages of planning and development, with construction expected within the 20-year analysis period. Development plans indicate that proposed critical habitat would be inundated as result of expanding the footprints of these three reservoirs. The expected impacts of the designation primarily consist of mitigation costs to offset the loss of habitat and additional administrative consultation costs. The incremental costs of the designation consist of the need for additional acres of mitigation that would not otherwise be required without the designation and the added cost of addressing adverse modification in section 7 consultations. These impacts are summarized in Exhibit 5-1 and discussed in detail below.

EXHIBIT 5-1 SUMMARY OF IMPACTS TO RESERVOIR PROJECTS, BY UNIT
(2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	PROJECT	PRESENT VALUE IMPACTS	
		LOW ESTIMATE	HIGH ESTIMATE
Post-Designation Incremental Impacts (2010 - 2029)			
1. N. Fork, Cache la Poudre River	Halligan and Milton-Seaman	\$20,700	\$38,800
9. West Plum Creek	Chatfield	\$102,000	\$301,000
10. Upper South Platte River	Chatfield	\$202,000	\$598,000
Total		\$324,000	\$938,000
Note: Totals may not sum due to rounding.			

5.2 BACKGROUND INFORMATION

135. Both the Halligan and Milton-Seaman (see below) reservoir expansion projects are participating in a joint permitting process called the Halligan-Seaman Water Management Project.⁸⁴ The Halligan Reservoir is located in Larimer County along the North Fork Cache La Poudre River. According to the USACE's current expansion plans, 20.2 acres of PMJM habitat in Unit 1 may be inundated (Exhibit 5-2).⁸⁵ According to the USACE, construction of the Halligan expansion could begin as early as 2013.⁸⁶ The primary customer of the water provided by this development is the City of Fort Collins, Colorado.
136. The Milton-Seaman Reservoir is located downstream of Halligan Reservoir, just upstream of where the North Fork Cache La Poudre River enters the Cache La Poudre River (Exhibit 5-3). The City of Greeley is planning on increasing the capacity of the existing reservoir to 53,000 acre-feet, which would inundate about 652 acres, of which 191.5 acres are being designated as critical habitat for the PMJM (Unit 1) under the proposed rule.⁸⁷ The City of Greeley does not plan to commence construction until about 2029, but efforts to mitigate for loss of habitat could start as soon as the required permits are obtained, which is expected as early as 2012.⁸⁸
137. The Chatfield Reservoir is located in Douglas County at the confluence of the South Platte River and Plum Creek (Exhibit 5-4). The Chatfield Water Providers, a consortium of 15 water providers in the Denver metropolitan area, in partnership with the Colorado Water Conservation Board, are requesting from the USACE the reallocation of storage at Chatfield Reservoir.⁸⁹ The USACE is currently preparing a draft feasibility report/environmental impact statement that addresses the requested reallocation. Under the preferred alternative, reallocation at the reservoir would inundate a maximum of about 1.3 stream miles and 86.5 acres of proposed critical habitat in the South Platte River arm (Unit 10) and 2.8 stream miles and 75.2 acres of proposed critical habitat in the Plum Creek arm (Unit 9). Construction of the project is expected by 2013.⁹⁰

⁸⁴ Kolanz, J., City of Greeley, letter to S. Linner, USFWS, re: Revision to Preble's Critical Habitat Designation, May 20, 2009.

⁸⁵ Estimated area based on GIS analysis of the proposed expansion project provided by USACE (Personal communication, C. Peter, U.S. Army Corps of Engineers, February 2, 2010).

⁸⁶ Personal communication, C. Peter, U.S. Army Corps of Engineers, January 22, 2010.

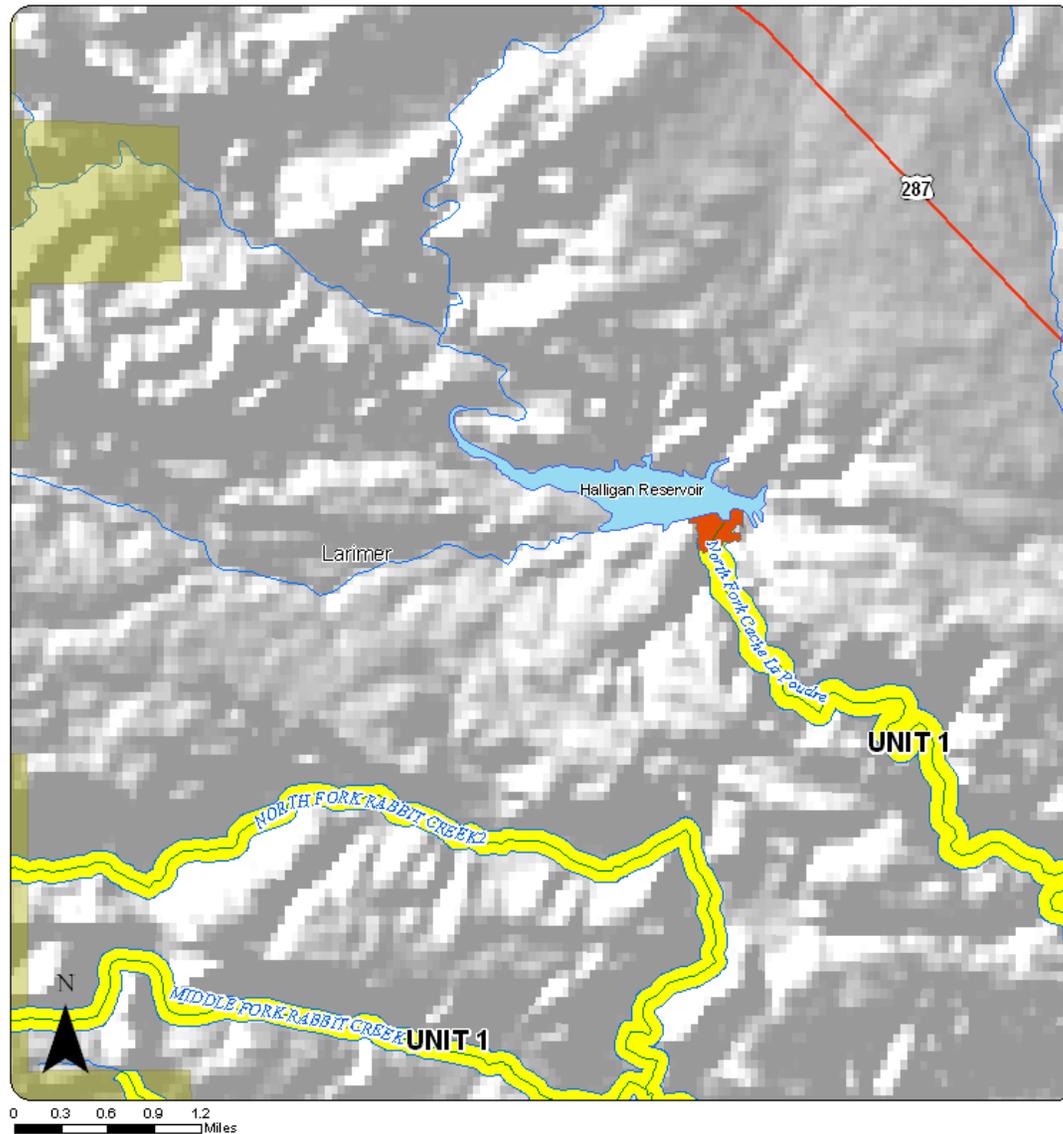
⁸⁷ Kolanz, J., City of Greeley, letter to S. Linner, USFWS, re: Revision to Preble's Critical Habitat Designation, May 20, 2009.

⁸⁸ Personal communication, J. Kolanz, City of Greeley, January 14, 2010.

⁸⁹ Dougherty, S., ERO Resources Corp., on behalf of the Chatfield Water Providers, letter to USFWS, re: Comments on FWS-R6-ES-2009-0013, December 7, 2009.

⁹⁰ Personal communication, S. Dougherty, ERO Resources Corp., February 1, 2010.

EXHIBIT 5-2 PROPOSED HALLIGAN RESERVOIR EXPANSION PROJECT, PROPOSED CRITICAL HABITAT UNIT 1

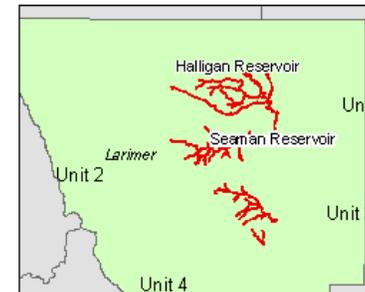


Halligan Reservoir

Unit 1 - North Fork Cache La Poudre River

- Legend
- Proposed Critical Habitat
 - Rivers & Streams
 - Urban Areas
 - Interstate Highways
 - U.S. Highways
 - State Highways
 - Halligan Expansion in Critical Habit
 - Arapaho & Roosevelt N'tl Forests

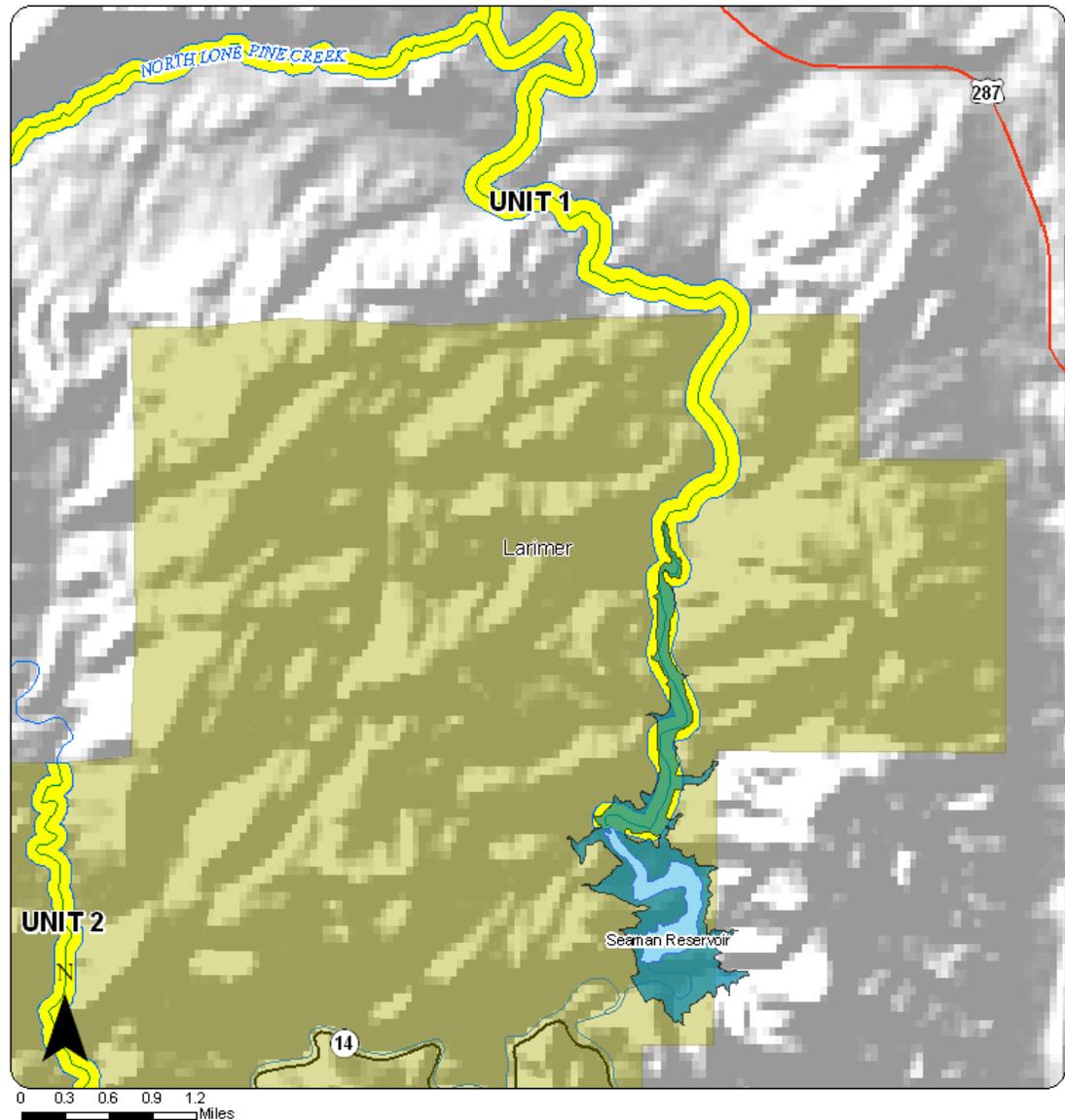
Study Area



- Sources:
- 1.) U.S. Fish and Wildlife Service
 - 2.) Environmental Systems Research Institute, Inc.
 - 3.) U.S. Army Corp of Engineers

IEC Map Projection: UTM Zone 13N
 Geodetic Reference System: NAD 1983
INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT 5-3 PROPOSED MILTON-SEAMAN RESERVOIR EXPANSION PROJECT, PROPOSED CRITICAL HABITAT UNIT 1



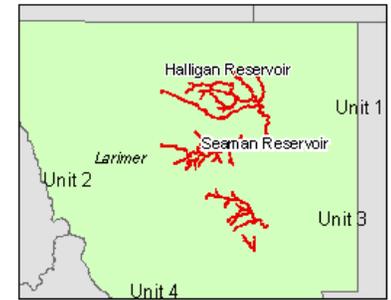
Milton-Seaman Reservoir

Unit 1 - North Fork Cache La Poudre River

Legend

- Proposed Critical Habitat
- Rivers & Streams
- Urban Areas
- Interstate Highways
- U.S. Highways
- State Highways
- Arapaho & Roosevelt N'tl Forests
- Milton-Seaman Expansion

Study Area

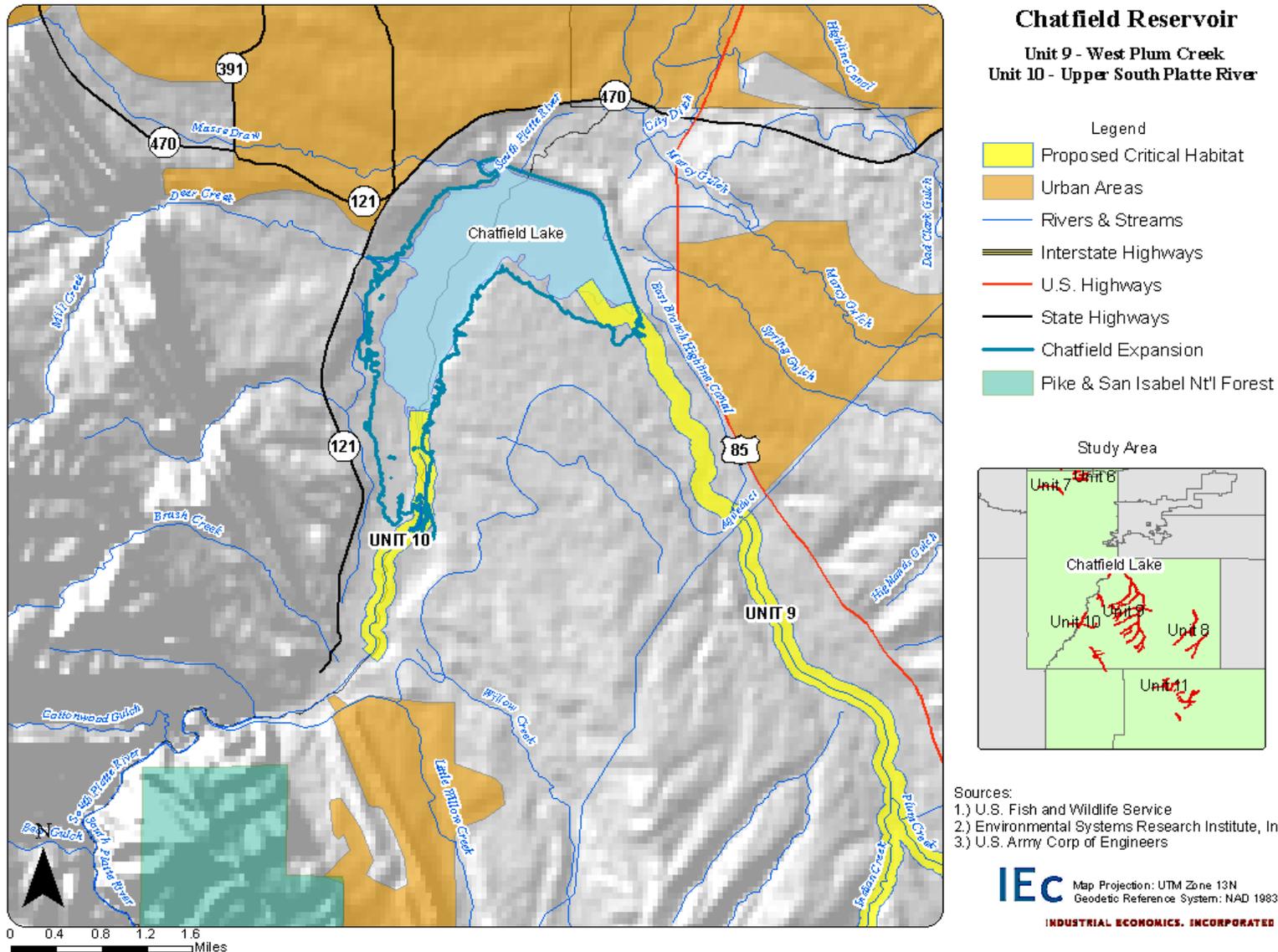


Sources:

- 1.) U.S. Fish and Wildlife Service
- 2.) Environmental Systems Research Institute, Inc.
- 3.) ERO Resources, Corp.

IEC Map Projection: UTM Zone 13N
 Geodetic Reference System: NAD 1983
INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT 5-4 PROPOSED CHATFIELD RESERVOIR REALLOCATION PROJECT, PROPOSED CRITICAL HABITAT UNITS 9 AND 10



5.3 ESTIMATING INCREMENTAL IMPACTS TO WATER SUPPLY DEVELOPMENT

138. Expected impacts to water supply development projects include added costs for administrative consultations and mitigation. In addition, the critical habitat designation may thwart the efforts of proponents to pursue and construct the preferred alternatives described in the previous section. The methods and assumptions used for estimating these impacts and the results are presented below.

5.3.1 SECTION 7 CONSULTATION COSTS

139. For the Halligan and Milton-Seaman water supply development projects, USACE permitting under section 404 of the Clean Water Act constitutes the primary Federal nexus for consultation. Under this program, the USACE issues permits for activities that involve modifying navigable waterways and/or wetlands for construction and maintenance of structures. For the Chatfield Reservoir, although a section 404 permit would likewise be required, the USACE's own action to reauthorize its existing Federal project to allow additional water storage constitutes the primary nexus for consultation.⁹¹
140. This analysis assumes one formal section 7 consultation with the Service, USACE, and proponent per project.⁹² As shown in Exhibit 2-3, the incremental cost for addressing adverse modification in a formal consultation is \$5,000. Based on the project information presented above, this analysis assumes that these consultation costs would be incurred in 2012, 2011, and 2012 for the Halligan, Milton-Seaman, and Chatfield reservoir projects, respectively.
141. The estimated number of formal and informal consultations is then multiplied by the per-consultation unit costs presented in Exhibit 2-3. Exhibit 5-5 presents the estimated total number and costs of future consultations by unit for the 20-year period of the analysis (2010 - 2029).

EXHIBIT 5-5 ESTIMATED NUMBER AND COSTS OF ADMINISTRATIVE CONSULTATIONS FOR WATER SUPPLY DEVELOPMENT-RELATED PROJECTS, BY UNIT (2010 - 2029)

RESERVOIR PROJECT (UNIT), YEAR TO BE INCURRED	FORMAL CONSULTATIONS	
	NUMBER	UNDISCOUNTED COST
Halligan Reservoir (Unit 1), 2012	1	\$5,000
Milton-Seaman Reservoir (Unit 1), 2011	1	\$5,000
Chatfield Reservoir (Units 9 and 10), 2012	1	\$5,000
Total	3	\$15,000
Notes: Does not include technical assistance costs. Totals may not sum due to rounding.		

⁹¹ This analysis assigns costs for technical assistance to activities and units after all other activity costs are estimated and assembled (see Appendix D).

⁹² Personal communication, P. Plage, USFWS, February 25 and March 2, 2010.

5.3.2 MITIGATION

142. Mitigation costs primarily consist of the cost to purchase land or conservation easements to offset the loss to habitat. The USACE and project proponents, however, could not specify the mitigation ratios they anticipate the Service will require. As a result, this analysis uses the ratios developed in the economic analyses prepared in support of the 2002 proposed critical habitat rule, which were based on the 2002 feasibility study for the Halligan Reservoir project.⁹³ As detailed in this study, it is estimated that for the purchase of conservation easements, mitigation ratios will range between 1.5 to 4.5 acres for every acre of PMJM habitat impacted. For the outright purchase of land, the mitigation ratios are expected to range between 1.5 to 2.0 acres for every acre of PMJM habitat impacted. These ratios are fairly consistent with the values currently anticipated by USACE and project proponents.⁹⁴
143. The value of land around the proposed Chatfield Reservoir project is estimated to range between \$10,000 to \$50,000 per acre, depending on current or potential land use (e.g., agricultural or residential).⁹⁵ Based on preliminary estimates of the types and amount of land that would be available for purchase, a weighted average cost of \$14,000 per acre is estimated.⁹⁶ For the more rural lands around the proposed Halligan and Milton-Seaman reservoir projects, purchase costs are estimated to be about one-half to two-thirds the lower-end value, or roughly \$6,000 per acre. However, property owners are currently demanding a premium of up to \$10,000 per acre for their land, having become aware of the need for project proponents to buy land as mitigation for their projects. The value of a conservation easement is approximately 75 percent of the value of the land. Additional funding will be needed to be set aside for the long-term management of these lands, at about \$1,000 per acre. As a result, the per acre cost of mitigation for the Halligan and Milton-Seaman projects can range from \$5,500 (easement plus management) to \$11,000 (purchase plus management), or \$8,250 to \$24,750 per acre impacted. For the Chatfield project, the per acre costs of mitigation can range from \$11,500 (easement plus management) to \$15,000 (purchase plus management), or \$17,250 to \$51,750 per acre impacted.
144. Because the proposed areas of critical habitat are generally larger than the areas in which potential impacts to the PMJM and its habitat would generally need to be addressed without the designation, the methodology described in Chapter 2 is followed to estimate the proportion of these mitigation costs that would not otherwise be required without the designation. As shown in Exhibit 5-6, the unit-specific area factors presented in Exhibit

⁹³ Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003.

⁹⁴ S. Dougherty of ERO Resources Corp. stated that the Douglas County HCP specifies mitigation ratios of three to four acres for every acre of habit impacted (Personal communication, S. Dougherty, ERO Resources Corp., January 19, 2010). C. Peter of USACE estimated an approximate range of one to seven acres for every acre of habit impacted, based on experience (Personal communication, C. Peter, USACE, January 22, 2010).

⁹⁵ Personal communication, S. Dougherty, ERO Resources Corp., January 19, 2010.

⁹⁶ Personal communication, S. Dougherty, ERO Resources Corp., January 19, 2010.

2-4, which range from 0.6 percent to 16.3 percent, are applied to the total mitigation costs.⁹⁷ Based on the project information presented above, this analysis assumes that these mitigation costs would be incurred in 2013, 2012, and 2013 for the Halligan, Milton-Seaman, and Chatfield reservoir projects, respectively. Exhibit 5-6 presents the incremental mitigation costs for each project, by unit, which range from approximately \$375,000 to \$1.13 million.

EXHIBIT 5-6 ESTIMATED MITIGATION COSTS FOR WATER DEVELOPMENT PROJECTS, BY UNIT (2009 DOLLARS)

RESERVOIR PROJECT (UNIT), YEAR INCURRED	ACRES IMPACTED	TOTAL MITIGATION COSTS (UNDISCOUNTED)		AREA FACTOR	INCREMENTAL MITIGATION COSTS (UNDISCOUNTED)	
		LOW	HIGH		LOW	HIGH
Halligan Reservoir (Unit 1), 2013	20	\$167,000	\$500,000	0.6%	\$994	\$2,980
Milton-Seaman Reservoir (Unit 1), 2012	192	\$1,580,000	\$4,740,000	0.6%	\$9,430	\$28,300
Chatfield Reservoir (Unit 9), 2013	75	\$1,300,000	\$3,890,000	9.4%	\$122,000	\$365,000
Chatfield Reservoir (Unit 10), 2013	87	\$1,490,000	\$4,480,000	16.3%	\$243,000	\$729,000
Total	373	\$4,540,000	\$13,600,000		\$375,000	\$1,130,000

Notes: Totals may not sum due to rounding. Because precise GIS renditions of the proposed expansions are not available, the unit-specific area factors provided in Exhibit 2-4 are applied.

145. Another incremental impact of the proposed revised critical habitat designation is the requirement for mitigation to occur within (and not outside) the unit being impacted. However, given the data limitations, these incremental in-unit mitigation costs are assessed qualitatively by discussing the area available for conservation activities relative to the required conservation actions within each critical habitat unit (Exhibit 5-7). As shown, the amount of land available for in-unit mitigation in Unit 10 (Upper South Platte River) is limited and may restrict the development of the Chatfield Reservoir or result in additional project cost (e.g., higher mitigation costs, smaller projects developed). In all other cases, the area required for mitigation is no more than about one-fifth of available land. Thus, availability of mitigation lands is not expected to be a factor in determining the future cost of conservation for the other two projects.

⁹⁷ Because of limitations in the geographical data depicting potential reservoir expansions, this analysis could not estimate a site-specific area adjustment factor with which to calculate added mitigation due to designation. This analysis therefore applies the unit-wide factors (Exhibit 2-4).

EXHIBIT 5-7 ESTIMATE OF ACRES AVAILABLE FOR IN-UNIT MITIGATION, BY UNIT

RESERVOIR PROJECT (UNIT)	ACRES NEEDED FOR MITIGATION		AVAILABLE IN-UNIT ACRES FOR MITIGATION
	LOW	HIGH	
Halligan Reservoir (Unit 1)	30	91	4,902
Milton-Seaman Reservoir (Unit 1)	287	862	4,902
Chatfield Reservoir (Unit 9)	113	338	6,923
Chatfield Reservoir (Unit 10)	130	389	366
Total	560	1,680	17,100
Note: Available in-unit acres for mitigation based on estimated area of privately-owned land within each unit, as presented in Exhibit 1-9. Totals may not sum due to rounding.			

5.3.3 REGULATORY UNCERTAINTY

146. Finally, project proponents indicate that the proposed designation of critical habitat may result in them having to pursue alternative, less preferable, and more costly projects. According to the USACE, the USACE cannot grant authorization and issue a section 404 permit unless the project has been shown to be the least environmentally damaging practicable alternative.⁹⁸ The designation of critical habitat within proposed project areas may imply that environmental impact is an issue, and therefore reduce the likelihood of approval in comparison to other alternatives perceived or evaluated to have less environmental impact (e.g., not in critical habitat areas). In certain instances, these alternatives may be more costly and take longer to develop. For example, the Cities of Fort Collins and Greeley are assessing their potential participation in the Northern Colorado Water Conservancy District's Northern Integrated Supply Project (NISP) (more specifically, the new Glade Reservoir portion of NISP) as an option to expanding the Halligan and Milton-Seaman reservoirs. The costs of participating in NISP may be as much as three to eight times the costs of developing their preferred alternatives, Halligan and Milton-Seaman.⁹⁹ The City of Greeley indicates that, because of the faster timeline for the proposed Glade Reservoir project, it will have trouble committing and providing the necessary financing to the project.¹⁰⁰
147. Because of their speculative nature, these costs are not included in this analysis, but discussed herein to reflect their potential incremental impact on water supply development as an indirect effect of the designation.

⁹⁸ Personal communication, C. Peter, U.S. Army Corps of Engineers, January 22, 2010.

⁹⁹ Personal communication, C. Peter, U.S. Army Corps of Engineers, January 22, 2010.

¹⁰⁰ Kolanz, J., City of Greeley, letter to S. Linner, USFWS, re: Revision to Preble's Critical Habitat Designation, May 20, 2009.

5.3.4 SUMMARY OF INCREMENTAL COSTS

148. Exhibits 5-8 and 5-9 present a summary of the forecast incremental (added) costs to water supply development by unit, without or with technical assistance costs, respectively.

EXHIBIT 5-8 POST-DESIGNATION INCREMENTAL IMPACTS TO WATER SUPPLY DEVELOPMENT, WITHOUT TECHNICAL ASSISTANCE COSTS, BY UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	PROJECT	LOW-END SCENARIO			HIGH-END SCENARIO		
		UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	Halligan, Milton-Seaman	\$20,400	\$18,100	\$1,710	\$41,300	\$36,200	\$3,410
9. West Plum Creek	Chatfield	\$124,000	\$101,000	\$9,580	\$367,000	\$300,000	\$28,300
10. Upper South Platte River	Chatfield	\$246,000	\$201,000	\$18,900	\$732,000	\$597,000	\$56,400
Total			\$320,000	\$30,200		\$934,000	\$88,100

Notes: Does not include technical assistance costs. Totals may not sum due to rounding.

EXHIBIT 5-9 POST-DESIGNATION INCREMENTAL IMPACTS TO WATER SUPPLY DEVELOPMENT, WITH TECHNICAL ASSISTANCE COSTS, BY UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	PROJECT	LOW-END SCENARIO			HIGH-END SCENARIO		
		UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	Halligan, Milton-Seaman		\$20,700	\$1,950		\$38,800	\$3,660
9. West Plum Creek	Chatfield		\$102,000	\$9,650		\$301,000	\$28,400
10. Upper South Platte River	Chatfield		\$202,000	\$19,000		\$598,000	\$56,500
Total			\$324,000	\$30,600		\$938,000	\$88,500

Notes: This analysis assigns technical assistance costs (on a present value basis) to activities and units after all other activity costs are estimated and assembled (see Appendix D). Totals may not sum due to rounding.

149. As shown in Exhibit 5-9, the incremental costs of designating critical habitat range from \$324,000 to \$938,000. Due to the higher costs of mitigation in Units 9 and 10, most of these incremental costs are associated with the proposed Chatfield Reservoir project.

5.4 SOURCES OF UNCERTAINTY

150. There are several sources of uncertainty related to future water supply development activity that may affect the results of this analysis.
- The scope and timing of forecast reservoir projects are subject to considerable change, depending on the progress and outcome of regulatory review and approval, project financing, and end-user or municipal water planning.
 - The land values used to estimate mitigation costs are subject to substantial uncertainty (e.g., highly site-specific and subject to change depending on market conditions). This analysis may understate or overstate the mitigation costs.
 - Because of limitations in the geographical data depicting potential reservoir expansions, this analysis could not estimate a site-specific area adjustment factor with which to calculate added mitigation due to designation. This analysis applies the unit-wide factors (estimated in Chapter 2), which may understate or overstate the incremental costs for mitigation.

CHAPTER 6 | U.S. FOREST SERVICE LANDS MANAGEMENT

151. This chapter considers potential economic impacts to activities occurring within the proposed revised critical habitat for lands managed by the U.S. Forest Service (USFS), namely the Arapaho & Roosevelt National Forests and the Pike & San Isabel National Forests. Some protection of habitat is already conducted under existing forest management plans, which outline management, protection, and use goals and guidelines. These plans contain general guidelines to avoid or minimize harm to endangered and threatened species and their habitats. Thus, forecast incremental impacts presented in this chapter are primarily due to addressing adverse modification in section 7 consultations, as well as the cost of implementing project modifications to mitigate impacts to and restore and enhance PMJM habitat. These impacts are summarized in Exhibit 6-1 and discussed in detail below.

**EXHIBIT 6-1 SUMMARY OF IMPACTS TO USFS LANDS MANAGEMENT, BY UNIT
(2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)**

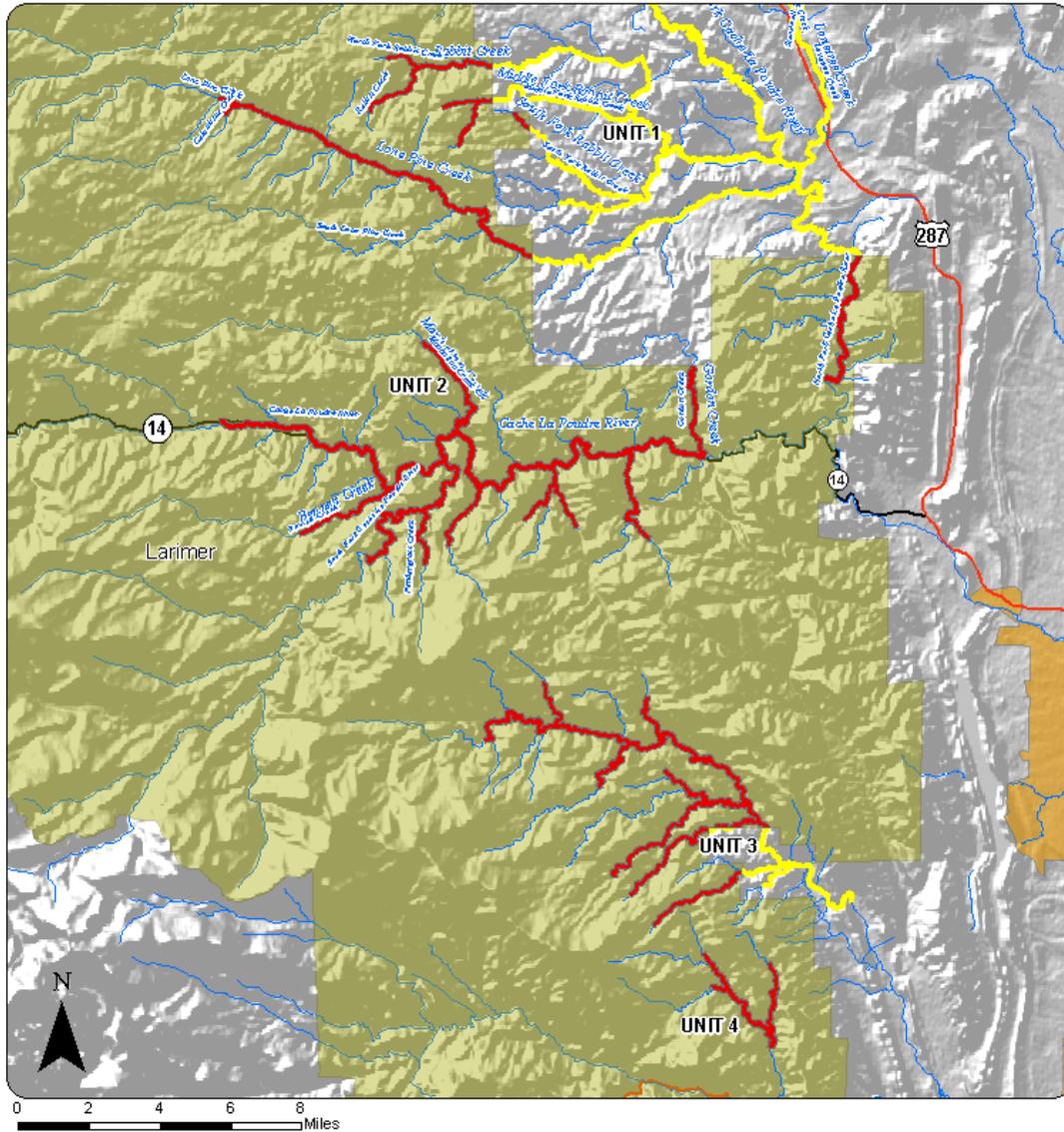
UNIT	NATIONAL FOREST	PRESENT VALUE IMPACTS	
		LOW ESTIMATE	HIGH ESTIMATE
Post-Designation Incremental Impacts (2010 - 2029)			
1. N. Fork, Cache la Poudre River	Arapaho & Roosevelt	\$47,600	\$47,600
2. Cache la Poudre River	Arapaho & Roosevelt	\$139,000	\$139,000
3. Buckhorn Creek	Arapaho & Roosevelt	\$90,700	\$90,700
4. Cedar Creek	Arapaho & Roosevelt	\$19,300	\$19,300
9. West Plum Creek	Pike & San Isabel	\$29,900	\$29,900
10. Upper South Platte River	Pike & San Isabel	\$85,200	\$85,200
11. Monument Creek	Pike & San Isabel	\$1,490	\$1,490
Total		\$413,000	\$413,000
Notes: Totals may not sum due to rounding.			

6.1 BACKGROUND INFORMATION

152. As shown in Exhibit 6-2, the Arapaho & Roosevelt National Forests (including the Pawnee National Grassland) consist of almost 1.5 million acres of short-grass prairie, montane forest, subalpine forest, and alpine tundra in northern Colorado. Approximately 11,165 acres, or 62 percent of the total acreage (17,960 acres) proposed as critical habitat in Units 1, 2, 3, and 4, are located within these forests.
153. As shown in Exhibit 6-3, the Pike & San Isabel National Forests (including the Comanche and Cimarron National Grasslands) consist of about 2.8 million acres of grasslands, pine forests, and mountain peaks in central and southeastern Colorado. Approximately 4,325 acres, or 28 percent of the total acreage (15,200 acres) proposed as critical habitat in Units 9, 10, and 11, are located within these forests.
154. USFS indicates that the following activities on national forest lands may be impacted by the proposed revised critical habitat designation: forest management plan revisions, national fire plan projects, recreation, construction projects authorized under special use permits (SUPs), exotic or invasive species control, and grazing.¹⁰¹ Each of these activities is described in the next section.

¹⁰¹ Personal communication, L. Diebel, USFS Arapaho & Roosevelt, December 11, 2009.

EXHIBIT 6-2 MAP OF ARAPAHO & ROOSEVELT NATIONAL FORESTS AND PROPOSED REVISED CRITICAL HABITAT (UNITS 1, 2, 3, AND 4)



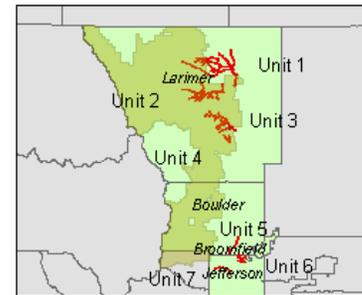
Arapaho & Roosevelt National Forests

- Unit 1 - Nork Fork Cache la Poudre River
- Unit 2 - Cache la Poudre River
- Unit 3 - Buckhorn Creek
- Unit 4 - Cedar Creek

Legend

- █ Proposed Critical Habitat
- █ Proposed Critical Habitat in NF
- █ Arapaho & Roosevelt N'tl Forests
- Rivers & Streams
- █ Urban Areas
- Interstate Highways
- U.S. Highways
- State Highways

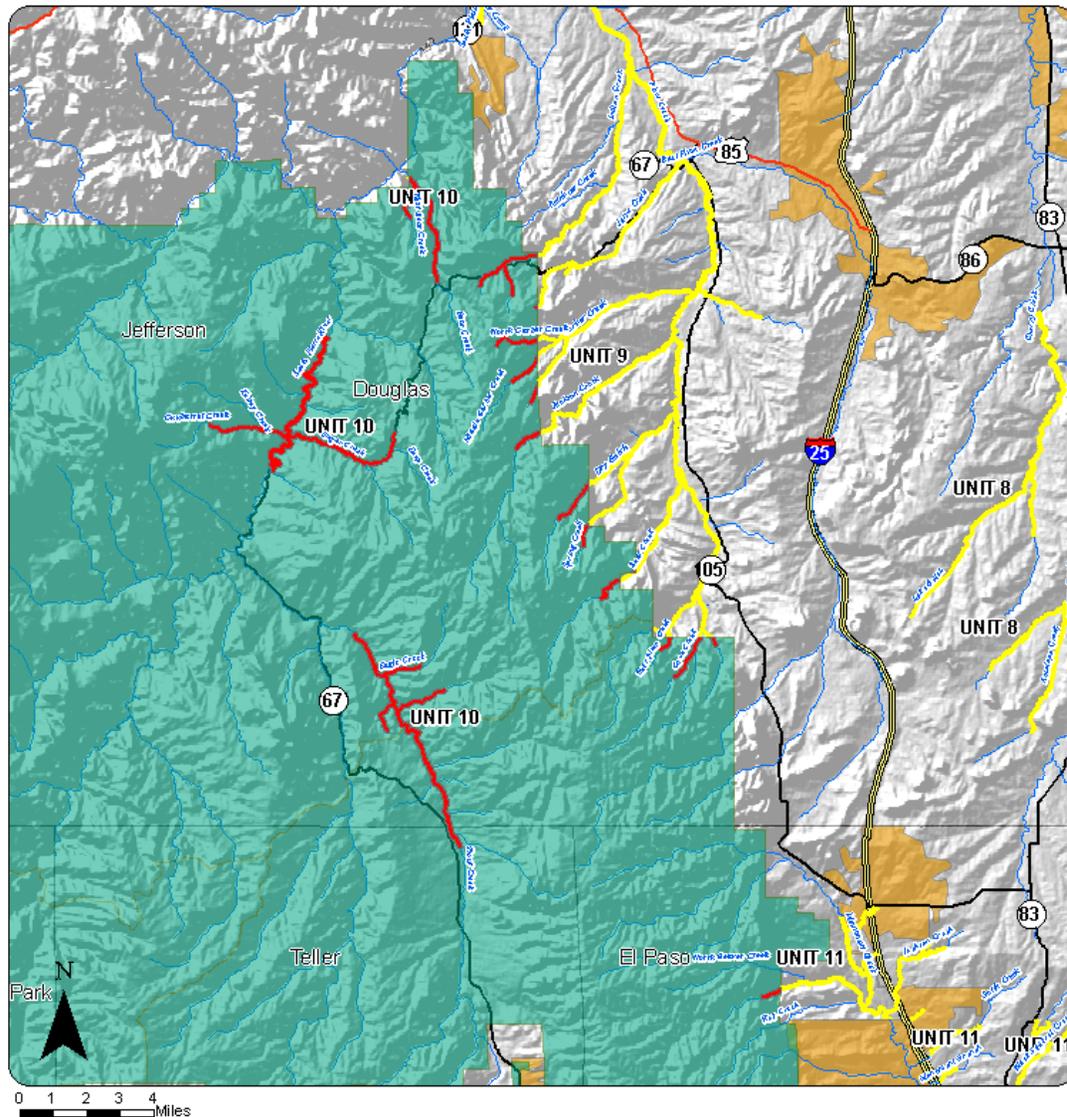
Study Area



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

IEC Map Projection: UTM Zone 13N
 Geodetic Reference System: NAD 1983
INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT 6-3 MAP OF PIKE & SAN ISABEL NATIONAL FORESTS AND PROPOSED REVISED CRITICAL HABITAT (UNITS 9, 10, AND 11)

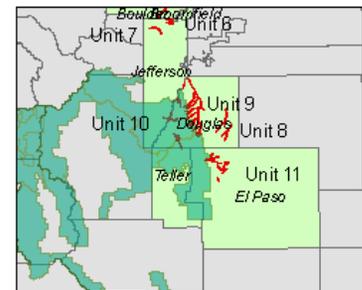


**Pike & San Isabel
National Forests**
 Units 9 - West Plum Creek
 Unit 10 - Upper South Platte River
 Unit 11 - Monument Creek

Legend

- Proposed Critical Habitat
- Proposed Critical Habitat in NF
- Pike & San Isabel N'tl Forests
- Rivers & Streams
- Urban Areas
- Interstate Highways
- U.S. Highways
- State Highways

Study Area



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

IEC Map Projection: UTM Zone 13N
 Geodetic Reference System: NAD 1983
INDUSTRIAL ECONOMICS, INCORPORATED

6.2 IMPACTED ACTIVITIES

155. Each national forest is governed by a management plan, in accordance with the National Forest Management Act.¹⁰² These plans are generally revised every 10 to 15 years, though the USFS may make revisions or amendments on an as needed basis. Such revisions require section 7 consultation with the Service.
156. These plans contain general guidelines to avoid or minimize harm to endangered and threatened species and their habitats. However, on a project-by-project basis, these guidelines are not sufficient to address the potential impacts to the species and habitat affected, especially in critical habitat areas.¹⁰³ As a result, the USFS participates in section 7 consultations with the Service to assess these impacts and, if warranted, specify measures or project design criteria. These measures and criteria are selected to mitigate impacts to or protect particular species and habitats, such as surveying for occupancy, prohibiting the removal of vegetation, and avoiding the construction of new recreational facilities and trails near or within habitat. These activities or projects are described below.
157. Fire management is a responsibility of the USFS. Fire management activities fall into several categories, including emergency suppression in response to wildfires, fuels reduction and fire prevention (e.g., tree thinning and prescribed burning), and restoration from wildfires. While emergency fire suppression activities are subject to emergency consultation rules (consultations are deferred until fire is controlled), prescribed burning and fire restoration activities in proposed critical habitat areas are subject to section 7 consultations with the Service.
158. The USFS allows access to its lands for public recreation. Activities to support recreation on national forest lands include recreation management, campground construction and maintenance, restroom facility maintenance, and trail construction and maintenance. SUPs are required for commercial recreational activities, and the USFS is required to consult with the Service on each SUP application for activities conducted within or affecting critical habitat. SUPs are also required for the construction of new structures on national forest lands such as towers and pipeline to support electrical, water, and telecommunications systems.
159. The Arapaho & Roosevelt National Forests is in the midst of a major infestation by the mountain pine beetle, which inflicts serious damage on trees.¹⁰⁴ The USFS is planning to implement a campaign to address the safety issues relating to damaged trees (e.g., cutting down hazardous dead trees), which will require a section 7 consultation with the Service.
160. Finally, the USFS allows managed livestock grazing in the forests, as long as it is consistent with the resource objectives and environmental constraints specified in the

¹⁰² USDA Forest Service. Arapaho & Roosevelt National Forests and Pawnee National Grassland, "Forest Planning". July 31, 2008. Accessed on December 28, 2009 at <http://www.fs.fed.us/r2/arnf/projects/forest-planning/index.shtml>.

¹⁰³ Personal communication, L. Diebel, USFS Arapaho & Roosevelt, December 11, 2009.

¹⁰⁴ Personal communication, L. Diebel, USFS Arapaho & Roosevelt, December 11, 2009. Personal communication, L. Ellwood, USFWS, March 2, 2010.

forest management plans. The Arapaho & Roosevelt National Forests issues grazing allotments to private ranchers and entities for areas within proposed critical habitat, an activity that is subject to section 7 consultation with the Service.

6.2.1 SECTION 7 CONSULTATION HISTORY

161. The Service has conducted 15 informal and seven formal consultations for activities undertaken in these two national forests since the 2003 critical habitat designation.¹⁰⁵ Exhibit 6-4 summarizes the projects or activities that were subjected to formal consultation and the project modifications that the Service required.

EXHIBIT 6-4 SUMMARY OF USFS LANDS MANAGEMENT ACTIVITIES SUBJECTED TO FORMAL CONSULTATIONS FOR THE PMJM

PROJECT / ACTIVITY (YEAR)	PROJECT SIZE AND IMPACTS	REQUIRED PROJECT MODIFICATIONS
Cache la Poudre Prescribed Fire Project, Arapaho & Roosevelt National Forests (2003)	3,600 acres over three to five years, 564 acres of PMJM habitat. Temporary loss of 197.5 acres of PMJM habitat.	<ul style="list-style-type: none"> • Burning during hibernation period. • On-ground surveys to assess recovery of natural vegetation.
Douglas-fir Tussock Moth Prescribed Burn, Arapaho & Roosevelt National Forests (2005)	1,413 acres 471 acres of PMJM habitat (of which 101 acres are PMJM critical habitat).	<ul style="list-style-type: none"> • Utilize existing roads and trails for firelines. • Limit activities to hibernation period. • Establish black line uphill from PMJM critical habitat. • Extinguish hotspots within PMJM critical habitat as soon as possible. • Monitor recovery of burned PMJM habitat. • Treat noxious weeds as necessary.
Lefthand Canyon Off-Highway Vehicle Area Travel Management Plan, Arapaho & Roosevelt National Forests (2005)	2,544 acres Permanent loss of 0.04 acres of PMJM habitat, but offset by restoration of 2.2 acres and closure of 22.4 miles of trails and roads.	<ul style="list-style-type: none"> • Monitor to determine adherence to design criteria and conservation criteria. • Locate equipment staging areas outside of PMJM potential habitat. • Improve, reroute, or harden crossings into streams, wetlands, and riparian areas. • Minimize impacts resulting from recreational use (signage, maps, traffic control devices). • Restore impacts from motorized use. • Restore at least 2.2 acres of potential PMJM habitat. • Monitor restored areas and take corrective action if necessary.

¹⁰⁵ U.S. Fish and Wildlife Service, biological opinions issued for formal section 7 consultations conducted for projects affecting the PMJM and its habitat, January 2003 through June 2009.

PROJECT / ACTIVITY (YEAR)	PROJECT SIZE AND IMPACTS	REQUIRED PROJECT MODIFICATIONS
Silver Dollar Lake Reservoir Project (reconstruction of outlet works), Arapaho & Roosevelt National Forests (2008)	Determined not likely to adversely affect the PMJM.	n/a
Rampart Range Travel Management Plan, Pike & San Isabel National Forests (2005)	91,000 acres. 18,778 acres of PMJM habitat (of which 1,796 acres are PMJM critical habitat). Loss of 6.4 acres of PMJM habitat, but offset by restoration of 24 acres.	<ul style="list-style-type: none"> • Restore 24 acres of PMJM habitat. • Conduct habitat assessment prior to ground disturbing activity. • Avoid PMJM habitat in all trail relocations and site improvements. • Conduct activities between breeding and hibernation seasons. • Design trail construction and removal activities to reduce impacts in riparian habitats. • Locate equipment staging areas outside PMJM habitat. • Keep work areas clean of trash. • Decommission, revegetate, and monitor closed routes in PMJM upland and riparian habitat.
Buffalo Creek Mountain Bike Trail Project Phase II, Pike & San Isabel National Forests (2007)	0.5 mile of mountain bike and hiking trail. 500 feet of the trail are within PMJM habitat (0.026 acres).	<ul style="list-style-type: none"> • Construction outside of PMJM active season. • Design trail construction activities to reduce adverse impacts in riparian habitats. • Restore and monitor 3,000 square feet of degraded PMJM habitat. • Conduct habitat assessment prior to ground disturbing activity. • Locate equipment staging areas outside PMJM habitat. • Keep work areas clean of trash.
Phase II of the Upper South Platte Watershed Restoration and Protection Project, Pike & San Isabel National Forests (2009)	Vegetation treatments, including forest thinning, creating openings, tree removal, and prescribed burning on up to 17,000 acres. 1,780 acres of PMJM habitat, of which 39 acres are PMJM critical habitat.	<ul style="list-style-type: none"> • Conduct activities during hibernation period. • Restrict vehicles away from riparian areas. • Limit prescribed burning to 1,780 acres of PMJM upland habitat and 20 acres of PMJM riparian habitat. • Protect vegetation from tree felling. • Minimize impacts to shrubs in upland areas. • Minimize impacts to riparian vegetation. • Minimize disturbances and impacts from drainage crossings by vehicles. • Limit willow cuttings in PMJM habitat.
Source: U.S. Fish and Wildlife Service, biological opinions issued for formal section 7 consultations conducted for projects affecting the PMJM and its habitat, January 2003 through June 2009.		

6.3 ESTIMATING IMPACTS TO USFS LANDS MANAGEMENT

162. The USFS generally tries to avoid activities that would impact the PMJM or its habitat, including avoidance of activities in, and impacts to, riparian areas. Nonetheless, as evidenced by the consultation history, in the future the USFS will likely undertake activities within the proposed revised designated habitat that will require section 7 consultation with the Service and, potentially, protective measures above and beyond those guidelines prescribed in forest management plans. Because of limited information and data with which to identify and estimate the future incremental costs due to the designation, the methodology described in Chapter 2 is followed to estimate: 1) that proportion of the total forecast consultation and project modification costs which results entirely from the critical habitat designation, and 2) the proportion of the remaining costs that reflects the additional effort to address adverse modification in new consultations. Expected impacts to USFS lands management include costs for administrative consultations and required modifications to project scope or design. The methods and assumptions used for estimating these impacts and the results are presented below.

6.3.1 SECTION 7 CONSULTATION COSTS

163. The Service could not specify a specific timeline or frequency for conducting the activities described in the previous section. Based on the consultation history and rough estimates provided by the USFS, this analysis therefore assumes a total of three informal and one formal section 7 consultations would be conducted for both forests annually.¹⁰⁶ The estimated number of consultations is then multiplied by the per-consultation unit costs presented in Exhibit 2-3. Exhibit 6-5 presents the estimated total number and costs of future consultations by unit for the 20-year period of the analysis (2010 – 2029).

6.3.2 PROJECT MODIFICATIONS

164. The USFS does not anticipate significant project modification costs above and beyond those already incurred without the critical habitat designation.¹⁰⁷ However, the USFS does indicate that project modification costs due to the designation would include the additional costs to conduct surveys to assess habitat and develop project design criteria to specifically mitigate impacts to or protect PMJM habitat. The USFS could not monetize these incremental costs for use in this analysis.

¹⁰⁶ Personal communication, L. Ellwood, USFWS, March 4, 2010. This analysis assigns costs for technical assistance to activities and units after all other activity costs are estimated and assembled (see Appendix D).

¹⁰⁷ Personal communication, L. Diebel, USFS Arapaho & Roosevelt, December 11, 2009.

**EXHIBIT 6-5 ESTIMATED NUMBER AND COSTS OF ADMINISTRATIVE CONSULTATIONS FOR
USFS LANDS MANAGEMENT-RELATED PROJECTS, BY UNIT (2010 - 2029)**

UNIT	INFORMAL CONSULTATIONS		FORMAL CONSULTATIONS		TOTAL CONSULTATIONS	
	NUMBER	UNDISCOUNTED COST	NUMBER	UNDISCOUNTED COST	NUMBER	UNDISCOUNTED COST
1. N. Fork, Cache la Poudre River	9.6	\$91,000	3.2	\$63,900	12.8	\$155,000
2. Cache la Poudre River	19.1	\$181,000	6.4	\$127,000	25.4	\$308,000
3. Buckhorn Creek	12.1	\$115,000	4.0	\$80,800	16.2	\$196,000
4. Cedar Creek	2.5	\$23,600	0.8	\$16,600	3.3	\$40,100
9. West Plum Creek	4.8	\$45,400	1.6	\$31,900	6.4	\$77,300
10. Upper South Platte River	11.7	\$111,000	3.9	\$78,200	15.6	\$190,000
11. Monument Creek	0.2	\$2,310	0.1	\$1,620	0.3	\$3,920
Total	60	\$570,000	20	\$400,000	80	\$970,000
Notes: Number and cost of consultations apportioned to units based on the proportion of each unit's critical habitat area to the total critical habitat area proposed in the forests. Does not include technical assistance costs. Totals may not sum due to rounding.						

6.4 ESTIMATING INCREMENTAL IMPACTS TO USFS LANDS MANAGEMENT

165. As previously described, the methodology described in Chapter 2 is followed to estimate: 1) that proportion of the total forecast consultation costs which results entirely from the critical habitat designation, and 2) the proportion of the remaining costs that reflects the additional effort to address adverse modification in new consultations. Exhibit 6-6 presents the total consultation costs. Exhibits 6-7 and 6-8 present the calculated incremental costs, without and with technical assistance costs, respectively.

EXHIBIT 6-6 POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS TO USFS LANDS MANAGEMENT, BY UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	\$155,000	\$87,800	\$8,290	\$155,000	\$87,800	\$8,290
2. Cache la Poudre River	\$308,000	\$175,000	\$16,500	\$308,000	\$175,000	\$16,500
3. Buckhorn Creek	\$196,000	\$111,000	\$10,500	\$196,000	\$111,000	\$10,500
4. Cedar Creek	\$40,100	\$22,800	\$2,150	\$40,100	\$22,800	\$2,150
9. West Plum Creek	\$77,300	\$43,800	\$4,130	\$77,300	\$43,800	\$4,130
10. Upper South Platte River	\$190,000	\$107,000	\$10,100	\$190,000	\$107,000	\$10,100
11. Monument Creek	\$3,920	\$2,220	\$210	\$3,920	\$2,220	\$210
Total		\$550,000	\$51,900		\$550,000	\$51,900

Notes: Does not include technical assistance costs. Totals may not sum due to rounding.

EXHIBIT 6-7 POST-DESIGNATION INCREMENTAL IMPACTS TO USFS LANDS MANAGEMENT, WITHOUT TECHNICAL ASSISTANCE COSTS, BY UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	\$39,400	\$22,300	\$2,110	\$39,400	\$22,300	\$2,110
2. Cache la Poudre River	\$115,000	\$65,400	\$6,170	\$115,000	\$65,400	\$6,170
3. Buckhorn Creek	\$75,200	\$42,600	\$4,020	\$75,200	\$42,600	\$4,020
4. Cedar Creek	\$16,000	\$9,050	\$854	\$16,000	\$9,050	\$854
9. West Plum Creek	\$24,800	\$14,000	\$1,320	\$24,800	\$14,000	\$1,320
10. Upper South Platte River	\$70,600	\$40,000	\$3,780	\$70,600	\$40,000	\$3,780
11. Monument Creek	\$1,240	\$702	\$66	\$1,240	\$702	\$66
Total		\$194,000	\$18,300		\$194,000	\$18,300

Notes: Does not include technical assistance costs. Totals may not sum due to rounding.

EXHIBIT 6-8 POST-DESIGNATION INCREMENTAL IMPACTS TO USFS LANDS MANAGEMENT, WITH TECHNICAL ASSISTANCE COSTS, BY UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River		\$47,600	\$4,490		\$47,600	\$4,490
2. Cache la Poudre River		\$139,000	\$13,100		\$139,000	\$13,100
3. Buckhorn Creek		\$90,700	\$8,560		\$90,700	\$8,560
4. Cedar Creek		\$19,300	\$1,820		\$19,300	\$1,820
9. West Plum Creek		\$29,900	\$2,820		\$29,900	\$2,820
10. Upper South Platte River		\$85,200	\$8,040		\$85,200	\$8,040
11. Monument Creek		\$1,490	\$141		\$1,490	\$141
Total		\$413,000	\$39,000		\$413,000	\$39,000
Notes: This analysis assigns technical assistance costs (on a present value basis) to activities and units after all other activity costs are estimated and assembled (see Appendix D). Totals may not sum due to rounding.						

166. As shown in Exhibit 6-6, the total forecast administrative costs associated with the PMJM for activities at the national forests are estimated to be about \$550,000, including both forecast baseline costs (i.e., associated with the listing of the species) incurred within critical habitat, and forecast incremental (added) costs incurred due to the additional administrative requirements associated with the designation of critical habitat. As discussed above, forecast costs associated with project modifications are not estimated in this analysis. As shown in Exhibit 6-8, forecast incremental costs of designating critical habitat are estimated to be \$413,000. The incremental costs are higher for Units 2, 3, and 10 because they contain a greater area of proposed revised critical habitat.

CHAPTER 7 | ROCKY FLATS

167. This chapter considers potential economic impacts to activities occurring within the proposed revised critical habitat (Unit 6) at Rocky Flats. Rocky Flats is comprised of two distinct areas: 1) the Central Operating Unit (COU), which is the former nuclear industry facility currently operated and managed by the U.S. Department of Energy (DOE) Office of Legacy Management, and 2) the surrounding Rocky Flats National Wildlife Refuge (NWR), which is managed by the Service. Some protection of the PMJM and its habitat is already provided by the Rocky Flats NWR Comprehensive Conservation Plan, which outlines the management direction and strategies for NWR operations, habitat restoration, and visitor services. In addition, a previous Programmatic Biological Assessment (PBA) between DOE and the Service also set aside 941 acres for PMJM protection.¹⁰⁸ Forecast incremental impacts from critical habitat designation are associated with addressing adverse modification in section 7 consultations (i.e., administrative in nature) as well as implementing project modifications to mitigate impacts to and restore and enhance PMJM habitat. These impacts are summarized in Exhibit 7-1 and discussed in detail below.

**EXHIBIT 7-1 SUMMARY OF IMPACTS TO ROCKY FLATS, BY UNIT
(2009 DOLLARS, ASSUMING A SEVEN PERCENT DISCOUNT RATE)**

UNIT	PRESENT VALUE IMPACTS
Incremental Impacts (2010 - 2029)	
6. Rocky Flats NWR	\$78,200
Total	\$78,200
Notes: Totals may not sum due to rounding.	

7.1 BACKGROUND INFORMATION

168. As shown in Exhibit 7-2, Rocky Flats is located in Jefferson County and covers approximately 6,200 acres. Rocky Flats NWR encompasses approximately 4,000 acres of undeveloped buffer zone around the DOE's COU (1,300 acres).¹⁰⁹ In addition to the COU, DOE owns and manages other parcels located in the northwest part of Rocky Flats

¹⁰⁸ Public comment letter submitted by DOE Office of Legacy Management. Available at <http://www.regulations.gov>, docket number FWS-R6-ES-2009-0013.

¹⁰⁹ Proposed Rule, 74 FR 52087.

(950 acres total), which will be transferred to the Rocky Flats NWR when private mineral rights are obtained.¹¹⁰

169. The DOE operated a nuclear industrial facility at Rocky Flats between 1951 and the end of the Cold War. Buildings and other structures at the site have been decommissioned and demolished, and the disturbed areas have been or are undergoing restoration. A programmatic section 7 consultation on cleanup activities was completed by the Service in 2004. This consultation addressed removal of manmade structures in and adjacent to PMJM habitat. In 2005, the 4,000 acre buffer area around the COU was transferred to the Service to become part of the National Wildlife Refuge System.¹¹¹
170. As shown in Exhibit 7-2, Unit 6 of the proposed revised critical habitat designation encompasses approximately 1,108 acres on 13 miles of streams, all of which are Federal lands within either the Rocky Flats NWR or the remaining lands managed by DOE.
171. The Service indicates that the following activities on the Rocky Flats NWR may be impacted by the proposed revised critical habitat designation: invasive weed control, culvert crossing removals, gravel road removal, and recreational trail construction and maintenance.¹¹² Because invasive weeds are well-established throughout the Rocky Flats NWR, the Service places priority on implementing an extensive control program (over 4,000 acres) as soon as funding is obtained, which is expected around the year 2012.¹¹³ The Service could not specify a timeline for conducting the remaining activities.
172. DOE currently engages in section 7 consultations with the Service on activities not covered in their 2004 programmatic consultation. DOE anticipates that the proposed revised critical habitat designation will impact future activities involving maintenance of groundwater treatment system components, which will require the use of heavy, ground-disturbing equipment.¹¹⁴

¹¹⁰ U.S. DOE Office of Legacy Management. "Rocky Flats Site, Colorado Fact Sheet." Accessed on March 3, 2010 at http://www.lm.doe.gov/rocky_flats/Sites.aspx.

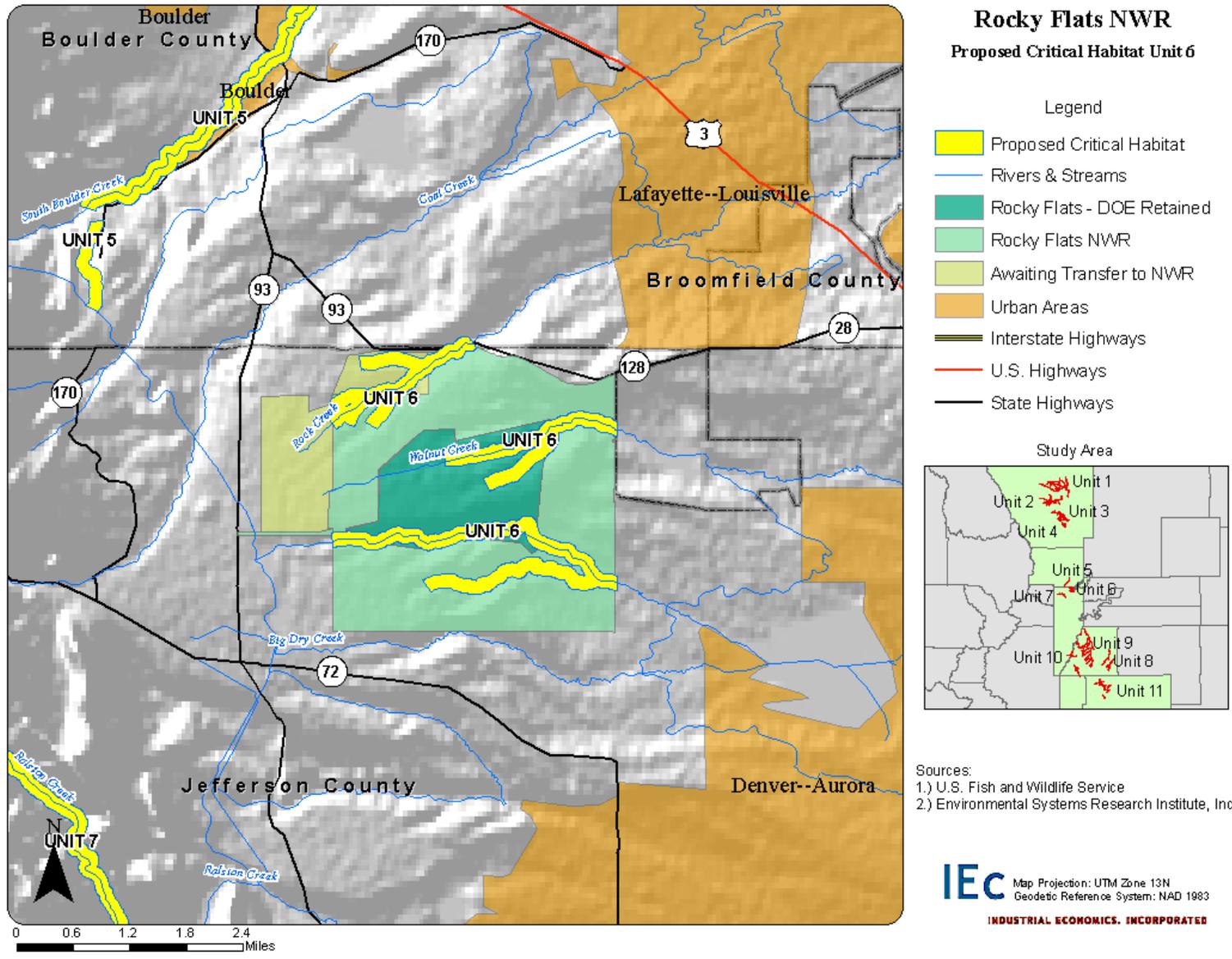
¹¹¹ According to the Service, DOE continues to conduct cleanup operations and monitoring and revegetation activities in the central industrial facility (Personal communication, S. Berendzen and B. Hastings, USFWS, January 5, 2010).

¹¹² Personal communication, S. Berendzen and B. Hastings, USFWS, January 5, 2010.

¹¹³ The Service indicates that the exemption for noxious weed control activities allowed by special rules issued in 2002 and 2004 (67 FR 61531 and 69 FR 29101) applies only to those activities conducted without a Federal nexus (Personal communication, P. Plage, USFWS, January 5, 2010).

¹¹⁴ Public comment letter submitted by DOE Office of Legacy Management. Available at <http://www.regulations.gov>, docket number FWS-R6-ES-2009-0013.

EXHIBIT 7-2 MAP OF ROCKY FLATS AND PROPOSED REVISED CRITICAL HABITAT (UNIT 6)



173. Another potential activity that may be impacted by the proposed revised critical habitat designation is the planned expansion of the Northwest Parkway to complete the outer C-470 beltway for metropolitan Denver.¹¹⁵ This proposed project would connect the communities of Broomfield and Golden with a 15-mile toll road, portions of which may run adjacent to or within the eastern boundary of the Rocky Flats NWR and therefore impact proposed critical habitat. However, because the refuge's involvement is unknown at this time (e.g., the refuge may either sell or lease land for the project), this analysis estimates the incremental impacts of this project in Chapter 4 as part of road/bridge construction activities forecasted in the study area.

7.2 ESTIMATING IMPACTS TO ROCKY FLATS

174. Because of limited information and data with which to identify and estimate the forecast incremental costs due to the designation, the methodology described in Chapter 2 is followed to estimate: 1) that proportion of the total forecast consultation and project modification costs which results entirely from the critical habitat designation, and 2) the proportion of the remaining costs that reflects the additional effort to address adverse modification in new consultations. Expected impacts to Rocky Flats operations and development include costs for administrative consultations and required modifications to project scope or design. The methods and assumptions used for estimating these impacts and the results are presented below.

7.2.1 SECTION 7 CONSULTATION COSTS

175. Based on the Service's estimates, this analysis assumes a formal section 7 consultation for the planned weed control program would be conducted in 2012 and an informal section 7 consultation would be conducted every other year starting in the year 2012 for the other Rocky Flats NWR activities described above.¹¹⁶ For DOE activities, this analysis assumes that one new programmatic consultation will be initiated in 2010 to cover all recurring maintenance activities within critical habitat.¹¹⁷ The estimated number of consultations is then multiplied by the per-consultation unit costs presented in Exhibit 2-3. Exhibit 7-3 presents the estimated total number and costs of future consultations by unit for the 20-year period of the analysis (2010 – 2029).

¹¹⁵ Personal communication, P. Plage, USFWS, February 25 and March 2, 2010.

¹¹⁶ Personal communication, S. Berendzen, USFWS, March 3, 2010. This analysis assigns costs for technical assistance to activities and units after all other activity costs are estimated and assembled (see Appendix D).

¹¹⁷ Personal communication with Jody Nelson, DOE Office of Legacy Management, March 16, 2010.

EXHIBIT 7-3 ESTIMATED NUMBER AND COSTS OF ADMINISTRATIVE CONSULTATIONS FOR ROCKY FLATS PROJECT ACTIVITY, BY UNIT (2010 - 2029)

UNIT	INFORMAL CONSULTATIONS		FORMAL CONSULTATIONS		PROGRAMMATIC CONSULTATIONS		TOTAL CONSULTATIONS	
	NUMBER	UNDISCOUNTED COST	NUMBER	UNDISCOUNTED COST	NUMBER	UNDISCOUNTED COST	NUMBER	UNDISCOUNTED COST
6. Rocky Flats NWR	9	\$85,500	1	\$20,000	1	\$35,700	11	\$141,000
Total	9	\$85,500	1	\$20,000	1	\$35,700	11	\$141,000

Notes: Does not include technical assistance costs. Totals may not sum due to rounding

7.2.2 PROJECT MODIFICATIONS

176. Future project modification costs may include mitigation (i.e., setting aside conservation lands on- and off-site), and other activities to restore, enhance, and monitor PMJM habitat. However, the Service and DOE are unable, at this time, to estimate these costs.

7.3 ESTIMATING INCREMENTAL IMPACTS TO ROCKY FLATS

177. As previously described, the methodology described in Chapter 2 is followed to estimate: 1) that proportion of the total forecast consultation costs which results entirely from the critical habitat designation, and 2) the proportion of the remaining costs that reflects the additional effort to address adverse modification in new consultations.¹¹⁸ Exhibit 7-4 presents the total consultation costs. Exhibits 7-5 and 7-6 present the calculated incremental costs, without and with technical assistance costs, respectively.

EXHIBIT 7-4 POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS TO ROCKY FLATS, BY UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	NO. OF PROJECTS	LOW ESTIMATE			HIGH ESTIMATE		
		UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
6. Rocky Flats NWR	11	\$141,000	\$99,300	\$9,380	\$141,000	\$99,300	\$9,380
Total	11		\$99,300	\$9,380		\$99,300	\$9,380

Notes: Does not include technical assistance costs. Totals may not sum due to rounding.

¹¹⁸ This methodology, however, is not applied to the formal consultation costs anticipated in 2012 for the Rocky Flats NWR's planned weed control program or the programmatic consultation costs anticipated in 2010 for DOE's maintenance activities. Because these programs will encompass most of the Rocky Flats, including proposed critical habitat for the PMJM, the costs of addressing adverse modification in these consultations (\$5,000 and \$8,910, respectively) are estimated separately and considered incremental.

EXHIBIT 7-5 POST-DESIGNATION INCREMENTAL IMPACTS TO ROCKY FLATS, WITHOUT TECHNICAL ASSISTANCE COSTS, BY UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
6. Rocky Flats NWR	\$68,300	\$49,300	\$4,650	\$68,300	\$49,300	\$4,650
Total		\$49,300	\$4,650		\$49,300	\$4,650

Notes: Does not include technical assistance costs. Totals may not sum due to rounding.

EXHIBIT 7-6 POST-DESIGNATION INCREMENTAL IMPACTS TO ROCKY FLATS, WITH TECHNICAL ASSISTANCE COSTS, BY UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
6. Rocky Flats NWR		\$78,200	\$7,380		\$78,200	\$7,380
Total		\$78,200	\$7,380		\$78,200	\$7,380

Notes: This analysis assigns technical assistance costs (on a present value basis) to activities and units after all other activity costs are estimated and assembled (see Appendix D). Totals may not sum due to rounding.

178. As shown in Exhibit 7-4, the total forecast costs of administrative requirements due to the PMJM at Rocky Flats are estimated to be about \$99,300, including both forecast baseline costs (i.e., associated with the listing of the species), and forecast incremental (added) costs incurred due to the additional administrative requirements associated with the designation of critical habitat. As shown in Exhibit 7-6, this analysis estimates the incremental costs of designating critical habitat to be approximately \$78,200.
179. Another incremental impact of the proposed revised critical habitat designation is the requirement for mitigation to occur within (and not outside) the unit being impacts. DOE expects that the designation of critical habitat will limit the amount of in-unit land available for mitigation. Proposed critical habitat in portions of the Walnut Creek drainage overlaps with areas that DOE formerly set aside for future mitigation to meet requirements outlined in the 2004 programmatic consultation.¹¹⁹ Designation of critical habitat will decrease the amount of land available for mitigation to DOE by

¹¹⁹ Personal communication with Jody Nelson, DOE LM, March 16, 2010.

approximately 390 acres, the total amount of the proposed designation that occurs on DOE-held land.

CHAPTER 8 | GRAVEL MINING

180. The economic analyses prepared in support of the 2002 proposed critical habitat rule discussed the possibility of four gravel mining operations in Colorado that may be affected by critical habitat.¹²⁰ Gravel mining operations can require section 404 permits from the USACE, and, during the life of a gravel mining operation, a permit amendment may be required. Of these four operations, the analyses forecasted and estimated the cost for one formal consultation associated with Lafarge West Incorporated's Bluestone aggregate production operation in Unit 6 (Rocky Flats NWR). In addition, the analyses discussed potential impacts for delay, increased aggregate prices, increased aggregate production costs, and lost opportunity costs but did not quantify them due to limited information and data. Beyond this one operation, the analyses did not forecast and estimate additional gravel mining consultations because of limited information and data.
181. Review of the Service's administrative record since the 2003 critical habitat designation shows that one formal consultation was conducted for gravel mining operations.¹²¹ In August 2003, the Service issued a formal biological opinion for a gravel mine operation (Western Equipment) located in Weld County, Colorado. The operation required issuance of a section 404 permit from the USACE. The operation would disturb 25 acres of PMJM habitat, which had not been designated as critical habitat. The Service recognized a number of conservation measures already included as part of the project that would benefit the PMJM, including the enhancement and preservation of 42 acres of habitat, culvert installation to allow PMJM dispersal, and weed control. The Service issued a number of terms and conditions to minimize impacts of incidental take of the PMJM, including restoration of temporary impacts, prohibiting construction or mining at night during the active season, monitoring of habitat restoration and enhancement efforts, and protective fencing.
182. With respect to the 2009 Proposed Rule, however, no information or data exists to characterize or estimate the number of gravel mining operations potentially affected or the associated impacts. The Service believes that there is little gravel mining activity that occurs within the proposed critical habitat designation.¹²² If such activity occurs, the incremental impacts would likely consist of additional administrative consultation and

¹²⁰ Industrial Economics, Inc., "Draft Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," January 2003, and "Addendum to Economic Analysis of Critical Habitat Designation for the Preble's Meadow Jumping Mouse," June 3, 2003.

¹²¹ U.S. Fish and Wildlife Service, Biological opinion issued to USACE regarding Mr. Bob Condon/Western Equipment, August 25, 2003.

¹²² Personal communication, P. Plage, USFWS, February 1, 2010.

project modification costs for gravel mining operations located in areas within critical habitat but outside of areas where potential impacts to the PMJM and its habitat are currently being addressed without the designation. However, given the lack of information and data, these impacts cannot be quantified and are not included in this analysis.

CHAPTER 9 | ECONOMIC BENEFITS

183. Characterization of the potential economic benefits of critical habitat designation for the PMJM provides context to the cost analyses presented in the preceding chapters. This chapter first describes the categories of economic benefit that may derive from the conservation of species and habitats, and discusses the research methods that economists employ to quantify these benefits. Next, this chapter summarizes the PMJM conservation efforts described in Chapters 3 through 8 of this report and links them with potential categories of economic benefit that may derive from their implementation. This chapter does not, however, attempt to quantify the potential baseline and incremental benefits described.

9.1 CATEGORIES OF BENEFIT RELATING TO SPECIES AND HABITAT CONSERVATION

184. The primary goal of listing a species is to conserve and recover the species and its habitat (as with critical habitat). Various economic benefits, measured in terms of social welfare or regional economic performance, may also result from species and habitat conservation. The benefits of species and habitat conservation can be placed into two broad categories: (1) those associated with the primary goal of species conservation, and (2) those that derive from the habitat conservation efforts to achieve this primary goal.
185. Because a purpose of the Act is to provide for the conservation of endangered and threatened species, the benefits of actions taken under the Act are often measured in terms of the value placed by the public on species preservation (e.g., avoidance of extinction, and/or increase in a species' population). Such social welfare values for a species may reflect both use and non-use values for the species and habitat. Use values derive from a direct use for a species, such as recreational wildlife-viewing opportunities. Non-use values are not derived from direct use of the species, but instead reflect the utility the public derives from knowledge that a species continues to exist (e.g., existence or bequest values).
186. As a result of actions taken to preserve endangered and threatened species, such as habitat management, various other benefits may accrue to the public. Conservation efforts for species and habitat may result in improved environmental quality, which in turn may have collateral human health or recreational use benefits. In addition, conservation efforts undertaken for the benefit of a threatened or endangered species may enhance shared habitat for other wildlife. Such benefits may be a direct result of modifications to projects, or may be collateral to such actions. For example, a section 7 consultation may result in the conservation of buffer strips along streams, in order to reduce sedimentation due to construction activities. A reduction in sediment load may directly benefit water

quality, while the presence of buffer strips may also provide the collateral benefits of preserving habitat for terrestrial species and enhancing nearby residential property values (e.g., preservation of open space).

187. Economists apply a variety of methodological approaches in estimating both use and non-use values for species and for habitat improvements, including stated preference and revealed preference methods. Stated preference techniques include the contingent valuation method and conjoint analysis or contingent ranking methods. In simplest terms, these methods employ survey techniques, asking respondents to state what they would be willing to pay for a resource or for programs designed to protect that resource. A substantial literature has developed that describes the application of this technique to the valuation of natural resource assets.
188. More specific to use values for species or habitats, revealed preference techniques examine individuals' behavior in markets in response to changes in environmental or other amenities, i.e., people "reveal" their value by their behavior. For example, travel cost models are frequently applied to value access to recreational opportunities, as well as to value changes in the quality and characteristics of these opportunities. Basic travel cost models are rooted in the idea that the value of a recreation resource can be estimated by analyzing the travel and time costs incurred by individuals visiting the site. Another revealed preference technique is hedonic analysis, which is often employed to determine the effect of specific site characteristics on property values.

9.2 POTENTIAL BENEFITS OF PMJM CONSERVATION

189. This section describes the categories of benefits that might result from PMJM conservation efforts within the study area. Exhibit 9-1 summarizes potential benefits associated with the specific PMJM conservation efforts described in Chapters 3 through 8 of this report. The first column summarizes PMJM conservation efforts by land use activity. The second column identifies potential categories of benefits that may derive from implementation of these conservation efforts. A description of these categories of benefit is provided below. The final columns of the exhibit identify the units in which baseline or incremental benefits may occur. Whether the benefits deriving from the conservation efforts are baseline or incremental depends on the reason for implementing the effort, as described for each activity and unit in Chapters 3 through 8 of this report.
190. The categories of economic benefit that may derive from the PMJM conservation efforts described in this report include:
- **Property value benefits:** Open space or decreased density of development resulting from PMJM conservation may increase adjacent or nearby property values.
 - **Improved water quality:** Limiting or redistributing development, as well as managing economic activities that occur adjacent to riparian and aquatic habitats (e.g., agriculture, construction, and recreation) may improve water quality. Water quality improvements may in turn have human health and human use (e.g.,

recreation) benefits. Critical habitat for the PMJM includes riparian and aquatic areas. In the case where conservation efforts occur in areas well upland, these benefits are unlikely to be realized. Available data did not indicate the exact location of the conservation efforts.

- **Aesthetic benefits:** Social welfare gains may be associated with enhanced aesthetic quality of habitat. For example, aesthetic improvements may result in increased willingness-to-pay to visit a habitat region for recreation, or increased visitation to that region.
- **Recreation benefits:** Protecting critical habitat for the PMJM may result in preservation of habitat suitable for recreational uses, such as hiking, horseback riding, picnicking, and bird-watching. Project modifications involving the purchase of mitigation lands by residential developers may result in the preservation of areas to be designated as parks or preserves for both species conservation and public enjoyment.
- **Regional economic benefits:** To the extent that increased open space, aesthetic benefits, or improved water quality lead to an increase in visitation to the region (e.g., for recreation such as hiking or wildlife-viewing), the economy and employment may benefit from increased regional spending.
- **Educational benefits:** Surveying of project areas for the PMJM confers educational benefits in that more is known about the species and where populations exist. This knowledge could help direct future conservation efforts.

191. In addition to these categories of potential benefit, all of the conservation efforts described in Exhibit 9-1 are related to the broader conservation and recovery of the species. For example, monitoring and surveying for the species is undertaken to better understand the effects of projects on species, and therefore inform the avoidance or minimization of those effects. All conservation efforts, therefore, relate to the maintenance or enhancement of the use (e.g., wildlife viewing) and non-use value (e.g., existence value) that the public may hold specifically for the PMJM. Further, many of the conservation efforts undertaken for the PMJM may also result in improvements to ecosystem health that are shared by other, coexisting species. The maintenance or enhancement of use and non-use values for these other species, or for biodiversity in general, may also result from these PMJM conservation efforts.

EXHIBIT 9-1 PMJM CONSERVATION EFFORTS AND POTENTIAL ASSOCIATED BENEFITS

CONSERVATION EFFORT	POTENTIAL ASSOCIATED ADDITIONAL BENEFITS	UNITS APPLIED	
		BASELINE BENEFIT	INCREMENTAL BENEFIT
RESIDENTIAL AND COMMERCIAL DEVELOPMENT			
Restrict grazing and mowing activities to enhance open spaces.	<i>Not applicable</i>	All units except Unit 6	No incremental conservation efforts; therefore, no incremental benefits.
Install fencing to delineate Preble's habitat and prevent pedestrian traffic.			
No outdoor cats permitted; dogs require leashes.			
Install signage for wildlife areas.			
Actively address drainage-wide stormwater runoff and creek flow issues.			
Report succession progress of re-vegetated areas annually.			
Purchase conservation habitat as mitigation for PMJM impacts.	<ul style="list-style-type: none"> • Property value benefits • Aesthetic benefits • Recreation benefits • Regional economic benefits 		All units except 6 (Increased in-unit mitigation for impacts to critical habitat)
ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE			
Directional boring to minimize disturbance	<i>Not applicable</i>	All units	No incremental conservation efforts; therefore, no incremental benefits.
Provide connectivity of habitat across highways.			
Restrict activity timing.			
Monitor construction activities on-site.			
Restore, enhance, and revegetate habitat.			
Establish gentle grades for regraded slopes.			
Convert uplands to habitat	<ul style="list-style-type: none"> • Property value benefits • Aesthetic benefits • Recreation benefits • Regional economic benefits 		All units (Increased in-unit mitigation and habitat for impacts to critical habitat)
Purchase conservation habitat as mitigation for PMJM impacts.			
WATER SUPPLY DEVELOPMENT			
Purchase conservation habitat as mitigation for PMJM impacts.	<ul style="list-style-type: none"> • Property value benefits • Aesthetic benefits • Recreation benefits • Regional economic benefits 	1, 9, 10	1, 9, 10 (Increased in-unit mitigation for impacts to habitat)
U. S. FOREST SERVICE LANDS MANAGEMENT AND ROCKY FLATS			
Restrict activity or project spatially and temporally to avoid habitat.	<i>Not applicable; Federally owned land</i>	1, 2, 3, 4, 6, 9, 10, 11	No incremental conservation efforts;

CONSERVATION EFFORT	POTENTIAL ASSOCIATED ADDITIONAL BENEFITS	UNITS APPLIED	
		BASELINE BENEFIT	INCREMENTAL BENEFIT
Conduct surveys to assess recovery of habitat.			
Locate equipment staging areas outside of PMJM habitat.			
Restore habitat and monitor.			
Conduct habitat assessment and develop project design criteria to mitigate impacts or protect habitat prior to activity.			
Keep work areas clean of trash.			
GRAVEL MINING			
Restore, enhance, preserve, and monitor habitat.	<i>Not applicable</i>	Unknown	No incremental conservation efforts; therefore, no incremental benefits.
Install culverts to allow PMJM dispersal.			
Remove and control weeds.			
Prohibit timing of construction or mining activity.			
Install protective fencing.			

192. As shown in Exhibit 9-1, the most prominent conservation effort that is expected to provide incremental benefits (e.g., property value, aesthetic, recreational, regional economic) is the purchase of conservation land or easements to offset impacts to PMJM critical habitat by the activity or project. These additional benefits are manifested in two ways. First, because the proposed critical habitat areas are generally more expansive, these benefits will extend beyond areas that are normally addressed (or mitigated) for PMJM impacts without the designation. Second, because impacts would have to be offset by conservation measures or actions *within* the same critical habit unit, these benefits will no longer be displaced to other areas of habitat that are possibly less important to the conservation and protection of the PMJM.

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APPENDIX A | INITIAL REGULATORY FLEXIBILITY ANALYSIS AND ENERGY IMPACT ANALYSIS

193. This appendix considers the extent to which incremental impacts from critical habitat designation may be borne by small entities and the energy industry. The analysis presented in Section A.1 is conducted pursuant to the 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), the Service, and from interviews with stakeholders contacted during the development of the economic analysis. The energy analysis in Section A.2 is conducted pursuant to E.O. No. 13211.
194. The analyses of impacts to small entities and the energy industry rely on the estimated *incremental* impacts resulting from the proposed critical habitat designation. The incremental impacts of the rulemaking are most relevant for the small business and energy impacts analyses because they reflect costs that may be avoided or reduced based on decisions regarding the composition of the final rule. The post-designation baseline impacts associated with the listing of the PMJM and other State and local regulations and policies, described in Chapters 3 through 8 of this analysis, are expected to occur regardless of the outcome of this rulemaking.

A.1 IMPACTS TO SMALL ENTITIES

195. When a Federal agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an Initial Regulatory Flexibility Analysis (IRFA) that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions).¹²³
196. If a proposed rule is not expected to have a significant impact on a substantial number of small entities, the RFA allows an agency to so certify the rule, in lieu of preparing an IRFA.¹²⁴ In the case of the proposed revised critical habitat for the PMJM, uncertainty exists regarding both the numbers of entities that will be affected by the Proposed Rule and the degree of impact on individual entities. In particular, uncertainty surrounds the effect that the Proposed Rule will have on small governmental jurisdictions that will be required to undergo section 7 consultation and implement project modifications for road/bridge, utility, and bank stabilization projects. In addition, the problem is

¹²³ 5 U.S.C. 601 et seq.

¹²⁴ Thus, for a regulatory flexibility analysis to be required, impacts must exceed a threshold for "significant impact" and a threshold for a "substantial number of small entities." 5 U.S.C. 605(b).

complicated by differences among entities – even within the same sector – as to the nature and size of their operations. Therefore, to ensure a broad consideration of impact on small entities, the Service has prepared this IRFA without first making the threshold determination of whether the proposed revised critical habitat designation could be certified as not having a significant economic impact on a substantial number of small entities.

197. This IRFA is intended to improve the Service’s understanding of the effects of the Proposed Rule on small entities and to identify opportunities to minimize these impacts in the final rulemaking. Exhibit A-1 describes the components of an IRFA. The remainder of this section addresses each of these IRFA requirements.

EXHIBIT A-1 ELEMENTS OF AN IRFA

ELEMENTS OF AN INITIAL REGULATORY FLEXIBILITY ANALYSIS
1. A description of the reasons why the action by the agency is being considered.
2. A succinct statement of the objectives of, and legal basis for, the proposed.
3. A description- and, where feasible, an estimate of the number- of small entities to which the rule will apply.
4. A description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the types of professional skills necessary for the preparation of the report or record.
5. An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap, or conflict with the proposed rule.
6. A description of alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities.
Source: Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act. pg. 32.

A.1.1 REASONS FOR CONSIDERING THE PROPOSED ACTION

198. Section 4(a)(3) of the Endangered Species Act (Act) requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable.¹²⁵ Given that the PMJM is Federally-listed as threatened under the Act, the Service finds that the designation of critical habitat is required. On July 17, 2002, the Service proposed critical habitat for the PMJM in portions of Colorado and Wyoming and on June 23, 2003, issued a Final Rule.¹²⁶ Soon after the 2003 designation, the City of Greeley and the Mountain States Legal Foundation filed complaints in U.S. District Court challenging the validity of the information and the reasoning used to designate critical habitat for the PMJM.¹²⁷ In July 2007, the Service announced that it would review the

¹²⁵ 16 U.S.C. Sections 1531-1544.

¹²⁶ 2002 Proposed Rule, 67 FR 41754 and 2003 Final Rule, 68 FR 37275.

¹²⁷ On August 22, 2003, the City of Greeley filed a complaint in the U.S. District Court for the District of Colorado challenging the Service’s designation of critical habitat for the PMJM (*City of Greeley, Colorado v. United States Fish and Wildlife*

critical habitat designation and later concluded that it was necessary to revise the critical habitat. On July 10, 2008, a final rule amended the portion of the range over which the PMJM was threatened, limiting it to the SPR in Colorado.¹²⁸ At that point, the Service removed all critical habitat in Wyoming from designation. On April 16, 2009, the Service reached a settlement agreement with the City of Greeley in which the Service agreed to reconsider critical habitat designation for the PMJM, issue a proposed rule for revised critical habitat by September 30, 2009, and issue a final rule for revised critical habitat by September 30, 2010. On June 16, 2009, an order was issued granting the Mountain States Legal Foundation a motion to dismiss their claims on the 1998 listing and 2008 final determination without prejudice, and stayed their challenge to the 2003 critical habitat designation pursuant to the City of Greeley settlement. Most recently, the Service published a Proposed Rule on October 8, 2009 to revise the existing critical habitat designation for the PMJM in Colorado.¹²⁹

199. The benefits of critical habitat designation derive from section 7 of the Act, which requires that Federal agencies, in consultation with the Service, ensure that actions they carry out, permit or fund are not likely to destroy or adversely modify critical habitat. As noted above, the Act requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable.

A.1.2 OBJECTIVES AND LEGAL BASIS OF THE PROPOSED RULE

200. The purpose of the proposed rule is to designate critical habitat for the PMJM pursuant to the Endangered Species Act (Act). Section 4(b)(2) of the Act requires that the Service designate critical habitat “on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impacts, of specifying any particular area as critical habitat.” This section grants the Secretary [of Interior] discretion to exclude any area from critical habitat if (s)he determines “the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat”. The Secretary’s discretion is limited, as (s)he may not exclude areas if it “will result in the extinction of the species.”

A.1.3 DESCRIPTION AND TYPES AND NUMBER OF SMALL ENTITIES TO WHICH THE RULE WILL APPLY

201. Three types of small entities are defined in the RFA:
- **Small Business** - Section 601(3) of the RFA defines a small business as having the same meaning as small business concern under section 3 of the Small Business Act.

Service et al., Case No. 03-CV-01607-AP). On December 9, 2003, the Mountain States Legal Foundation filed a complaint in the U.S. District Court for the District of Wyoming challenging the 1998 listing of the PMJM and designation of critical habitat for the PMJM (*Mountain States Legal Foundation v. Gale E. Norton et al.*, Case No. 03-CV-250-J) that was later expanded to include the 2008 final determination on the PMJM and transferred to the U.S. District Court for the District of Colorado (*Mountain States Legal Foundation v. Ken Salazar et al.*, Case No. 1:08-CV-2775-JLK).

¹²⁸ 2008 Final Rule to Amend the Listing, 73 FR 39789.

¹²⁹ 2009 Proposed Rule, 74 FR 52065. The existing critical habitat designation remains effective.

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.

202. The courts have held that the RFA/SBREFEA requires Federal agencies to perform a regulatory flexibility analysis of forecast impacts to small entities that are directly regulated. In the case of *Mid-Tex Electric Cooperative, Inc., v. Federal Energy Regulatory Commission (FERC)*, FERC proposed regulations affecting the manner in which generating utilities incorporated construction work in progress in their rates. The generating utilities that expected to be regulated were large businesses; however, their customers – transmitting utilities such as electric cooperatives – included numerous small entities. In this case, the court agreed that FERC simply authorized large electric generators to pass these costs through to their transmitting and retail utility customers, and FERC could therefore certify that small entities were not directly impacted within the definition of the RFA.¹³⁰
203. Similarly, *American Trucking Associations, Inc. v. Environmental Protection Agency (EPA)* addressed a rulemaking in which EPA established a primary national ambient air quality standard for ozone and particulate matter.¹³¹ The basis of EPA's RFA/SBREFEA certification was that this standard did not directly regulate small entities; instead, small entities were indirectly regulated through the implementation of state plans that incorporated the standards. The court found that, while EPA imposed regulation on states, it did not have authority under this rule to impose regulations directly on small

¹³⁰ 773 F. 2d 327 (D.C. Cir. 1985).

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

entities and therefore small entities were not directly impacted within the definition of the RFA.

204. The Small Business Administration (SBA) in its guidance on how to comply with the RFA recognizes that consideration of indirectly affected small entities is not required by the RFA, but encourages agencies to perform a regulatory flexibility analysis even when the impacts of its regulation are indirect.¹³² "If an agency can accomplish its statutory mission in a more cost-effective manner, the Office of Advocacy [of the SBA] believes that it is good public policy to do so. The only way an agency can determine this is if it does not certify regulations that it knows will have a significant impact on small entities even if the small entities are regulated by a delegation of authority from the federal agency to some other governing body."¹³³
205. The regulatory mechanism through which critical habitat protections are enforced is section 7 of the Act, which directly regulates only those activities carried out, funded, or permitted by a Federal agency. By definition, Federal agencies are not considered small entities, although the activities they may fund or permit may be proposed or carried out by small entities. Given the SBA guidance described above, this analysis considers the extent to which this designation could potentially affect small entities, regardless of whether these entities would be directly regulated by the Service through the proposed rule or by a delegation of impact from the directly regulated entity.
206. This IRFA focuses on small entities that may bear the estimated incremental impacts associated with the proposed rulemaking as described in Chapters 3 through 8 of this analysis. Specifically, this economic analysis quantifies incremental economic impacts of PMJM conservation associated with residential and commercial development; construction and maintenance of roads/bridges, utilities, and banks; water supply development; USFS lands management; Rocky Flats; and gravel mining. However, as described below, only incremental impacts to residential and commercial development and construction and maintenance of roads/bridges, utilities, and bank stabilization projects are expected to affect small entities.
207. Impacts are not expected to small entities in other economic sectors potentially affected by this rule for the following reasons:
- **Water Supply Development (Chapter 5)** – The City of Greeley and the City of Fort Collins will bear the third party incremental impacts associated with their planned reservoir expansion projects in proposed PMJM critical habitat. These two municipalities, however, have populations greater than 50,000 and are therefore not considered small entities.
 - **U.S. Forest Service Lands Management (Chapter 6)** – Impacts to the Arapaho & Roosevelt and the Pike & San Isabel National Forests are borne by the U.S. Forest Service, which is not considered a small entity.

¹³² Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act. pg. 20.

¹³³ *ibid.*, pg. 21.

- **Rocky Flats (Chapter 7)** – Impacts to Rocky Flats are borne by the Service (U.S. Fish and Wildlife Service) and DOE, which are not considered small entities.
- **Gravel Mining (Chapter 8)** – Gravel mining companies in the region may include small entities, however, the incremental impacts to gravel mining activities cannot be estimated at this time.

208. Incremental impacts to residential and commercial development and construction and maintenance of roads/bridges, utilities, and bank stabilization, however, may affect small entities. A description of the types and number of small entities potentially affected follows.

Residential and Commercial Development (Chapter 3)

209. Potentially significant incremental impacts will be borne by the development industry. Exhibit A-2 summarizes the total number of developer entities and small developer entities located in the counties in which critical habitat for the PMJM is being proposed.¹³⁴ As shown, small entities represent 97 percent of the universe of entities that may be affected.

EXHIBIT A-2 TOTAL ENTITIES AND SMALL ENTITIES IN RELEVANT SECTORS OF THE RESIDENTIAL AND COMMERCIAL DEVELOPMENT INDUSTRY

NAICS CODE	DESCRIPTION	SMALL BUSINESS THRESHOLD	TOTAL NUMBER OF ENTITIES	NUMBER OF SMALL ENTITIES	PERCENT SMALL
236117	New Housing Operative Builders	\$33.5 million	102	96	94%
237210	Land Subdivision	\$7 million	663	648	98%
TOTAL			765	744	97%

Source: Dialog search of B 516, Dun & Bradstreet: Dun's Market Identifiers, completed on February 10, 2010.

Note: U.S. Census Bureau, 2007 Economic Census (accessed on February 10, 2010 at http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-fds_name=EC0700A1&-_skip=100&-ds_name=EC0723A1&-_lang=en) reports 175 total establishments with NAICS code 237210. This analysis defers to the percentage of small businesses reported by Dun and Bradstreet.

¹³⁴ For small-scale developments, individual landowners or homeowners may also be impacted. However, no NAICS code exists for homeowners, and the SBA does not provide a definition of a small landowner. Not accounting for these individuals is likely to overstate the actual impacts to small developer entities.

Road/Bridge, Utility, and Bank Stabilization Construction and Maintenance
(Chapter 4)

210. Chapter 4 of this analysis describes incremental costs associated with the construction and maintenance of roads, bridges, utilities, and banks in proposed PMJM critical habitat. These activities are typically undertaken by municipalities and other governmental jurisdictions (such as metropolitan districts and sanitation districts), utility companies, and other related proponents. Potentially significant impacts may accrue to small entities that conduct these activities.
211. Exhibit A-3 summarizes the total number of entities and small entities in industries with NAICS codes that may undertake these activities in PMJM critical habitat, and therefore be subject to section 7 consultations and required project modifications. As shown, small entities represent about 90 percent of the total entities that may be affected.

EXHIBIT A-3 TOTAL BUSINESSES AND SMALL BUSINESSES IN RELEVANT SECTORS OF ROAD/BRIDGE, UTILITY, AND BANK CONSTRUCTION AND MAINTENANCE INDUSTRIES

NAICS CODE	DESCRIPTION	THRESHOLD	TOTAL NUMBER OF ENTITIES	NUMBER OF SMALL ENTITIES	PERCENT SMALL
221210	Natural Gas Distribution	500 employees	46	32	70%
221310	Water Supply and Irrigation Systems	\$7 million	154	144	94%
237210	Land Subdivision	\$7 million	663	648	98%
486210	Pipeline Transportation of Natural Gas	\$7 million	16	11	69%
926120 ¹	Regulation and Administration of Transportation Programs	N/A	40	0	0%
926130 ¹	Regulation and Administration of Communications, Electric, Gas, and Other Utilities	N/A	6	0	0%
Total			925	835	90%
¹ Small business size standards are not established for this sector. These NAICS codes (926120 and 926130) represent establishments in the Public Administration sector, which are largely Federal, State, and local government agencies that administer and oversee government programs and activities that are not undertaken by private entities. Source: Dialog search of B 516, Dun & Bradstreet: Dun's Market Identifiers, completed on February 10, 2010.					

212. In addition to the small entities listed in Exhibit A-3, a number of small governmental jurisdictions will bear incremental impacts associated with these activities in proposed PMJM critical habitat designation. As discussed above, the threshold for small governmental jurisdictions is a population of 50,000. Exhibit A-4 presents a list of small governmental jurisdictions that either have previously or may in the future undertake

road/bridge, utility, and/or bank stabilization activities in proposed PMJM critical habitat. As shown, there are likely a substantial number of these small government jurisdictions that may be impacted by the Proposed Rule.

EXHIBIT A-4 SMALL GOVERNMENTAL JURISDICTIONS CONDUCTING ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE ACTIVITIES IN PMJM CRITICAL HABITAT

CATEGORY	DESCRIPTION	POPULATION	PROPORTION SMALL
Small Municipalities	Broomfield	19,619	50 percent small (eight out of a total of 16 municipalities identified in the study area)
	Eldorado Springs	2,500	
	Louviers	2,500	
	Monument	1,125	
	Perry Park	2,500	
	Red Feather Lakes	2,500	
	Sedalia	2,500	
	Woodmor	7,500	
Wastewater and Sanitation Districts	Donala Water and Sanitation District	2,600	80 percent small (nine out of a total of 11 wastewater and sanitation districts identified in the study area)
	Parker Water and Sanitation District	22,000	
	Pinery Water and Wastewater District	4,000	
	Pinewood Springs Water District	275	
	Roxborough Park Sanitation District	4,000	
	Woodmor Water and Sanitation District No. 1	2,546 taps	
	Monument Sanitation District	Unknown	
	Perry Park Water and Sanitation District	Unknown	
	Thunderbird Water and Sanitation District	Unknown	
Metropolitan Districts	Forest Lakes Metropolitan District	644	100 percent small (six out of a total of six metropolitan districts identified in the study area)
	Perry Park Metropolitan District	622 housing units	
	Triview Metropolitan District	2,600 housing units	
	Jefferson Center Metropolitan District No. 1	Unknown	
	Roxborough Park Metropolitan District	Unknown	
	Thompson Crossing Metropolitan District	Unknown	
TOTAL			Approximately 70 percent

Notes: The governmental jurisdictions listed here are based on available information (see sources below), which is limited. There are likely more governmental jurisdictions potentially affected that this analysis could not identify (e.g., small townships). If information regarding the population served by an entity was not available (e.g., Monument Sanitation District), it was assumed to be small.

Sources: U.S. Fish and Wildlife Service, biological opinions issued for formal section 7 consultations conducted for projects affecting the PMJM and its habitat, January 2003 through June 2009, U.S. Fish and Wildlife Service; Colorado Department of Local Affairs, Special District Boundaries GIS data layers, accessed on 11 February 2010 at <http://www.dola.colorado.gov/gis/politicalboundaries.html>.

A.1.4 DESCRIPTION OF THE PROJECTED REPORTING, RECORDKEEPING, AND OTHER COMPLIANCE REQUIREMENTS OF THE RULE

213. As discussed above, this analysis estimates that small entities represent 97 percent of residential and commercial development entities potentially affected by the proposed revised critical habitat designation. In addition, small entities represent 90 percent of businesses and approximately 70 percent of governmental jurisdictions that are potentially affected by the proposed revised critical habitat designation on the construction and maintenance activities they undertake. The magnitude of these potential impacts to these small entities are described in detail below.

Residential and Commercial Development

214. Chapter 3 of the analysis discusses the potential incremental impacts of the proposed revised critical habitat for the PMJM on residential and commercial development. Over the next 20 years, the forecast incremental impacts for residential and commercial development borne by developer entities are estimated to total \$19.6 to \$49.9 million (present value estimate at seven percent).¹³⁵
215. To estimate the potential magnitude of the incremental impact of PMJM conservation on small developer entities, this analysis first estimates the number of developments potentially affected during the timeframe of the analysis. Second, this analysis estimates the number of developers required to undertake these projects, including those that are small. Third, this analysis estimates the incremental impact that PMJM conservation efforts may have on the sales revenues of small developers. These steps are detailed below.
216. **Estimate the number of forecast development projects.** As estimated in Chapter 3, about 171 developments, or about nine developments per year (65 small-scale development and 106 large-scale developments), are anticipated to be built in proposed PMJM critical habitat from 2010 through 2029.
217. **Estimate the number of developers required to construct the number of forecasted development projects and estimate how many of those developers are small.** This analysis assumes that one developer is required for each development project (i.e., 171 developers). In addition, because the sizes of these future developers are unknown, this analysis assumes that all 171 developers are small. This assumption likely overstates the impacts to small entities because some developers are not small. As shown in Exhibit A-2, this analysis identified 96 small New Housing Operative Builders (NAICS 236117) and 648 Land Subdividers (NAICS 237210) in Boulder, Douglas, El Paso, Jefferson, and Larimer Counties. This analysis assumes that either a Land Subdivider or a Builder will bear the incremental impact. There is a higher likelihood the party realizing this impact

¹³⁵ This analysis assumes that all project modification costs (e.g., purchasing lands for mitigation, and restoring and enhancing habitat), in addition to the portion of section 7 consultation costs attributed to the third party, will be borne by developer entities.

will be a Builder. To the extent to which this is the case, 100 percent of small developers could be affected over the 20 year period of the analysis. However, to the extent to which a Land Subdivider will realize the impact, up to 26 percent of small developers could be impacted over the 20 year period of this analysis.

218. **Estimate the incremental impact of PMJM conservation efforts on small developers.** Over the next 20 years, the incremental impact due to critical habitat designation is estimated to range from \$115,000 to \$292,000 per project.¹³⁶
219. **Estimate the impact of the incremental costs of PMJM conservation efforts relative to the annual sales revenues of small developers.** For New Housing Operative Builders (NAICS code 236117), estimated annual sales in 2007 per entity in Colorado are \$6.51 million.¹³⁷ The estimated incremental impacts therefore represent 1.8 to 4.5 percent of an entity's annual sales in this industry. However, we expect these costs to be incurred over a period of more than one year, since most developments will take longer than one year to complete (i.e. if a project takes two years to complete, the impact as a proportion of revenue will be between 0.9 and 2.2 percent). For Land Subdividers (NAICS code 237210), estimated annual sales in 2007 per entity in Colorado are \$8.3 million.¹³⁸ However, this estimate appears high since the threshold for small entities is \$7 million, and 98 percent are considered to be small. Due to this discrepancy, this analysis assumes that estimated annual sales per establishment for Land Subdivision entities are equal to the small business threshold of \$7 million. The estimated annual incremental impact therefore represents 1.6 to 4.2 percent of an entity's annual sales in this industry. As discussed above, the incremental impact associated with each project is expected to be incurred over a period of more than one year. Thus, this analysis overstates the actual annual impact on a small entity.
220. There are a number of additional factors that may cause this analysis to overstate the actual impact on small residential and commercial developers. First, it is likely that a portion of the impact will be realized by landowners in the form of higher housing prices. The proportion of the total impact borne by landowners, however, is unknown. Lastly, as discussed in Chapter 3, this analysis is likely to overstate the amount of development activity, and therefore the total incremental impact, associated with residential and commercial development. Anecdotal information and existing county building restrictions suggests that fewer properties in critical habitat are being developed than are quantified by the methodology used in this analysis.

¹³⁶ As discussed previously, these costs include project modification costs and third party section 7 consultation costs..

¹³⁷ U.S. Census Bureau, 2007 Economic Census, accessed on February 10, 2010 at http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-fds_name=EC0700A1&-_skip=100&-ds_name=EC0723A1&-_lang=en. It is important to note that these annual revenues are an average for all entities, large and small. While small entities will likely have smaller revenues, as shown in Exhibit A-2, the majority of entities are considered small.

¹³⁸ *ibid.*

Road/Bridge, Utility, and Bank Stabilization Construction and Maintenance

221. As described in Chapter 4 of this analysis, 76 section 7 consultations for road, bridge, utility, and bank stabilization activities are forecasted over the 20-year period of the analysis. Assuming one project per consultation, 76 projects are expected, or about four annually. Third party consultation costs and project modification costs associated with these projects are estimated to range from \$392,000 to \$818,000 over the 20-year period, or about \$37,000 to \$77,200 annually.¹³⁹ This analysis similarly conservatively assumes (that is, more likely to overstate than to understate the cost) that each project will be undertaken by a small entity. Thus, 76 small entities will be affected. It is unknown, however, which type of small entity (e.g., small municipality, small wastewater and sanitation district, or small metropolitan district) will conduct which type of the three activities. This analysis therefore applies and distributes the total estimated incremental costs associated with all three activities equally over the 76 small entities. As a result, this analysis estimates that the impact on each of the four small entities affected annually will be about \$9,250 to \$19,300.

A.1.5 IDENTIFICATION OF ALL RELEVANT FEDERAL RULES THAT MAY DUPLICATE, OVERLAP, OR CONFLICT WITH THE PROPOSED RULE

222. An IRFA must identify any duplicative, overlapping, and conflicting Federal rules. Rules are duplicative or overlapping if they are based on the same or similar reasons for the regulation, the same or similar regulatory goals, and if they regulate the same classes of industry. Rules are conflicting when they impose two conflicting regulatory requirements on the same classes of industry.
223. The protection of listed species and habitat may overlap other sections of the Act. The protections afforded to threatened and endangered species and their habitat are described in sections 7, 9, and 10 of the Act. While the proposed critical habitat regulates activities that are Federally funded, authorized by a Federal agency, or carried out by a Federal agency, section 7 also 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 baseline conservation efforts discussed in this report overlaps with the jeopardy standard invoked by the listing of the species. The incremental impacts forecast in this report and contemplated in this IRFA are expected to result from the critical habitat designation, however, and not other Federal rules.

A.1.6 A DESCRIPTION OF ALTERNATIVES TO THE PROPOSED RULE WHICH ACCOMPLISH THE OBJECTIVES AND WHICH MINIMIZE IMPACT ON SMALL ENTITIES

224. In the proposed rule the service identifies 11 units as potential critical habitat for the PMJM. Section 4(b)(2) of the Act allows the Service to exclude areas proposed for designation based on economic impact and other relevant impacts. As a result,

¹³⁹ Some of these costs may be borne by funding agencies such as U.S. Department of Transportation and CODOT. As a result, this analysis may overstate impacts to small entities.

designation of a sub-set of the critical habitat, as it is defined in the proposed rule, is available to the Service as an alternative.

A.2 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

225. Pursuant to E.O. 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.”¹⁴⁰
226. The Office of Management and Budget provides guidance for implementing this E.O., outlining nine outcomes that may constitute “a significant adverse effect” as compared to a scenario without 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.¹⁴¹
227. The criterion that may be relevant to this analysis is increases in the cost of energy distribution in excess of one percent. As described in Chapter 4, constructing and maintaining electrical and natural gas distribution and transmission systems is a type of utility project potentially occurring in the study area. Incremental impacts may be incurred, however, projecting this activity is beyond the scope of the analysis and is unlikely to reach the threshold discussed above.

¹⁴⁰ 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>.

¹⁴¹ 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>.

APPENDIX B | IMPACTS CALCULATED USING A THREE PERCENT DISCOUNT RATE

228. This appendix summarizes the post-designation baseline and incremental impacts discounted at three percent for all activities in this analysis (does not include technical assistance costs).

EXHIBIT B-1 BASELINE AND INCREMENTAL IMPACTS TO RESIDENTIAL AND COMMERCIAL DEVELOPMENT (3% DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	\$788,000	\$603,000	\$40,600	\$1,460,000	\$1,120,000	\$75,400
2. Cache la Poudre River	\$394,000	\$302,000	\$20,300	\$732,000	\$561,000	\$37,700
3. Buckhorn Creek	\$394,000	\$302,000	\$20,300	\$732,000	\$561,000	\$37,700
4. Cedar Creek	\$98,400	\$75,400	\$5,070	\$183,000	\$140,000	\$9,420
5. South Boulder Creek	\$1,410,000	\$1,070,000	\$71,700	\$2,630,000	\$1,980,000	\$133,000
6. Rocky Flats NWR	-	-	-	-	-	-
7. Ralston Creek	\$1,720,000	\$1,290,000	\$87,000	\$3,190,000	\$2,400,000	\$162,000
8. Cherry Creek	\$13,000,000	\$9,800,000	\$659,000	\$34,900,000	\$26,300,000	\$1,770,000
9. West Plum Creek	\$41,000,000	\$30,900,000	\$2,080,000	\$110,000,000	\$83,200,000	\$5,590,000
10. Upper South Platte River	\$31,000,000	\$23,400,000	\$1,570,000	\$83,300,000	\$62,800,000	\$4,220,000
11. Monument Creek	\$14,800,000	\$12,200,000	\$818,000	\$31,300,000	\$25,800,000	\$1,730,000
Total		\$79,900,000	\$5,370,000		\$205,000,000	\$13,800,000

Note: Does not include technical assistance costs. Totals may not sum due to rounding.

EXHIBIT B-2 INCREMENTAL IMPACTS TO RESIDENTIAL AND COMMERCIAL DEVELOPMENT (3% DISCOUNT RATE)

UNIT	LOW ESTIMATE IMPACTS			HIGH ESTIMATE IMPACTS		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	\$788,000	\$154,000	\$10,300	\$1,460,000	\$285,000	\$19,200
2. Cache la Poudre River	\$394,000	\$113,000	\$7,590	\$732,000	\$210,000	\$14,100
3. Buckhorn Creek	\$394,000	\$116,000	\$7,770	\$732,000	\$215,000	\$14,500
4. Cedar Creek	\$98,400	\$30,000	\$2,020	\$183,000	\$55,700	\$3,750
5. South Boulder Creek	\$1,410,000	\$310,000	\$20,900	\$2,630,000	\$577,000	\$38,800
6. Rocky Flats NWR	\$0	\$0	\$0	\$0	\$0	\$0
7. Ralston Creek	\$1,720,000	\$382,000	\$25,700	\$3,190,000	\$710,000	\$47,700
8. Cherry Creek	\$13,000,000	\$2,850,000	\$192,000	\$34,900,000	\$7,670,000	\$516,000
9. West Plum Creek	\$41,000,000	\$9,910,000	\$666,000	\$110,000,000	\$26,600,000	\$1,790,000
10. Upper South Platte River	\$31,000,000	\$8,690,000	\$584,000	\$83,300,000	\$23,400,000	\$1,570,000
11. Monument Creek	\$14,800,000	\$3,840,000	\$258,000	\$31,300,000	\$8,130,000	\$546,000
Total		\$26,400,000	\$1,770,000		\$67,900,000	\$4,560,000
Note: Does not include technical assistance costs. Totals may not sum due to rounding.						

EXHIBIT B-3 BASELINE AND INCREMENTAL IMPACTS ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION PROJECTS (3% DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	\$246,000	\$189,000	\$12,700	\$571,000	\$438,000	\$29,400
2. Cache la Poudre River	\$85,600	\$65,600	\$4,410	\$361,000	\$277,000	\$18,600
3. Buckhorn Creek	\$150,000	\$115,000	\$7,710	\$395,000	\$303,000	\$20,300
4. Cedar Creek	\$4,390	\$3,360	\$226	\$5,730	\$4,390	\$295
5. South Boulder Creek	\$91,100	\$69,800	\$4,690	\$369,000	\$283,000	\$19,000
6. Rocky Flats NWR	\$32,900	\$25,200	\$1,700	\$143,000	\$109,000	\$7,360
7. Ralston Creek	\$30,500	\$23,400	\$1,570	\$89,700	\$68,800	\$4,620
8. Cherry Creek	\$139,000	\$107,000	\$7,170	\$382,000	\$292,000	\$19,700
9. West Plum Creek	\$314,000	\$241,000	\$16,200	\$660,000	\$505,000	\$34,000
10. Upper South Platte River	\$61,200	\$46,900	\$3,150	\$230,000	\$176,000	\$11,800
11. Monument Creek	\$479,000	\$367,000	\$24,700	\$880,000	\$674,000	\$45,300
Total		\$1,250,000	\$84,200		\$3,130,000	\$210,000
Note: Does not include technical assistance costs. Totals may not sum due to rounding.						

EXHIBIT B-4 INCREMENTAL IMPACTS TO ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION PROJECTS (3% DISCOUNT RATE)

UNIT	LOW ESTIMATE IMPACTS			HIGH ESTIMATE IMPACTS		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	\$62,700	\$48,000	\$3,230	\$145,000	\$111,000	\$7,480
2. Cache la Poudre River	\$32,000	\$24,600	\$1,650	\$135,000	\$104,000	\$6,970
3. Buckhorn Creek	\$57,400	\$43,900	\$2,950	\$151,000	\$116,000	\$7,800
4. Cedar Creek	\$1,750	\$1,340	\$90	\$2,280	\$1,740	\$117
5. South Boulder Creek	\$26,500	\$20,300	\$1,370	\$107,000	\$82,200	\$5,530
6. Rocky Flats NWR	\$13,200	\$10,100	\$682	\$57,400	\$44,000	\$2,960
7. Ralston Creek	\$9,000	\$6,900	\$463	\$26,500	\$20,300	\$1,360
8. Cherry Creek	\$40,600	\$31,100	\$2,090	\$111,000	\$85,200	\$5,720
9. West Plum Creek	\$101,000	\$77,100	\$5,180	\$211,000	\$162,000	\$10,900
10. Upper South Platte River	\$22,800	\$17,400	\$1,170	\$85,500	\$65,500	\$4,400
11. Monument Creek	\$151,000	\$116,000	\$7,790	\$278,000	\$213,000	\$14,300
Total		\$397,000	\$26,700		\$1,000,000	\$67,500

Note: Does not include technical assistance costs. Totals may not sum due to rounding.

EXHIBIT B-5 BASELINE AND INCREMENTAL IMPACTS TO WATER SUPPLY DEVELOPMENT (3% DISCOUNT RATE)

UNIT	PROJECT	LOW ESTIMATE IMPACTS			HIGH ESTIMATE IMPACTS		
		UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	Halligan, Milton-Seaman	\$1,760,000	\$1,650,000	\$111,000	\$5,250,000	\$4,930,000	\$332,000
9. West Plum Creek	Chatfield	\$1,300,000	\$1,190,000	\$80,000	\$3,890,000	\$3,560,000	\$240,000
10. Upper South Platte River	Chatfield	\$1,490,000	\$1,370,000	\$91,900	\$4,480,000	\$4,100,000	\$276,000
Total			\$4,210,000	\$283,000		\$12,600,000	\$847,000

Note: Does not include technical assistance costs. Totals may not sum due to rounding.

EXHIBIT B-6 INCREMENTAL IMPACTS TO WATER SUPPLY DEVELOPMENT (3% DISCOUNT RATE)

UNIT	PROJECT	LOW ESTIMATE IMPACTS			HIGH ESTIMATE IMPACTS		
		UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	Halligan, Milton-Seaman	\$20,400	\$19,400	\$1,300	\$41,300	\$39,000	\$2,620
9. West Plum Creek	Chatfield	\$124,000	\$114,000	\$7,640	\$367,000	\$336,000	\$22,600
10. Upper South Platte River	Chatfield	\$246,000	\$225,000	\$15,100	\$732,000	\$670,000	\$45,000
Total			\$358,000	\$24,100		\$1,040,000	\$70,200

Note: Does not include technical assistance costs. Totals may not sum due to rounding.

EXHIBIT B-7 BASELINE AND INCREMENTAL IMPACTS TO U.S. FOREST SERVICE LANDS MANAGEMENT (3% DISCOUNT RATE)

UNIT	LOW ESTIMATE IMPACTS			HIGH ESTIMATE IMPACTS		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	\$155,000	\$119,000	\$7,980	\$155,000	\$119,000	\$7,980
2. Cache la Poudre River	\$308,000	\$236,000	\$15,900	\$308,000	\$236,000	\$15,900
3. Buckhorn Creek	\$196,000	\$150,000	\$10,100	\$196,000	\$150,000	\$10,100
4. Cedar Creek	\$40,100	\$30,800	\$2,070	\$40,100	\$30,800	\$2,070
9. West Plum Creek	\$77,300	\$59,200	\$3,980	\$77,300	\$59,200	\$3,980
10. Upper South Platte River	\$190,000	\$145,000	\$9,760	\$190,000	\$145,000	\$9,760
11. Monument Creek	\$3,920	\$3,010	\$202	\$3,920	\$3,010	\$202
Total		\$743,000	\$50,000		\$743,000	\$50,000

Note: Does not include technical assistance costs. Totals may not sum due to rounding.

EXHIBIT B-8 INCREMENTAL IMPACTS TO U.S. FOREST SERVICE LANDS MANAGEMENT (3% DISCOUNT RATE)

UNIT	LOW ESTIMATE IMPACTS			HIGH ESTIMATE IMPACTS		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
1. N. Fork, Cache la Poudre River	\$39,400	\$30,200	\$2,030	\$39,400	\$30,200	\$2,030
2. Cache la Poudre River	\$115,000	\$88,400	\$5,940	\$115,000	\$88,400	\$5,940
3. Buckhorn Creek	\$75,200	\$57,600	\$3,870	\$75,200	\$57,600	\$3,870
4. Cedar Creek	\$16,000	\$12,200	\$822	\$16,000	\$12,200	\$822
9. West Plum Creek	\$24,800	\$19,000	\$1,270	\$24,800	\$19,000	\$1,270
10. Upper South Platte River	\$70,600	\$54,100	\$3,630	\$70,600	\$54,100	\$3,630
11. Monument Creek	\$1,240	\$948	\$64	\$1,240	\$948	\$64
Total		\$262,000	\$17,600		\$262,000	\$17,600

Note: Does not include technical assistance costs. Totals may not sum due to rounding.

EXHIBIT B-9 BASELINE AND INCREMENTAL IMPACTS TO ROCKY FLATS (3% DISCOUNT RATE)

UNIT	LOW ESTIMATE IMPACTS			HIGH ESTIMATE IMPACTS		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
6. Rocky Flats NWR	\$141,000	\$119,000	\$7,990	\$141,000	\$119,000	\$7,990
Total		\$119,000	\$7,990		\$119,000	\$7,990

Note: Does not include technical assistance costs. Totals may not sum due to rounding.

EXHIBIT B-10 INCREMENTAL IMPACTS TO ROCKY FLATS (3% DISCOUNT RATE)

UNIT	LOW ESTIMATE IMPACTS			HIGH ESTIMATE IMPACTS		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
6. Rocky Flats NWR	\$68,300	\$58,300	\$3,920	\$68,300	\$58,300	\$3,920
Total		\$58,300	\$3,920		\$58,300	\$3,920

Note: Does not include technical assistance costs. Totals may not sum due to rounding.

APPENDIX C | UNDISCOUNTED STREAM OF IMPACTS

229. This appendix summarizes the undiscounted values of post-designation baseline and incremental impacts quantified in this analysis. These costs do not include technical assistance costs.

EXHIBIT C-1 POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS TO EACH ACTIVITY, 2010 - 2029

YEAR	RESIDENTIAL AND COMMERCIAL DEVELOPMENT		ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE		WATER SUPPLY DEVELOPMENT		U.S. FOREST SERVICE LANDS MANAGEMENT	ROCKY FLATS
	LOW	HIGH	LOW	HIGH	LOW	HIGH		
POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS								
2010	\$5,017,349	\$12,647,344	\$81,723	\$204,276	\$0	\$0	\$48,500	\$35,700
2011	\$5,017,349	\$12,647,344	\$81,723	\$204,276	\$5,000	\$5,000	\$48,500	\$0
2012	\$5,017,349	\$12,647,344	\$81,723	\$204,276	\$1,589,875	\$4,749,625	\$48,500	\$29,500
2013	\$5,017,349	\$12,647,344	\$81,723	\$204,276	\$2,955,975	\$8,867,925	\$48,500	\$0
2014	\$5,017,349	\$12,647,344	\$81,723	\$204,276	\$0	\$0	\$48,500	\$9,500
2015	\$5,348,990	\$13,621,785	\$81,723	\$204,276	\$0	\$0	\$48,500	\$0
2016	\$5,348,990	\$13,621,785	\$81,723	\$204,276	\$0	\$0	\$48,500	\$9,500
2017	\$5,348,990	\$13,621,785	\$81,723	\$204,276	\$0	\$0	\$48,500	\$0
2018	\$5,348,990	\$13,621,785	\$81,723	\$204,276	\$0	\$0	\$48,500	\$9,500
2019	\$5,348,990	\$13,621,785	\$81,723	\$204,276	\$0	\$0	\$48,500	\$0
2020	\$5,257,055	\$13,639,123	\$81,723	\$204,276	\$0	\$0	\$48,500	\$9,500
2021	\$5,257,055	\$13,639,123	\$81,723	\$204,276	\$0	\$0	\$48,500	\$0
2022	\$5,257,055	\$13,639,123	\$81,723	\$204,276	\$0	\$0	\$48,500	\$9,500
2023	\$5,257,055	\$13,639,123	\$81,723	\$204,276	\$0	\$0	\$48,500	\$0
2024	\$5,257,055	\$13,639,123	\$81,723	\$204,276	\$0	\$0	\$48,500	\$9,500
2025	\$5,294,169	\$13,838,476	\$81,723	\$204,276	\$0	\$0	\$48,500	\$0
2026	\$5,294,169	\$13,838,476	\$81,723	\$204,276	\$0	\$0	\$48,500	\$9,500
2027	\$5,294,169	\$13,838,476	\$81,723	\$204,276	\$0	\$0	\$48,500	\$0
2028	\$5,294,169	\$13,838,476	\$81,723	\$204,276	\$0	\$0	\$48,500	\$9,500
2029	\$5,294,169	\$13,838,476	\$81,723	\$204,276	\$0	\$0	\$48,500	\$0

EXHIBIT C-2 POST-DESIGNATION INCREMENTAL IMPACTS TO EACH ACTIVITY, 2010 - 2029

YEAR	RESIDENTIAL AND COMMERCIAL DEVELOPMENT		ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE		WATER SUPPLY DEVELOPMENT		U.S. FOREST SERVICE LANDS MANAGEMENT	ROCKY FLATS
	LOW	HIGH	LOW	HIGH	LOW	HIGH		
POST-DESIGNATION INCREMENTAL IMPACTS								
2010	\$1,650,570	\$4,173,993	\$25,892	\$65,562	\$0	\$0	\$17,124	\$8,910
2011	\$1,650,570	\$4,173,993	\$25,892	\$65,562	\$5,000	\$5,000	\$17,124	\$0
2012	\$1,650,570	\$4,173,993	\$25,892	\$65,562	\$19,426	\$38,279	\$17,124	\$28,818
2013	\$1,650,570	\$4,173,993	\$25,892	\$65,562	\$365,677	\$1,097,032	\$17,124	\$0
2014	\$1,650,570	\$4,173,993	\$25,892	\$65,562	\$0	\$0	\$17,124	\$3,818
2015	\$1,764,692	\$4,507,312	\$25,892	\$65,562	\$0	\$0	\$17,124	\$0
2016	\$1,764,692	\$4,507,312	\$25,892	\$65,562	\$0	\$0	\$17,124	\$3,818
2017	\$1,764,692	\$4,507,312	\$25,892	\$65,562	\$0	\$0	\$17,124	\$0
2018	\$1,764,692	\$4,507,312	\$25,892	\$65,562	\$0	\$0	\$17,124	\$3,818
2019	\$1,764,692	\$4,507,312	\$25,892	\$65,562	\$0	\$0	\$17,124	\$0
2020	\$1,741,758	\$4,529,305	\$25,892	\$65,562	\$0	\$0	\$17,124	\$3,818
2021	\$1,741,758	\$4,529,305	\$25,892	\$65,562	\$0	\$0	\$17,124	\$0
2022	\$1,741,758	\$4,529,305	\$25,892	\$65,562	\$0	\$0	\$17,124	\$3,818
2023	\$1,741,758	\$4,529,305	\$25,892	\$65,562	\$0	\$0	\$17,124	\$0
2024	\$1,741,758	\$4,529,305	\$25,892	\$65,562	\$0	\$0	\$17,124	\$3,818
2025	\$1,758,480	\$4,605,855	\$25,892	\$65,562	\$0	\$0	\$17,124	\$0
2026	\$1,758,480	\$4,605,855	\$25,892	\$65,562	\$0	\$0	\$17,124	\$3,818
2027	\$1,758,480	\$4,605,855	\$25,892	\$65,562	\$0	\$0	\$17,124	\$0
2028	\$1,758,480	\$4,605,855	\$25,892	\$65,562	\$0	\$0	\$17,124	\$3,818
2029	\$1,758,480	\$4,605,855	\$25,892	\$65,562	\$0	\$0	\$17,124	\$0

APPENDIX D | TECHNICAL ASSISTANCE COSTS

230. This appendix calculates and apportions technical assistance costs across activities and units, assuming a seven percent discount rate.
231. Technical assistance costs are calculated using the following method:
- Based on past section 7 consultations conducted for the PMJM from 2006 through 2009, an average of 200 technical assistance consultations occur each year.¹⁴² Thus, this analysis assumes the same rate, or a total of 4,000 technical assistance consultations will be conducted over the next 20 years.
 - For each year of the 20-year analysis period, the forecasted number of annual technical assistance consultations (200) was then multiplied by the per-unit consultation costs (\$1,500) provided in Exhibit 2-3.
 - This analysis then calculates the net present value of the total technical assistance costs forecasted over the next 20 years at three percent and seven percent, as well as the annualized costs.
 - The net present value of the technical assistance costs is then apportioned across activities and units based on the total forecasted cost of the other consultations (informal, formal, and programmatic) previously estimated in this analysis, as summarized in Exhibit D-1.
 - The methodology described in Chapter 2 is then followed to estimate the incremental technical assistance costs: 1) that portion of the total forecast technical assistance costs which results entirely from the critical habitat designation, and 2) the proportion of remaining costs that reflects the additional effort to address adverse modification in new technical assistance consultations. The results are provided in Exhibit D-2, by activity and unit.

¹⁴² U.S. Fish and Wildlife Service, TAILS (Tracking and Integrated Logging System) query report of technical assistance for PMJM, 2006 through 2009. Provided to Industrial Economics, Inc. on October 26, 2009.

EXHIBIT D-1 TOTAL CONSULTATION COSTS (INFORMAL, FORMAL, AND PROGRAMMATIC) AND PERCENTAGE OF TOTAL CONSULTATION COSTS, BY ACTIVITY AND UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	RESIDENTIAL AND COMMERCIAL DEVELOPMENT	ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE	WATER SUPPLY DEVELOPMENT	U.S. FOREST SERVICE LANDS MANAGEMENT	ROCKY FLATS	GRAVEL MINING	TOTAL
1. N. Fork, Cache la Poudre River	\$137,000 4.5%	\$113,000 3.7%	\$9,040 0.3%	\$87,800 2.9%	\$0 0.0%	\$0 0.0%	\$346,000 11.5%
2. Cache la Poudre River	\$68,300 2.3%	\$47,600 1.6%	\$0 0.0%	\$175,000 5.8%	\$0 0.0%	\$0 0.0%	\$291,000 9.6%
3. Buckhorn Creek	\$68,300 2.3%	\$71,000 2.4%	\$0 0.0%	\$111,000 3.7%	\$0 0.0%	\$0 0.0%	\$250,000 8.3%
4. Cedar Creek	\$17,100 0.6%	\$1,780 0.1%	\$0 0.0%	\$22,800 0.8%	\$0 0.0%	\$0 0.0%	\$41,600 1.4%
5. South Boulder Creek	\$237,000 7.9%	\$49,900 1.7%	\$0 0.0%	\$0 0.0%	\$0 0.0%	\$0 0.0%	\$286,000 9.5%
6. Rocky Flats	\$0 0.0%	\$18,500 0.6%	\$0 0.0%	\$0 0.0%	\$63,600 2.1%	\$0 0.0%	\$82,200 2.7%
7. Ralston Creek	\$287,000 9.5%	\$14,900 0.5%	\$0 0.0%	\$0 0.0%	\$0 0.0%	\$0 0.0%	\$302,000 10.0%
8. Cherry Creek	\$62,500 2.1%	\$66,800 2.2%	\$0 0.0%	\$0 0.0%	\$0 0.0%	\$0 0.0%	\$129,000 4.3%
9. West Plum Creek	\$197,000 6.6%	\$140,000 4.7%	\$2,180 0.1%	\$43,800 1.5%	\$0 0.0%	\$0 0.0%	\$384,000 12.7%
10. Upper South Platte River	\$149,000 4.9%	\$32,500 1.1%	\$2,180 0.1%	\$107,000 3.6%	\$0 0.0%	\$0 0.0%	\$291,000 9.7%
11. Monument Creek	\$402,000 13.3%	\$205,000 6.8%	\$0 0.0%	\$2,220 0.1%	\$0 0.0%	\$0 0.0%	\$609,000 20.2%
Total	\$1,620,000 53.9%	\$761,000 25.2%	\$13,400 0.4%	\$550,000 18.3%	\$63,600 2.1%	\$0 0.0%	\$3,011,800 100%

Note: Consultation costs for road/bridge, utility and bank stabilization and construction costs are the high cost estimate. Totals may not sum due to rounding.

EXHIBIT D-2 INCREMENTAL TECHNICAL ASSISTANCE COSTS, BY ACTIVITY AND UNIT (2010 - 2029, 2009 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	RESIDENTIAL AND COMMERCIAL DEVELOPMENT	ROAD/BRIDGE, UTILITY, AND BANK STABILIZATION CONSTRUCTION AND MAINTENANCE	WATER SUPPLY DEVELOPMENT	U.S. FOREST SERVICE LANDS MANAGEMENT	ROCKY FLATS	GRAVEL MINING	TOTAL
1. N. Fork, Cache la Poudre River	\$39,200	\$32,400	\$2,600	\$25,200	\$0	\$0	\$99,400
2. Cache la Poudre River	\$28,900	\$20,100	\$0	\$73,800	\$0	\$0	\$123,000
3. Buckhorn Creek	\$29,600	\$30,700	\$0	\$48,100	\$0	\$0	\$108,000
4. Cedar Creek	\$7,660	\$798	\$0	\$10,200	\$0	\$0	\$18,700
5. South Boulder Creek	\$77,700	\$16,400	\$0	\$0	\$0	\$0	\$94,100
6. Rocky Flats	\$0	\$8,410	\$0	\$0	\$28,900	\$0	\$37,300
7. Ralston Creek	\$95,600	\$4,980	\$0	\$0	\$0	\$0	\$101,000
8. Cherry Creek	\$20,600	\$22,000	\$0	\$0	\$0	\$0	\$42,500
9. West Plum Creek	\$71,400	\$50,700	\$790	\$15,800	\$0	\$0	\$139,000
10. Upper South Platte River	\$62,600	\$13,700	\$918	\$45,200	\$0	\$0	\$122,000
11. Monument Creek	\$143,000	\$72,900	\$0	\$792	\$0	\$0	\$217,000
Total	\$576,000	\$273,000	\$4,300	\$219,000	\$28,900	\$0	\$1,100,000

Note: Totals may not sum due to rounding.