PROGRAMMATIC BIOLOGICAL ASSESSMENT: GUNNISON RIVER BASIN, COLORADO: OPERATIONS OF THE WAYNE N. ASPINALL UNIT; OPERATIONS AND DEPLETIONS OF EXISTING RECLAMATION PROJECTS; AND OPERATIONS AND DEPLETIONS OF NON-FEDERAL WATER DEVELOPMENT

1.0 INTRODUCTION

1.1 General

The Bureau of Reclamation (Reclamation), in cooperation with interested non-federal parties, is submitting this programmatic biological assessment (PBA) to the Fish and Wildlife Service (Service) in compliance with Section 7(a)(2) of the Endangered Species Act (ESA), 16 U.S. Code 1536(a)(2). This PBA addresses the potential effects of Reclamation's discretionary actions related to water management operations throughout the Gunnison Basin, and Dolores Project operations in the Dolores River/Colorado River basins in west central Colorado and eastern Utah.

The purpose of this PBA is to evaluate the impacts of Reclamation's proposed action, which includes reoperation of the Wayne N. Aspinall Unit (Aspinall Unit), on threatened, endangered, and candidate species and on critical habitat. Preparation of the PBA has been coordinated with the state and private agencies/organizations in the action area. Foreseeable future changes to the environment that result from continuation of state and private water related actions are included in the PBA effects analysis.

The Service has cited 9 endangered, 4 threatened, and 2 candidate species potentially affected by the proposed action based on their presence in the Gunnison or portions of the Colorado River Basin (Fish and Wildlife Service 2008):

Clay-loving wild buckwheat	*Eriogonum pelinophilum*	endangered
Uinta Basin hookless cactus	*Sclerocactus glaucus*	threatened
Jones' cycladenia	*Cycladenia humilis var. jonesii*	threatened
Yellow-billed cuckoo	*Coccyzus americanus*	candidate
Mexican spotted owl	*Strix occidentalis lucida*	threatened
Southwestern willow flycatcher	*Empidonax traillii extimus*	endangered
California condor	*Gymnogyps californianus*	endangered
Colorado pikeminnow	*Ptychocheilus lucius*	endangered
Razorback sucker	*Xyrauchen texanus*	endangered
Humpback chub	*Gila lacypha*	endangered
Bonytail	*Gila elegans*	endangered
Black-footed ferret	*Mustela nigripes*	endangered
Canada lynx	*Lynx Canadensis*	threatened
Gunnison's prairie dog	*Cynomys gunnisoni*	candidate
Uncompahgre fritillary butterfly	*Boloria acrocnema*	endangered

The timeframe addressed in the assessment is considered to be 25 years from completion of the biological opinion. The action area for this assessment is the Gunnison River Basin and the Upper Colorado River downstream from the Gunnison confluence to the

Dolores River confluence and downstream to Lake Powell. The Aspinall Unit itself is located in Gunnison and Montrose Counties, Colorado, along a 40-mile reach of the Gunnison River as shown on the frontispiece maps. Downstream from the Aspinall Unit, the Gunnison River also flows through Delta and Mesa Counties. The Aspinall Unit consists of a series of three dams and reservoirs: Blue Mesa, Morrow Point, and Crystal. The Aspinall Unit was authorized by the Colorado River Storage Project Act of 1956 (CRSPA) along with Glen Canyon, Flaming Gorge, and the Navajo Unit. All are operated by the Reclamation. The authorization calls for meeting a variety of purposes listed in Section 2.7.

1.2 Summary of the Proposed Action

1.2.1 Federal Action

"Action" is defined as all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies. The Service's regulations at 50 CFR 402.03 provide that Section 7 applies to all actions in which there is discretionary Federal involvement or control.

The proposed Federal action analyzed in this PBA includes those discretionary actions proposed by Reclamation regarding water operations and management in the Gunnison Basin and in the portion of the Colorado River affected by the Dolores Project and Aspinall Unit. The elements of the Federal action are:

- Reclamation's modification of the operation of the Aspinall Unit to avoid jeopardy to downstream endangered fish in the Gunnison and Colorado rivers. The new operation is designed to increase downstream spring peak flows while maintaining moderate base flows. A detailed description is found in Section 2.1.2.
- The continuation of all of Reclamation Project operations in the Gunnison River Basin. Reclamation projects are: Smith Fork, Paonia, Fruitgrowers, Bostwick Park, and Uncompahgre (Attachment 1).
- The continued operation of the Dolores Project (Attachment 1) in the Dolores Basin, included based on a prior biological opinion Reasonable and Prudent Alternative, and reinitiation of consultation on it to address new listed species and depletions.
- The continued operation of the Dallas Creek Project (Attachment 1) included based on a prior biological opinion Reasonable and Prudent Alternative, and reinitiation of consultation on it to address new listed species and depletions.
- Actions undertaken by the Service, Reclamation, the National Park Service, and Western Area Power Administration in the funding and carrying out of recovery actions for the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) that affect the Gunnison Basin. See Section 2.8.

- The continued operation and use of water rights of Federal agencies such as the Bureau of Land Management, Forest Service, and National Park Service. These are generally small stock watering facilities or wells and springs.

1.2.2 Non-Federal Action

In addition to Reclamation actions, there are state organizations and private entities in the action area included in this consultation.

- The continuation of the operations and depletions of all non-Federal projects and water uses in the Gunnison Basin. Average annual depletions from these uses are estimated at approximately 250,000-275,000 acre-feet (af).
- The future depletion 3,500 af of unspecified depletions in the Gunnison Basin is also included in the action as well as 30,800 af of Aspinall Unit water rights subordinated to upstream uses.

1.3 General Description of Action Area

The Gunnison River originates where the East and Taylor Rivers join at Almont, Colorado, in Gunnison County, Colorado (Frontispiece). From that point, the river flows 25 miles to Blue Mesa Reservoir and on through Morrow Point and Crystal Reservoirs. From Crystal Reservoir, it flows approximately two miles to the Gunnison Tunnel. From the Gunnison Tunnel, the river flows for 29 miles to the confluence with the North Fork of the Gunnison (North Fork). It then travels 75 miles to its confluence with the Colorado River at Grand Junction, Colorado. The lower river has been divided into river miles (RM) for research purposes. Key river miles are listed below:

- RM 0 Colorado River confluence
- RM 3 Redlands Diversion
- RM 12 Craig Bottomland pond
- RM 14 Whitewater gage
- RM 18 Kannah Creek confluence
- RM 23 Deer Run
- RM 29 Deer Creek confluence (Bridgeport)
- RM 30 Dominquez Creek
- RM 35 Peeples Orchard
- RM 38 Wells Gulch
- RM 42 Escalante Creek
- RM 50 Roubideau Creek
- RM 53 Escalante State Wildlife Area backwaters
- RM 56 Uncompahgre River confluence
- RM 60 Hartland Diversion
- RM 65 Austin
- RM 75 North Fork confluence
- RM 104 Gunnison Tunnel
- RM 106 Crystal Dam

The area of the watershed upstream from the Aspinall Unit is approximately 4,000 square miles. At the U.S. Geological Survey gage downstream from the Gunnison Tunnel and Crystal Dam, historical average annual flows have been 1,320 cubic feet per second (cfs) and mean daily flow extremes pre-Aspinall Unit ranged from a few days of no flows to 19,000 cfs. Another important measurement point on the river is the U.S.G.S.

Whitewater gage (Gunnison River near Grand Junction), 14 miles upstream from the Colorado River confluence. At this point the drainage area is roughly 8,000 square miles, average monthly flows are approximately 2,600 cfs, and pre-Aspinall Unit extremes ranged from 106 cfs to over 35,000 cfs.

The upper portion of the Gunnison River Basin is characterized by mountainous landscape with perennial mountain streams that peak during spring snow melt. The basin area is moderately wet to semi-arid; the major part of this area being greater than 6,000 feet in elevation. Major tributaries include the East and Taylor Rivers, Tomichi Creek, the Lake Fork, and Cimarron Creek. Vegetation ranges from mixed conifer and aspen in the mountain areas to sagebrush communities in the valleys. Predominant riparian vegetation consists of narrowleaf cottonwood, box elder, willows, spruce, and other conifers. The town of Gunnison is the major community in the upper basin.

The lower (western) portion of the Gunnison River Basin is characterized by desert landscape with two major tributaries-the North Fork and the Uncompahgre River. There are also small perennial tributaries and intermittent washes that carry significant sediment loads during periodic thunderstorms. The area is semiarid to arid; the major part of this area is less than 6,000 feet in elevation and receives less than 8 inches of precipitation annually. Vegetation ranges from pinon-juniper on mesa tops to desert shrubs and grasses near the lower Gunnison and Colorado rivers. The river supports riparian vegetation such as cottonwood, willow, and non-native salt cedar and Russian olive. The Black Canyon of the Gunnison National Park and the Gunnison Gorge National Conservation Area are downstream from Crystal Dam. The cities of Delta and Grand Junction are located along the lower Gunnison River.

The Colorado River downstream from the Gunnison River confluence flows through the Grand Valley and then enters Utah and eventually Lake Powell. Lands along the Colorado River are semi-arid with numerous canyon reaches.

There are no significant water imports to or exports from the Gunnison Basin. Approximately 1,600 af are imported and 3,500 af are exported. This excludes consideration of the two diversions near the mouth of the river, the Redlands Diversion (approximately 510,000 af) and the Grand Junction water system (approximately 7,000 af).

There are approximately 264,000 irrigated acres in the basin and irrigation represents the major water use (Colorado Department of Natural Resources 2006). Major private and federal storage reservoirs in the basin are tabulated in Table 1.

Average annual depletions above the Whitewater gage are approximately 450,000-500,000 af. Approximately 45% of the depletions are related to Federal projects and 55% to private projects.

Table 1. Major water storage reservoirs, Gunnison Basin.

Reservoir	Total storage capacity (acre-feet)
Blue Mesa Reservoir	940,700
Morrow Point Reservoir	117,190
Taylor Park Reservoir	106,700
Ridgway Reservoir	94,176
Crystal Reservoir	25,240
Paonia Reservoir	20,950 (15,977 present capacity)
Crawford Reservoir	14,395
Silver Jack Reservoir	13,520
Gould Reservoir	9,000
Overland Reservoir	5,828
Fruitgrowers Reservoir	4,540 (3,576 present capacity)

Annual evaporation depletions at the Aspinall Unit averaged 8,100 acre-feet in the 2001-2005 period and 8,700 af in the 1975-1995 period. Depletions from water sales from the Aspinall Unit are less than 1,000 af annually.

2.0 DESCRIPTION OF PROPOSED ACTION

2.1 Aspinall Unit Operations

This section describes the process that Reclamation will use to implement the proposed modification of Aspinall Unit operations while maintaining other authorized purposes and assuring safe operations. The modification of the operations of the Aspinall Unit portion of the proposed action will be implemented by Reclamation following signature of a Record of Decision prepared under the National Environmental Policy Act.

RiverWare was the simulation software selected by Reclamation for use in the development of a hydrology model to be used to evaluate and compare alternatives. The Gunnison River model simulates historic hydrology from 1975 to 2005. This period of record was selected as the most complete historical dataset at the time that model analysis began. The initial conditions of the Gunnison River model were selected to be the state of the Aspinall Unit and Gunnison River system at the start of January of 1975. The Gunnison River model runs for the 31 year period between 1975 and 2005. The model runs a single trace of 31 years during this time period. The model separates annual reservoir operations into 3 time periods: January-March, April-July, and August-December. Basic daily input data to the model are: historic Blue Mesa inflows, both actual and unregulated; historic side inflows to Morrow Point and Crystal; Gunnison Tunnel diversions; and various downstream gains computed from actual gage data. Other data provided as input to the model include forecasted inflow and Gunnison Tunnel demands for each forecast period.

The model will not be used for actual operations. Operations of the Aspinall Unit will be based upon forecasted inflow volume to Blue Mesa Reservoir as well as other factors such as storage levels, physical capabilities of the facilities, and flood control to determine the magnitude, duration, and timing of releases. The spring inflow is highly