RECLAMATION

Managing Water in the West

FONSI No. 2010-16A

Carter Lake Hydropower Project Environmental Assessment

Finding of No Significant Impact

Approved: _____ Date: 8/19/2010

U.S. Department of the Interior
Bureau of Reclamation
Great Plains Region
Eastern Colorado Area Office

August 2010

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INTRODUCTION

This Finding of No Significant Impact has been prepared to document the environmental review and evaluation of the proposed action in compliance with the National Environmental Policy Act of 1969, as amended. Based on the following finding, the Bureau of Reclamation (Reclamation) has determined that entering into a Lease of Power Privilege (LOPP) contract with Northern Colorado Water Conservancy District (Northern Water) at Carter Lake will not result in a significant impact to the human environment.

PREFERRED ALTERNATIVE

Reclamation evaluated the effects of two alternatives: the No Action Alternative and the Proposed Action Alternative, and has selected the latter as the Preferred Alternative. Under this alternative, Reclamation will enter into a LOPP contract with Northern Water. The contract allows connection to the existing Carter Lake Dam Outlet and use of water released from the outlet for the generation of hydroelectric power. Issuing the contract will lead to the construction, operation, and maintenance of a nonfederal hydroelectric generation facility on Carter Lake Dam, Colorado Big-Thompson Project (C-BT), and associated power transmission lines and facilities. In May 2009, Reclamation issued a notice of intent to accept proposals for a contract to develop hydroelectric power. In November 2009, Reclamation selected Northern Water as the potential lessee for development of hydropower at Carter Lake Dam Outlet under a LOPP contract.

FINDING OF NO SIGNIFICANT IMPACT

In the attached Environmental Assessment, Reclamation evaluated the environmental consequences associated with implementing the Proposed Action. A brief summary of the environmental effects of the Proposed Action is listed below. **Based on this analysis, Reclamation has determined that the Preferred Alternative would not cause significant impacts.**

There would be no impacts expected to air quality, hydrology and reservoir operations, wetlands, floodplains, prime and unique farmlands, environmental justice, Indian trust resources, or socioeconomic resources as a result of the issuance of the proposed contract.

Water quality – The Proposed Action would have no significant impact on water quality. Construction activities would potentially affect the water quality of surface runoff, but soil- and erosion-control best management practices (BMPs) will be used during construction to reduce the potential for sediment transport. Construction and operation of the hydropower facility will not result in changes in water levels or operations, and will not affect water quality in Carter Lake. The proposed action will result in a slight decrease in temperature and dissolved oxygen in water released to the St. Vrain Supply Canal. The effects to water temperature and dissolved oxygen will be barely perceptible and will have a short-term, localized, negligible impact on water quality in the St. Vrain Supply Canal.

Geology and soils – The Proposed Action will have no significant impact on geology and soils. Ground disturbing activities during construction will occur mostly within previously disturbed areas. Construction of the hydropower facility will result in a surface disturbance of less than 1 acre, including less than 0.10 acre within a previously undisturbed area. Use of BMPs and implementation of a Stormwater Management Plan (SWMP) will reduce the potential for erosion

and soil loss during construction. The effects to geology and soils will be localized, short-term and minor.

Vegetation – The Proposed Action will have no significant impact on vegetation. The hydropower facility will be constructed mostly within existing disturbed areas. Vegetation will be cleared on less than 1 acre at the power house and substation site, of which less than 0.10 acre is native shrub-grassland. Temporarily disturbed vegetation will be restored with native vegetation following construction. Implementation of BMP weed-control practices will minimize the potential for weed establishment and long-term impacts. The effects to vegetation will be localized, short-term and minor.

Fish and Wildlife – The Proposed Action will have no significant impact on fish and wildlife. Fish from Carter Lake will continue to be prevented from entering the outlets by a screen. Most of the project area has been previously disturbed. Human presence and construction noise will temporarily disturb and displace resident wildlife during or following construction. Raptors are unlikely to be affected because no nests were found during July 9 and 13, 2010 nest surveys. The surveys were conducted within a 0.25 mile radius of the project site and fulfilled the Colorado Department of Wildlife's raptor survey recommendations. Also, transmission lines will be constructed in a manner to reduce risk electrocution risk to raptors. Generally, wildlife will be expected to move and find alternative forage and cover areas during construction. The effects to fish and wildlife will be localized, short-term and minor.

Threatened, endangered and special status species – The Proposed Action will have no effect on threatened, endangered, and special status species. No federally listed species or their habitat occurs in the project area. The Proposed Action will not result in depletions to the Platte River system; therefore, the project will have no effect on Platte River species. There will be no effects to threatened and endangered species.

The project will result in increased noise and human activity and temporary loss of habitat that could potentially affect several special status species (northern pocket gopher, Townsend's big-eared bat, bald eagle, and ferruginous hawk). The effects to special status species, if present, will be localized, short-term and minor.

Cultural resources – The Proposed Action will have no significant impact to cultural resources. Impacts will occur to the St. Vrain Supply Canal (5LR11011.1), which is officially eligible for inclusion to the NRHP. The integrity of the St. Vrain Supply Canal has been compromised by work in the 1990's and will not be seriously compromised by the Proposed Action. Reclamation recommended a finding of no adverse effect to historic properties as a result of the Proposed Action. The Colorado State Historic Preservation Officer (SHPO) concurred with this finding in a letter dated July 19, 2010. There will be no adverse effects to historic properties.

Recreation - The Proposed Action will have minor impact on recreation. There will be no change in water levels in the reservoir and, therefore, no effect to water-based recreation. The project area is not open to the public and, therefore, there will be no change in recreational use during or after construction of the hydropower facility. Visitors might be temporarily inconvenienced by noise or traffic during construction. There will be no road closures. The effects to recreation will be localized, short-term and minor.

Visual resources – The Proposed Action will have no significant impact on visual resources. Temporary visual impacts will occur during construction from equipment, materials, and ground disturbances. The hydropower facility will be visible from three residences located more than ½

mile from the project area, but will be constructed to blend with the landscape with minimal visual intrusion. Outdoor lighting will be kept to a minimum and will consist of fixtures that point downward. The effects to visual resources will be localized, short and long-term and minor.

Noise – The Proposed Action will have no significant impact on noise. Construction activities will result in temporarily elevated noise levels near the hydropower facility from equipment such as graders, trucks, backhoes, and other smaller pieces of equipment or machinery. Limited blasting may also be required during construction. Construction noise will be buffered by natural terrain and distance, and will not be noticeable to most visitors using the lake and campgrounds. The turbines and generators will be fully enclosed by the power house, which would be insulated to reduce noise outside the building. The effects of construction noise will be localized, short-term and minor. No long-term noise impacts are expected.

Transportation – The Proposed Action will have no significant impact on transportation. Construction will involve a temporary increase in construction traffic near the project area. Impacts will be confined to areas near the project area and will be limited to the construction period. It is anticipated that the hydropower facility will be monitored remotely, but there will be a slight increase in vehicle traffic required to monitor the facility, with an additional one to two vehicle trips per day by Northern Water staff. The effects to transportation will be localized, short-term and minor.

ENVIRONMENTAL COMMITMENTS

Construction zones will be identified with construction fence, silt fence, or similar material prior to any construction activity. The fencing will define the construction zone and confine activity to the minimum area required for construction. All protection measures will be clearly stated in the construction specifications, and workers will be instructed to avoid conducting activities beyond the construction zone. Disturbances will be limited to specifically designated construction limits. No machinery, vehicles, or equipment will access areas outside the construction limits.

Construction equipment staging will occur within existing areas of disturbance. Off-site equipment and vehicle parking will be limited to designated staging areas.

Contractors will be required to properly maintain construction equipment to minimize noise (i.e., mufflers and brakes). Construction vehicle engines will not be allowed to idle for extended periods. Material and equipment hauling will comply with all legal load restrictions.

Water sprinkling will be used, as needed, to reduce fugitive dust in work zones.

All tools, equipment, barricades, signs, surplus materials, and rubbish will be removed from the project work limits upon project completion.

Erosion-control BMPs for drainage and sediment control will be implemented to prevent or reduce nonpoint source pollution and minimize soil loss and sedimentation in drainage areas. These BMPs may include, but are not limited to, silt fencing, filter fabric, temporary sediment ponds, check dams of pea gravel-filled burlap bags or other material, and/or immediate mulching of exposed areas to minimize sedimentation and turbidity impacts as a result of construction activities. Silt fencing fabric will be inspected daily during project work, and weekly after project completion, until removed. Silt removal will be accomplished in such a way as to avoid introduction into any flowing water bodies.

Regular site inspections will be conducted to ensure that erosion-control measures are properly installed and functioning effectively.

A SWMP will be developed as part of the National Pollutant Discharge Elimination System (NPDES) Stormwater permit with the Colorado Water Quality Control Division prior to construction.

All equipment will be maintained in a clean and well-functioning state to avoid or minimize contamination from fluids and fuels. Prior to starting work each day, all machinery will be inspected for leaks (e.g., fuel, oil, and hydraulic fluid), and all necessary repairs will be made before work begins.

A hazardous spill plan will be required from the contractor prior to the start of construction stating what actions will be taken in the case of a spill and preventive measures to be implemented. Hazardous spill clean-up materials will be on-site at all times. This measure is designed to avoid/minimize the introduction of chemical contaminants associated with machinery (e.g., fuel, oil, and hydraulic fluid) used in project implementation.

All temporarily disturbed ground will be reclaimed using appropriate BMPs and use of native plants. Until the soil is stable and vegetation is established, erosion-control measures will be implemented to minimize erosion and prevent sediment from reaching streams.

To prevent the introduction of, and minimize the spread of, nonnative vegetation and noxious weeds, the following measures will be implemented during construction:

- Soil disturbance will be minimized.
- All haul trucks bringing fill materials will be covered to prevent seed transport.
- Vehicle and equipment parking will be limited to within construction limits or approved staging areas, and these sites will be treated for exotic species if necessary.
- All fill, rock, and additional topsoil will be obtained from weed-free sources.

Monitoring and follow-up treatment of exotic vegetation will occur after project activities are completed.

No construction activities will occur at night. Night is defined from 7:00 p.m. or sunset (whichever is earlier) until 7:00 a.m.

Transmission construction must meet the National Electric Safety Code regulations and guidelines set forth in Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006 (Avian Power Line Interaction 9APLIC) 2006), which provides information on specialized design for avian use to prevent electrocution including, providing for a minimum of 60 inch (or appropriate to species expected in area) spacing of conductors and grounded hardware.

The construction contractor will be required to keep all garbage and food waste contained and removed daily from the work site to avoid attracting wildlife into the construction zone. Construction workers will be instructed to remove food scraps and not feed or approach wildlife.

Should the Contractor, any of the Contractor's employees, or parties operating for or associated with the Contractor discover or encounter evidence of possible cultural or paleontological resources, the Contractor shall immediately cease all ground-disturbing activities in the vicinity of the site and notify the Area Manager, giving the location and nature of the findings. The

Contractor shall secure the discovery area from further disturbance. The Contractor shall not resume work within the vicinity until notified by the Area Manager.

Northern Water shall immediately provide an oral notification to Reclamation's authorized official of the discovery of human remains on Reclamation land. Northern Water shall forward a written report of their findings to Reclamation's authorized official within 48 hours by certified mail. Northern Water shall cease activity, and stabilize and protect such discoveries until authorized to proceed by Reclamation's authorized official. Protective and mitigative measures specified by Reclamation's authorized official shall be the responsibility of Northern Water.

Construction will not occur on weekends or holidays.

There will be no road closures during construction to minimize disruption in traffic flow.

The power house will be constructed with an earth-tone architectural block veneer.

Outdoor lighting will be kept to a minimum and will use fixtures that point downward.

Construction traffic will generally be limited to daylight hours and will not be earlier than 7:00 a.m.

The turbines and generators will be fully enclosed by the power house, which will be insulated to reduce noise outside the building.

RECLAMATION

Managing Water in the West

EA No. 2010-16A

Carter Lake Hydropower Project

Environmental Assessment

U.S. Department of the Interior
Bureau of Reclamation
Great Plains Region
Eastern Colorado Office

August 2010

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Prepared by
ERO Resources Corporation
For Bureau of Reclamation and Northern Colorado Water Conservancy District

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Carter Lake Hydropower Project Environmental Assessment

1.0 Purpose and Need

1.1 Introduction

The United States Bureau of Reclamation is proposing to enter into a Lease of Power Privilege (LOPP) contract. The contract would allow connection to the existing Carter Lake Dam Outlet and use of water released from the outlet for the generation of hydroelectric power. Issuing the contract would lead to the construction, operation, and maintenance of a nonfederal hydroelectric generation facility on Carter Lake Dam Number 1, Colorado Big-Thompson Project (C-BT), and associated power transmission lines and facilities. In May 2009, Reclamation issued a notice of intent to accept proposals for a contract to develop hydroelectric power. In November 2009, Reclamation selected the Northern Water Conservancy District (Northern Water) as the potential lessee for development of hydropower at Carter Lake Dam Outlet under a LOPP contract.

This Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508), and the U.S. Department of the Interior's NEPA regulations (43 CFR Part 46). The EA is not a decision document, but rather a disclosure of the environmental consequences of the No Action and Proposed Action alternatives.

1.2 Project Purpose and Need

The purpose of a LOPP contract is to ensure the Proposed Action is implemented consistent with established authorities for operation of Carter Lake Dam. The contract is an instrument that would allow Northern Water to connect to Reclamation's Carter Lake Dam Outlet and use water releases to generate hydroelectric power, as an incidental use to the authorized delivery of water for C-BT and other nonproject purposes. The need for the LOPP contract is to protect Reclamation's interests in the form of a long-term formal agreement for the arrangement and conditions of use of Carter Lake facilities while providing for hydropower generation.

1.3 Decision to be Made

Reclamation's decision for the Proposed Action is whether or not to issue a LOPP contract. Once issued, Northern Water would be provided the opportunity to construct and operate a nonfederal power generation facility at the federal Carter Lake Dam Outlet. The LOPP contract would ensure that the nonfederal facilities are constructed and operated in compatibility with Reclamation's needs. In order to make an informed decision, Reclamation will consider the environmental consequences of the Proposed Action and the subsequent construction, operation, and maintenance of power generation

facilities. In addition to engineering compatibility, the decision may incorporate other design and operational measures necessary to meet environmental responsibilities.

1.4 Study Area

The proposed project is on the downstream side of Carter Lake Dam Number 1, approximately 6 miles west of the town of Berthoud in Larimer County, Colorado (Figure 1). The project would be constructed in the northeast ¼ of the southeast ¼ of Section 10, Range 70 North, Township 4 West. The northing-easting coordinates of the project are 105 degrees, 12 minutes, 33 seconds West; and 40 degrees, 19 minutes, 27 seconds North.

1.5 History and Background

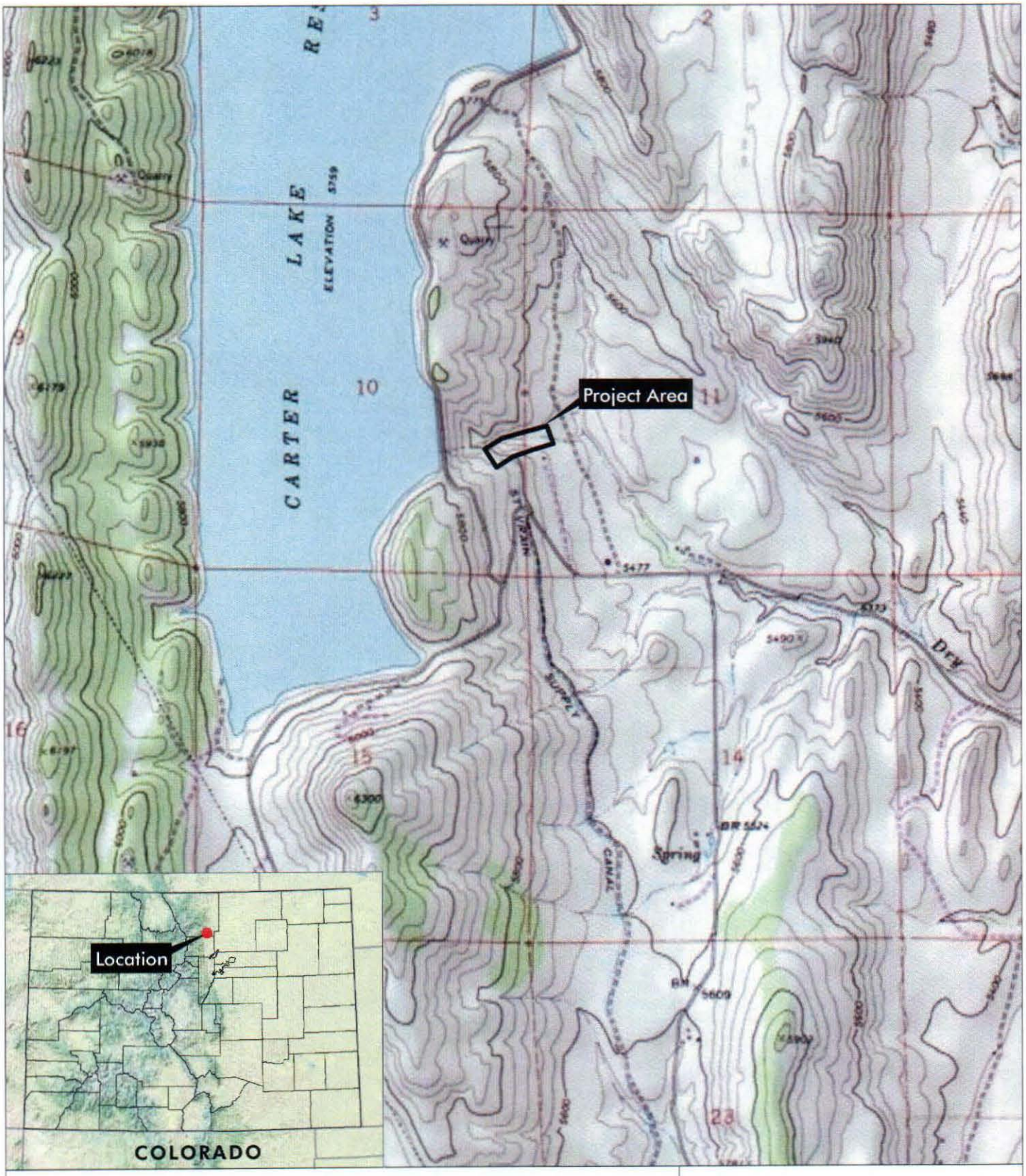
Carter Lake (the reservoir) is an 112,000-acre-foot impoundment in the foothills west of Berthoud, Colorado. Carter Lake lies in a natural basin at an elevation of 5,760 feet. The reservoir is created by three dams, the largest of which is Carter Lake Dam Number 1. The reservoir is bordered to the west by Chimney Hollow ridge, which runs north-south. Carter Lake is about 3 miles long and about 1 mile wide, and is bordered by about 1,000 acres of public land. The reservoir is owned by Reclamation as part of the C-BT Project and operated and maintained by Northern Water.

1.5.1 Operation of Carter Lake Dam Outlet Works

Northern Water delivers water from Carter Lake to agricultural, municipal, and industrial users. Water delivered from the C-BT system is pumped from Flatiron Reservoir to Carter Lake and released via either the original Carter Lake Dam Outlet (original outlet) or the Carter Lake Supplemental Outlet (supplemental outlet). C-BT water is released through an energy dissipation structure before being delivered into the adjacent St. Vrain Supply Canal owned by Northern Water. Releases are made based on water orders that typically range from approximately 30 cubic feet per second (cfs) during the winter to 500 cfs during the summer. Prior to 1995, Northern Water delivered water from Carter Lake only during the crop irrigation season (April through October). In 1995, Northern Water completed the Southern Water Supply Project, a pipeline that delivers water from Carter Lake to municipal and industrial users in Northern Water's service area. The original outlet was designed to deliver water during the crop irrigation season with annual maintenance occurring during the winter; however, an increase in the number of municipal water users in Northern Water's service area has resulted in the need for year-round deliveries.

1.5.2 Carter Lake Supplemental Outlet

Northern Water completed the supplemental outlet at Carter Lake in cooperation with Reclamation in June 2008. The purpose of the supplemental outlet is to provide redundancy to the original outlet and facilitate year-round deliveries of water. The supplemental outlet project consisted of a multilevel outlet tower; an 800-foot-long, 72-inch-diameter tunnel; a flow meter structure; approximately 400 feet of pipeline; and an energy dissipation structure. The design flow rate for these facilities is 250 cfs. The supplemental outlet connects to the St. Vrain Supply Canal, which is owned and operated by Northern Water.



Carter Lake Dam Hydroelectric Project
Sections 10 and 11, T4N, R70W; 6th PM
UTM NAD 83: Zone 13N; 482264mE, 4463774mN
Latitude, Longitude: 40.32431°N, 105.20877°W
USGS Carter Lake Reservoir, CO Quadrangle
Larimer County, Colorado

0 1,000 2,000 Feet
1:24,000

N

Figure 1
Site Location

Prepared for: NWCD
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March 2010

ERO
ERO Resources Corp.

Water deliveries are made through the supplemental outlet on a year-round basis. Deliveries range from 30 cfs in the winter to 250 cfs in the summer. Water deliveries in excess of 250 cfs are routed through the original outlet. While the primary purpose of the supplemental outlet is for a redundant point of discharge, the sizing of the tunnel and penstock at 72 inches for 250 cfs was made based on the anticipation of the addition of hydropower. A 72-inch blind flange also was included in this project to allow for future connection of a hydropower facility.

1.5.3 Hydropower at Carter Lake

Northern Water has had a continued interest in the development of hydropower at Carter Lake. In 1982, Northern Water commissioned a feasibility study of the development of hydropower at Carter Lake and submitted a License Application to the Federal Energy Regulatory Commission (FERC). However, because of changes in the power market and technical difficulties in determining the method for lining the original outlet tunnel while providing the necessary drainage, the License Application was allowed to expire. In 1999, Northern Water commissioned another feasibility study for a new outlet with hydropower capacity. In 2006, Northern Water and Reclamation prepared the design of the supplemental outlet with a provision for a future hydropower facility.

1.5.4 Lease of Power Privilege

A LOPP is a contractual right given to a nonfederal entity for use of a Reclamation facility in hydroelectric power generation development. A LOPP must be consistent with Reclamation project purposes and be used where Reclamation has the authority to develop power on any or all features of a federal project. Northern Water was granted a Preliminary Permit to study and plan for the proposed hydroelectric power.

1.6 Required Permits and Approvals

Reclamation would comply with all applicable federal and state regulations when implementing the Proposed Action. Permitting and regulatory requirements for the Proposed Action are listed in Table 1.

Table 1. Environmental compliance requirements.

Agency	Statute, Regulation, or Order	Purpose	Project Application
		Federal	
Bureau of Reclamation	National Environmental Policy Act	Applies to federal actions that may significantly affect the quality of the environment.	Environmental review of the Proposed Action and a decision to prepare a FONSI or EIS.
	National Historic Preservation Act, Section 106	Protection of historic and cultural resources in coordination with the State Historic Preservation Office (SHPO).	Reclamation is consulting with the SHPO to address potential effects and mitigation for cultural resources.

Agency	Statute, Regulation, or Order	Purpose	Project Application
	Executive Order 11990, Protection of Wetlands	Requires avoidance of adverse wetland impacts where practicable and mitigation, if necessary.	No wetlands are in the project area.
	Executive Order 11988, Floodplain Management	Requires avoidance of adverse floodplain impacts where practicable and mitigation, if necessary.	The project would have no impact on floodplains.
U.S. Army Corps of Engineers (Corps)	Clean Water Act – Section 404 Permit to discharge dredge and fill material	Authorizes placement of fill or dredge material in waters of the U.S. including wetlands.	The connection to the St. Vrain Supply Canal would be authorized under a Nationwide 404 Permit, if necessary.
U.S. Fish and Wildlife Service (USFWS)	Endangered Species Act	Protection of federally listed threatened or endangered species.	Reclamation consulted with the USFWS as part of the NEPA process.
State of Colorado			
Colorado Water Quality Control Division	National Pollutant Discharge Elimination System (NPDES) Storm Water General Permit for Construction Activities	Erosion control and protection of water quality.	An NPDES Permit and storm water management plan (SWMP) would be developed prior to surface disturbances.
Office of Archaeology and Historic Preservation, Colorado State Historic Preservation Office	Coordination of Section 106 compliance with Reclamation	Determination of eligibility of cultural resources for the National Register of Historic Places (NRHP), significance of impacts, and appropriate mitigation measures.	Surface-disturbing activities, where cultural resources have been identified.

1.7 Scoping

Scoping is an early and open process to determine the issues and alternatives to be addressed in an EA. Reclamation interdisciplinary staff conducted internal scoping to define the purpose and need, identify potential actions to address the need, and determine the likely issues and impact topics.

Reclamation initiated public scoping on April 15, 2010, with a press release to provide the public and interested parties an opportunity to comment on the proposed project (Appendix A). Reclamation also sent letters to interested individuals; organizations; state, county, and local governments; and federal agencies describing the Proposed Action and asking for comment.

On April 21, 2010, Reclamation held a public scoping open house at the Larimer County Bison Center in Loveland, Colorado to allow the public to learn more about the Proposed Action, identify issues, and comment on the project. Comments on the Proposed Action were solicited through May 7, 2010. Four individuals attended the public open house and one individual provided written comments on the proposed project.

Primary issues of concern identified during scoping included physical changes to water released and potential impacts to wildlife, mainly raptors. Additional information on the scoping and agency consultation process is found in Chapter 4 – Consultation and Coordination.

1.8 Issues and Impact Topics

During consideration of the proposed contract, Reclamation conducted internal and external agency scoping to determine the issues relevant to the proposed project. Below is a summary of impact topics Reclamation identified for further evaluation in Chapter 3 – Affected Environment and Environmental Consequences and those considered but excluded from further evaluation.

The following impact topics were identified in scoping for further analysis in the EA: water quality; geology and soils; vegetation; fish and wildlife; threatened, endangered, and special status species; cultural resources; recreation; visual resources; noise; and transportation. These topics are addressed in Chapter 3 – Affected Environment and Environmental Consequences.

1.8.1 Impact Topics Considered but Excluded from Further Evaluation

The following impact topics or issues were eliminated from the list of potential impacts because the proposed project would have no or negligible adverse effects on the resources.

Air Quality

Air quality in the project area is typical of undeveloped regions in the western United States. The nearest Class I airshed is Rocky Mountain National Park, approximately 16 miles west of the project area. The No Action Alternative would have no effect on existing air quality. Earthwork and hauling material during construction would temporarily increase dust and vehicle emissions under the Proposed Action, and would result in localized effects on air quality. Hydrocarbons, nitrogen oxide, and sulfur dioxide vehicle emissions would be rapidly dissipated; and visibility, deposition, and other air quality-related values are not expected to be appreciably impaired. These effects would be short-term, negligible, and adverse. Neither local air quality nor regional air quality would be more than negligibly affected by the short-term increase in emissions. Because the Proposed Action would result in short-term negligible adverse effects and the No Action Alternative would have no effect, air quality was dismissed as an impact topic in this EA.

Hydrology and Reservoir Operations

Under the No Action Alternative, existing hydrology and the operation of Carter Lake would not change. The Proposed Action includes a connection to the existing 72-inch "Wye," which would require the supplemental outlet to be taken out of service for a short period. During this time, water deliveries would be made through the original outlet. Connection to the St. Vrain Canal would take place during the annual winter inspection and should not require any additional interruption in deliveries.

After completion of the hydropower facility, flows up to 250 cfs would be routed through the hydropower facility before delivery to the St. Vrain Supply Canal. There would be no drawdown of the reservoir and no change in the timing or amount of water released from the reservoir. The Proposed Action would have no long-term effects on hydrology or reservoir operations. There would be no adverse effects to hydrology and reservoir operations under either alternative; therefore, this impact topic was dismissed from additional discussion in this EA.

Wetlands

Executive Order (EO) 11990 directs that wetlands be protected, and that wetlands, and wetland functions and values be preserved. In addition, Section 404 of the Clean Water Act regulates dredge and fill activities within waters of the U.S., including wetlands. The U.S. Army Corps of Engineers (Corps) has determined that Carter Lake and the St. Vrain Supply Canal are jurisdictional waters of the U.S. (Downing, pers. comm. 2010). No wetlands are in the project area, and the St. Vrain Supply Canal is the only water of the U.S. in the project area. The segment of the St. Vrain Supply Canal in the project area is concrete-lined and concrete-covered. Temporary disturbance to the St. Vrain Supply Canal would occur during construction of the tie-in to the canal. Connection to the canal would involve temporary disturbance to the concrete walls of the canal. There would be no loss of wetlands or waters of the U.S. Northern Water worked with the Corps and received verification that no permit is required for the project. Impacts to waters of the U.S. would be negligible and there would be no impacts to wetlands. Because there would be no impacts to wetlands under either alternative and because impacts to waters of the U.S. would be negligible under the Proposed Action, wetlands were dismissed as an impact topic in this EA.

Floodplains

EO 11988 – Floodplain Management requires an examination of impacts to floodplains and potential risks involved in placing facilities within floodplains. No floodplains have been identified in the project area (FEMA 2006). Under the Proposed Action, no proposed work activities or structures would be in a floodplain. Because there would be no impacts to floodplains under either alternative, floodplains were dismissed as an impact topic in this EA.

Prime and Unique Farmlands

In 1980, the Council on Environmental Quality (CEQ) directed federal agencies to assess the effects of their actions on farmland soils classified as prime or unique by the United States Department of Agriculture, Natural Resources Conservation Service (NRCS). Prime or unique farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; and unique farmland produces specialty crops such as fruits, vegetables, and nuts. No prime or unique farmlands occur in the project area; therefore, prime and unique farmlands were dismissed as an impact topic in this EA.

Environmental Justice

Presidential EO 12898 – General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires all federal agencies to incorporate

environmental justice into their missions by identifying and addressing the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities.

Environmental justice is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income; with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Berthoud and surrounding communities contain both minority and low-income populations; however, environmental justice is dismissed as an impact topic in this EA for the following reasons:

- Reclamation actively solicited public participation as part of the planning process and gave equal consideration to all input from persons regardless of age, race, income status, or other socioeconomic or demographic factors.
- Implementation of the Proposed Action would not result in any identifiable adverse human health effects. Therefore, there would be no direct or indirect adverse effects on any minority or low-income population.
- The impacts associated with implementation of the Proposed Action would not disproportionately affect any minority or low-income population or community.
- Implementation of the Proposed Action would not result in any identified effects that would be specific to any minority or low-income community.

Indian Trust Resources

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by the U.S. Department of the Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights. The order represents a duty to carry out the mandates of the federal law with respect to American Indian and Alaska Native tribes. There are no Indian trust resources in the project area. The lands comprising the project area are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Therefore, Indian trust resources were dismissed as an impact topic in this EA.

Socioeconomic Resources

Carter Lake and the C-BT Project are important to the regional economy. Carter Lake is an important storage facility for water on the Front Range. Water stored and released from Carter Lake is used by irrigation users and by municipal and industrial users throughout the area served by Northern Water. The $6.2 million cost of the Proposed Action includes construction-related spending, which would provide a short-term benefit to the local and regional economy from employment opportunities and spending on goods, services, and materials. While some visitors to Carter Lake may be disturbed by noise or activities during construction, no substantial change in visitor attendance affecting local businesses is anticipated. No adverse socioeconomic effects were

identified for the Proposed Action; therefore, this impact topic was dismissed from detailed discussion in this EA.

2.0 Alternatives

2.1 Introduction

This section describes the No Action Alternative and Proposed Action. NEPA requires that the environmental effects of the Proposed Action be compared with the environmental effects of an alternative that does not require a federal action (the No Action Alternative). The No Action Alternative is the same as existing conditions.

2.2 Alternatives Development

Several preliminary alternatives were considered during development of the Proposed Action. Northern Water retained the engineering consulting firm Black & Veatch to prepare an Alternatives Analysis Report. Various turbine configurations were considered, including single turbine options and multiple turbines. A configuration of two identical turbines was selected in order to provide a wide range of flow capability, along with the maintenance benefit of having identical units.

2.3 No Action Alternative

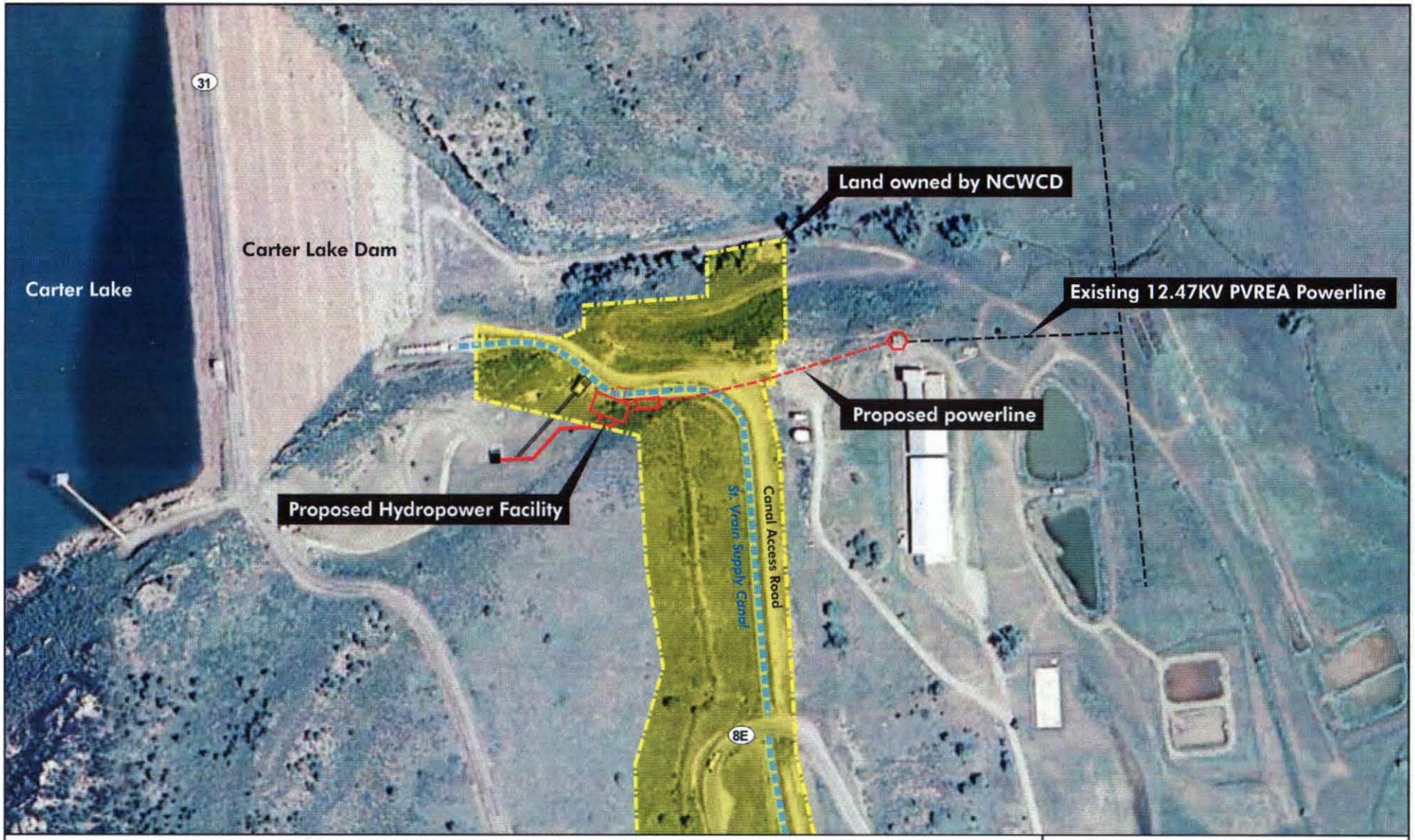
Under the No Action Alternative, Reclamation would not enter into a LOPP with Northern Water, and the proposed Carter Lake hydropower facility would not be constructed. Operation of the Carter Lake Dam Outlet would continue as it has in the past. Water would continue to flow through the dam via either the supplemental outlet or the original outlet before being discharged to the St. Vrain Supply Canal. Under the No Action Alternative, potential energy of the discharged water would continue to be dissipated as heat and vibration.

2.4 Proposed Action

Under the Proposed Action, Reclamation would grant a LOPP to Northern Water. Northern Water would construct, operate, and maintain the Carter Lake Hydropower Facility. The components of the Proposed Action are described below and are shown in The components of the Proposed Action are described below and are shown in Figure 2 and Figure 3.

2.4.1 Hydropower Facility Construction

The Carter Lake Hydropower Facility (the hydropower facility) would include a penstock tying into the existing supplemental outlet, a 48-inch bifurcation, a power house, two turbines, a tie-in to the existing St. Vrain Canal, an electrical substation, and approximately 1,000 feet of new power transmission line. The estimated cost of the project is $6.2 million, with an additional $300,000 (about 5 percent) estimated for contingencies. The project would be funded by Northern Water. The anticipated annual output would be approximately 10 gigawatt-hours.



Carter Lake Dam Hydroelectric Project

0 100 200 Feet

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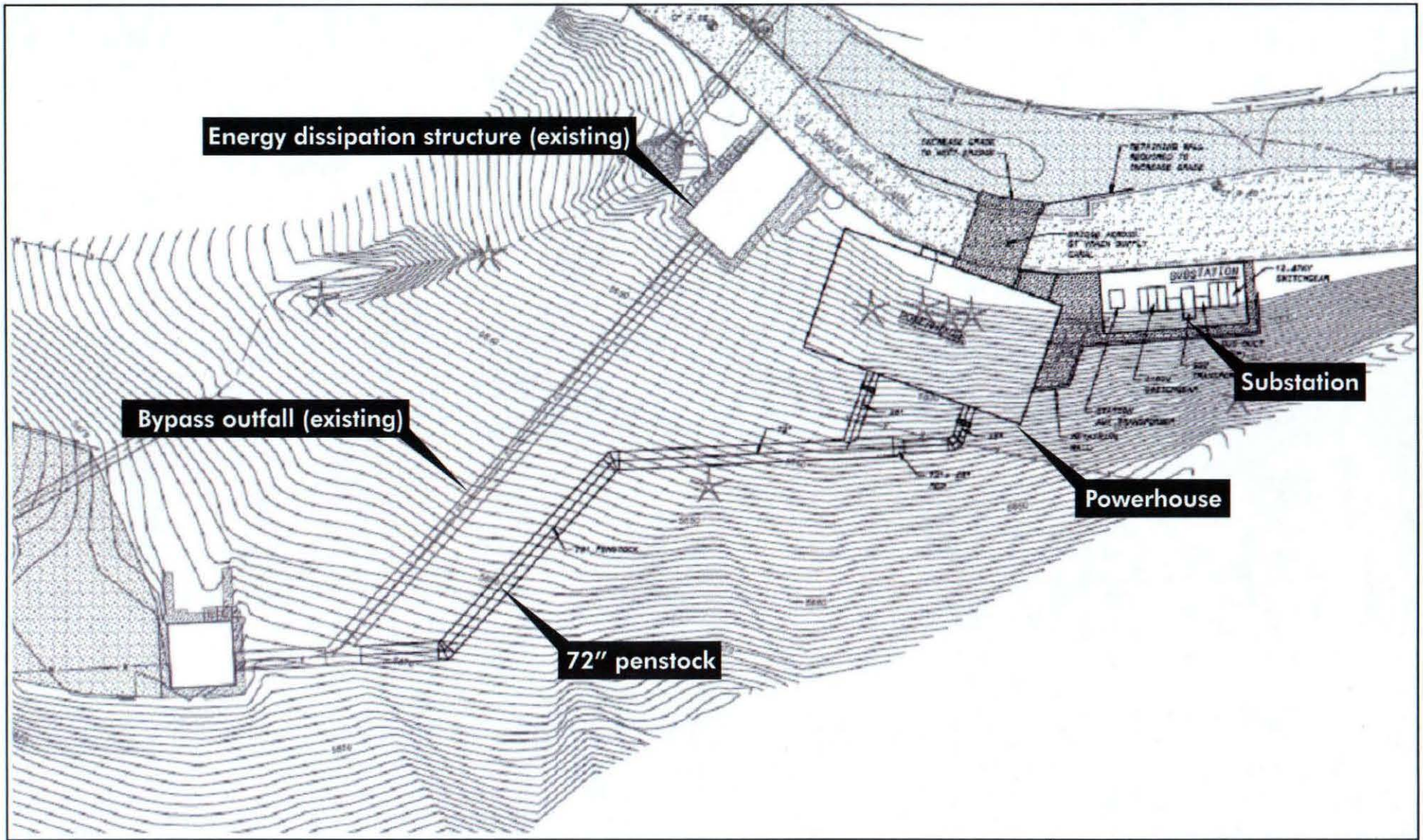
Figure 2
Project Overview

Prepared for: NCWCD
File: 4642 Figure 2.pdf
April 2010

ERO
ERO Resources Corp.



Carter Lake Dam Hydroelectric Project

Figure 3
Project Components

Not to Scale

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Prepared for: NCWCD
File: 4642 Figure 3.pdf
April 2010

ERO
ERO Resources Corp.

Penstock

The penstock would connect the existing supplemental outlet to the proposed power plant. The penstock would be 72 inches in diameter, approximately 200 feet long, and would use an existing connection point (a blind flanged wye) to connect to the supplemental outlet. Connection to the 72-inch wye would require the supplemental outlet to be taken out of service for a short period. During this time, deliveries would be made through the original outlet. A portion of the penstock would be on land owned by Northern Water and a portion would be on land owned by Reclamation. The penstock would be constructed in an area previously disturbed during construction of the supplemental outlet, and would be designed to deliver up to 250 cfs of water.

Power House and Turbines

The penstock would split into two 48-inch-diameter pipes just above the power plant and the pipes would deliver water to two synchronous 1,300-kilowatt horizontal Francis turbines. The turbines, generators, and other appurtenances would be enclosed within a 72-foot by 38-foot power house to be constructed on land owned by Northern Water. The power house would be designed to blend into the existing landscape using earth-tone architectural block veneer. Outdoor lighting would be kept to a minimum and would use fixtures that point downward. The power house would be primarily in an area previously disturbed by construction of the St. Vrain Supply Canal. A small amount of new disturbance to the adjacent hillside would occur. The amount of new disturbance in the adjacent hillside would be less than 0.10 acre.

Substation and Power Line

A substation with a switchyard and transformer would be constructed adjacent to the power house on land owned by Northern Water. A 12.47 kilovolt (Kv), three-phase power line would be constructed from the substation to an existing power pole just north of the existing Carter Lake Filter Plant Number 1, which is owned jointly by the Little Thompson and Central Weld County water districts. This 1,000-foot-long power line would parallel the St. Vrain Supply Canal to the east in a previously disturbed area. No previously undisturbed area would be impacted from construction of the power line.

St. Vrain Supply Canal Connection

A portion of the canal wall would be cut from the outside using a saw. The concrete connection from the hydropower facility to the canal would be poured up to the canal wall. A portion of the wall would then be removed from the outside. Any minor spalling of the wall from the saw would be patched. There would be no construction inside the canal. Connection to the St. Vrain Supply Canal would take place during the annual winter inspection and should not require any additional interruption in deliveries. Water users would be notified at least 80 days in advance of the shutdown.

Site Access

Site access for construction would be via the existing canal road and the road to the supplemental outlet meter structure. No new roads would be constructed as part of the project.

Schedule

Upon receiving approval of the LOPP from Reclamation, Northern Water would commence preparing plans and specifications for the project. The turbine/generator is expected to take 61 weeks to procure. Therefore, this equipment would be purchased by Northern Water before site construction. The remainder of the project would be bid in November 2010. Site construction is anticipated to last approximately 1 year, from early 2011 through early 2012. The project is anticipated to be ready for testing in late 2011; however, in order to allow the units to be tested to their full operational flow (125 cfs each), testing would not occur until April 1, 2012, when the St. Vrain Supply Canal is ready for the irrigation season.

2.4.2 Hydropower Facility Operation

Water Releases

The hydropower facility would be integrated into the existing outlet operations at Carter Lake Dam Number 1. Northern Water would run the hydropower facility remotely. Northern Water would continue to release water from the reservoir into the St. Vrain Supply Canal based upon water orders placed by C-BT and Windy Gap allottees. Water releases from Carter Lake mainly occur during mid-May through mid-October as the elevation in the lake is drawn down. Carter Lake is refilled from October to May. Northern Water would discharge all water releases up to 250 cfs through the new hydropower facility. Water releases that exceed 250 cfs would be discharged through the original outlet. Delivery patterns would continue to be based upon water orders. Therefore, the hydropower facility would act as "run-of-river" and would not affect the operations of the C-BT Project. The hydropower facility would not affect reservoir operations or reservoir levels.

Energy Output

Carter Lake Dam provides the hydraulic head required to generate power. Reclamation will receive a lease payment from Northern Water for the use of government facilities which allows them to generate power at Carter Lake Dam.

The expected average monthly discharge, elevation, head, and hydropower unit output of the proposed hydropower facility are listed in Table 2. With a maximum head at full reservoir of approximately 150 feet, the rated output of the hydropower facility would be 2,600 kilowatts. The anticipated annual output is approximately 10 gigawatt-hours. The energy associated with the water presently discharged through both the original outlet and the supplemental outlet is dissipated as vibration and heat. The hydropower facility would put this otherwise wasted energy into productive service. The energy associated with the proposed project would fall under the category of "green" energy because it does not require any additional impoundment and does not alter the existing use of any streams, rivers, or impoundments.

Table 2. Modeled Carter Lake average monthly elevation, discharge, hydro capacity, and hydropower output based on 1950 – 1994 average hydrology.

Month	End of the Month Elevation (ft)	Outlet Discharge (cfs)	Hydro Capacity (Avg. kW)	Hydropower Output (MWhrs)
January	5,759	32	0	0
February	5,759	40	0	0
March	5,759	39	0	0
April	5,759	87	942	678
May	5,759	151	1,736	1,291
June	5,756	245	2,426	1,746
July	5,749	381	2,657	1,977
August	5,740	400	2,483	1,847
September	5,742	242	2,279	1,641
October	5,749	123	1,270	945
November	5,756	33	0	0
December	5,758	30	0	0

Future winter releases are expected to continue to increase from the present winter flow of 30 cfs to 50 cfs or greater. A flow of 50 cfs would be the minimum flow at which one of the turbines could operate (at 40 percent capacity). When winter deliveries rise to 50 cfs or greater, the typical winter output would be approximately 500 kilowatts (kWs) with a typical monthly output of 360 megawatt hours (MWhrs), which would add approximately 1,800,000 MWhrs to the annual total output.

Northern Water expects to sell the produced power to either Western Area Power Administration (Western) or to Tri-State Generation and Transmission Association, Inc. (Tri-State). Under the LOPP, Western would have the first right of refusal to the power. In the event that Western does not exercise its right, Tri-State has expressed interest in purchasing the power. In either case, Northern Water, acting through a new Hydropower Water Activity Enterprise, would enter into a power purchase contract where power would be purchased on a per-kilowatt-hour basis. It is anticipated that the cost per kilowatt-hour (kWhr) would be a fixed rate of $0.07/kWhr over the term of the contract, with an additional $0.01/kWhr that would escalate at the rate of inflation associated with the LOPP annual cost, and operation and maintenance costs (Note: 1,000 kWhrs equals 1 MWhr). The $0.07/kWhr portion may be reduced to as little as $0.05/kWhr if the corresponding capital cost of the project is proportionally lower than the estimated $6.2 million amount. In no case would the total cost per kWhr (fixed plus variable) be less than $0.06/kWhr. The term of the power purchase contract is anticipated to be 20 years with a renewal clause. Northern Water would sell the power at the meter location at the on-site switchyard.

Environmental Commitments

Environmental commitments to protect natural resources, cultural resources, and other values, as described in Table 3, will be implemented prior, during, or after project construction. Many of these obligations are considered best management practices (BMPs) for construction projects to control erosion, revegetate disturbed areas, control

weeds, and minimize resource impacts. The status of each commitment's effectiveness and completion will be part of an implementation plan or conditions to be developed by Reclamation.

Table 3. Environmental Commitments

Resource Area	Commitment
General Construction Considerations	Construction zones would be identified with construction fence, silt fence, or similar material prior to any construction activity. The fencing would define the construction zone and confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications, and workers would be instructed to avoid conducting activities beyond the construction zone. Disturbances would be limited to specifically designated construction limits. No machinery, vehicles, or equipment would access areas outside the construction limits. Construction equipment staging would occur within existing areas of disturbance. Off-site equipment and vehicle parking would be limited to designated staging areas. Contractors would be required to properly maintain construction equipment to minimize noise (i.e., mufflers and brakes). Construction vehicle engines would not be allowed to idle for extended periods. Material and equipment hauling would comply with all legal load restrictions. Water sprinkling would be used, as needed, to reduce fugitive dust in work zones. All tools, equipment, barricades, signs, surplus materials, and rubbish would be removed from the project work limits upon project completion.
Water Quality and Soils	Erosion-control BMPs for drainage and sediment control would be implemented to prevent or reduce nonpoint source pollution and minimize soil loss and sedimentation in drainage areas. These BMPs may include, but are not limited to, silt fencing, filter fabric, temporary sediment ponds, check dams of pea gravel-filled burlap bags or other material, and/or immediate mulching of exposed areas to minimize sedimentation and turbidity impacts as a result of construction activities. Silt fencing fabric would be inspected daily during project work, and weekly after project completion, until removed. Silt removal would be accomplished in such a way as to avoid introduction into any flowing water bodies. Regular site inspections would be conducted to ensure that erosion-control measures are properly installed and functioning effectively. A Stormwater Mitigation Plan (SWMP) would be developed as part of the National Pollutant Discharge Elimination System (NPDES) Stormwater permit with the Colorado Water Quality Control Division prior to construction. All equipment would be maintained in a clean and well-functioning state to avoid or minimize contamination from fluids and fuels. Prior to starting work each day, all machinery would be inspected for leaks (e.g., fuel, oil, and hydraulic fluid), and all necessary repairs would be made before work begins. A hazardous spill plan would be required from the contractor prior to the start of construction stating what actions would be taken in the case of a spill and preventive measures to be implemented. Hazardous spill clean-up materials would be on-site at all times. This measure is designed to avoid/minimize the introduction of chemical contaminants associated with machinery (e.g., fuel, oil, and hydraulic fluid) used in project implementation.

Resource Area	Commitment
Vegetation	All temporarily disturbed ground would be reclaimed using appropriate BMPs and use of native plants. Until the soil is stable and vegetation is established, erosion-control measures would be implemented to minimize erosion and prevent sediment from reaching streams. To prevent the introduction of, and minimize the spread of, nonnative vegetation and noxious weeds, the following measures would be implemented during construction: • Soil disturbance would be minimized. • All haul trucks bringing fill materials would be covered to prevent seed transport. • Vehicle and equipment parking would be limited to within construction limits or approved staging areas, and these sites would be treated for exotic species if necessary. • All fill, rock, and additional topsoil would be obtained from weed-free sources. • Monitoring and follow-up treatment of exotic vegetation would occur after project activities are completed.
Fish, Wildlife, and Special Status Species	No construction activities will occur from 7:00 p.m. or sunset (whichever is earlier) until 7:00 a.m. Transmission construction must meet the National Electric Safety Code regulations and guidelines set forth in Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006 (Avian Power Line Interaction 9APLIC) 2006), which provides information on specialized design for avian use to prevent electrocution including, providing for a minimum of 60 inch (or appropriate to species expected in area) spacing of conductors and grounded hardware. The construction contractor would be required to keep all garbage and food waste contained and removed daily from the work site to avoid attracting wildlife into the construction zone. Construction workers would be instructed to remove food scraps and not feed or approach wildlife.
Cultural Resources	Should the Contractor, any of the Contractor's employees, or parties operating for or associated with the Contractor discover or encounter evidence of possible cultural or paleontological resources, the Contractor shall immediately cease all ground-disturbing activities in the vicinity of the site and notify the Area Manager, giving the location and nature of the findings. The Contractor shall secure the discovery area from further disturbance. The Contractor shall not resume work within the vicinity until notified by the Area Manager. Northern Water shall immediately provide an oral notification to Reclamation's authorized official of the discovery of human remains on Reclamation land. Northern Water shall forward a written report of their findings to Reclamation's authorized official within 48 hours by certified mail. Northern Water shall cease activity, and stabilize and protect such discoveries until authorized to proceed by Reclamation's authorized official. Protective and mitigative measures specified by Reclamation's authorized official shall be the responsibility of Northern Water.
Recreation and Transportation	Construction would not occur on weekends or holidays. There would be no road closures during construction to minimize disruption in traffic flow.
Visual Resources	The power house would be constructed with an earth-tone architectural block veneer. Outdoor lighting would be kept to a minimum and would use fixtures that point downward.

Resource Area	Commitment
Noise	Construction traffic would generally be limited to daylight hours and would not be earlier than 7:00 a.m. The turbines and generators would be fully enclosed by the power house, which would be insulated to reduce noise outside the building.

3.0 Affected Environment and Environmental Consequences

3.1 Introduction

This chapter describes the affected environment and discloses the potential environmental consequences associated with implementing the No Action and Proposed Action alternatives described in Chapter 2. Resources evaluated in this chapter include water quality; geology and soils; vegetation; fish and wildlife; threatened, endangered, and special status species; cultural resources; recreation; visual resources; noise; and transportation.

3.2 General Methods

The No Action Alternative provides a baseline condition, which was used to evaluate the level of potential impacts resulting from the implementation of the Proposed Action. The analysis is based on the assumption that the measures identified in the "Mitigation" section of this EA (Table 3) would be implemented for the Proposed Action. Reclamation based these impact analyses and conclusions on the review of existing literature and studies; information provided by other agencies, professional judgment and staff insights; site review; and public input.

The following terms are used in the discussion of environmental consequences to assess the impact intensity threshold and the nature of impacts associated with each alternative.

Type: Impacts can be beneficial or adverse (Table 4).

Table 4. Impact types.

Impact Type	Description
Beneficial	A positive change in the condition or appearance of the resource, or a change that moves the resource toward a desired condition.
Adverse	A negative change that detracts from the resource's appearance or condition, or a change that moves the resource away from a desired condition.

Context: Context is the setting within which an impact would occur, such as local (in the project area) or regional (in Larimer County, Colorado, and nearby).

Impact Intensity: The impact intensity for each resource is identified as no impact; or impacts may be negligible, minor, moderate, or major (Table 5).

Table 5. Impact intensity.

Impact Intensity	Description
No impact	No discernable effect.
Negligible	Effect is at the lowest level of detection and causes very little or no disturbance.
Minor	Effect that is slight, but detectable, with some perceptible effects of disturbance.
Moderate	Effect is readily apparent and has measurable effects of disturbance.
Major	Effect is readily apparent and has significant effects of disturbance.

Duration: For purposes of this analysis, impact duration is described as short-term or long-term. Short-term impacts last no longer than one year after construction. Long-term impacts last no more than one year beyond the completion of construction.

Direct and Indirect Impacts: Effects can be direct, indirect, or cumulative. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later or farther away, but are still reasonably foreseeable.

Direct and indirect impacts are considered in this analysis, but are not specified in the narratives. Cumulative effects are discussed in the next section.

3.3 Cumulative Effects

Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time. The CEQ regulations that implement NEPA require the assessment of cumulative impacts in the decision-making process for federal projects.

3.3.1 Methods for Assessing Cumulative Effects

Cumulative impacts were determined by combining the impacts of the Proposed Action or No Action Alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects near the project area that may contribute to cumulative impacts. The geographic scope of the analysis includes actions in the project area as well as other actions in surrounding lands where overlapping resource impacts are possible. The temporal scope includes projects within a range of approximately 10 years.

Past, present, and reasonably foreseeable actions were assessed in conjunction with the impacts of the alternatives to determine if they would have any added adverse or beneficial effects on a particular resource. The impacts of reasonably foreseeable actions vary for each of the resources. Cumulative effects are considered for each alternative and are presented in the Environmental Consequences discussion for each impact topic.

3.3.2 Past and Current Actions

Past actions include activities that have influenced and affected the current conditions of the environment near the project area within the past 10 years. The project area has been affected by construction of the supplemental outlet in 2008. The project area continues to be affected by ongoing use of the original outlet, the supplemental outlet, the St. Vrain Supply Canal, and the canal access road. The surrounding area continues to be affected by the use and operation of the reservoir, roads, and other facilities at Carter Lake.

3.3.3 Future Actions

No reasonably foreseeable future actions were identified to occur in or near the project area.

3.4 Water Quality

3.4.1 Affected Environment

Carter Lake historically has had clear, high quality water that is low in nutrients and metal concentrations (Reclamation 2007). Carter Lake is assigned the following beneficial uses by the Colorado Water Quality Control Commission (WQCC):

- Aquatic Life Cold Water Class 1—(1) currently capable of sustaining a wide variety of cold water biota, including sensitive species, or (2) could sustain such biota but for correctable water quality conditions.
- Recreation Class E—primary contact recreation.
- Water Supply—suitable or intended to become suitable for potable water supplies.
- Agriculture—suitable for crop irrigation and stock watering.

Currently, the water quality in Carter Lake does not meet all of the water quality standards established by the state. Carter Lake is listed as impaired for aquatic life use (mercury fish consumption advisory) on the 303(d) list of water quality-limited segments requiring Total Maximum Daily Loads (TMDLs) (CDPHE 2010). In 2007, a fish consumption advisory was issued for walleye at Carter Lake after routine monitoring found that some walleye from Carter Lake exceeded the mercury action level of 0.5 parts per million set by CDPHE. Consuming fish that exceed this level may cause health problems, especially for pregnant women and small children. The source of the mercury contamination is atmospheric deposition. Carter Lake also is on the 303(d) monitoring and evaluation list for copper and arsenic (CDPHE 2010).

Water released through the outlets passes through an energy dissipation structure. Energy in the water is dissipated as heat and vibration before the water is released to the St. Vrain Supply Canal. Under current conditions, a small amount of heat is transferred to the water released to the St. Vrain Supply Canal. Water passing through the supplemental outfall becomes saturated with oxygen due to the churning action of the energy dissipation structure, increasing the concentration of dissolved oxygen in water released into the St. Vrain Supply Canal.

3.4.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative the proposed hydropower facility would not be constructed. There would be no change from existing conditions and there would be no effects on water quality.

Proposed Action

Proposed construction activities, such as excavation to install the penstock and land clearing to construct the power house and substation, would potentially affect the water quality of surface runoff. Erosion and sediment transport are possible from excavation and land-clearing activities that expose soil during construction. Sediment could potentially reach Dry Creek and downstream waters. Soil- and erosion-control BMPs would be used during construction to reduce the potential for sediment transport. Construction and operation of the hydropower facility would not result in changes in water levels or operations, and would not affect water quality in Carter Lake. Under the Proposed Action, water would be routed through the hydropower facility instead of the energy dissipation structure, which could result in a slight decrease in temperature of water released to the St. Vrain Supply Canal over the long term compared to existing conditions. The decrease in temperature would be barely perceptible and would have a negligible impact on water quality in the St. Vrain Supply Canal. Water passing through the turbines would absorb oxygen from the air. The increase in dissolved oxygen would not be as much as under current conditions when water passes through the energy dissipation structure, resulting in a slight decrease in dissolved oxygen in water released to the St. Vrain Supply Canal compared to current conditions. Therefore, it is expected that the implementation of the Proposed Action would cause beneficial and adverse localized short-term negligible impacts to water quality.

3.4.3 Cumulative Impacts

No Action Alternative

There would be no effects to water quality under the No Action Alternative and, therefore, there would be no cumulative impacts.

Proposed Action

Construction of the supplemental outlet involved excavation and other construction activities that disturbed soils in the project area, potentially resulting in impacts to water quality in downstream waters. Construction of the supplemental outlet also involved the drawdown of the reservoir during construction, which may have had short-term minor adverse impacts to water quality. The ongoing operation of the original outlet, supplemental outlet, and St. Vrain Supply Canal likely has had no long-term effect on Carter Lake water quality. The cumulative impacts to water quality from the Proposed Action and other past and present activities would be localized, short-term, negligible, and adverse.

3.5 Geology and Soils

3.5.1 Affected Environment

Carter Lake is contained in a natural topographic basin bordered by hogback ridges of the Lyons Sandstone Formation on the west and the Dakota and Morrison formations on the east. The east side of the lake is dominated by colorful irregular hogbacks and rock outcroppings, including the Carter Lake anticline. The Carter Lake anticline is an area of folded sedimentary rock north of Dam Number 1. Dam Number 1 occupies a gap across the Dakota sandstone hogback, and is founded on Morrison shale and limestone, and Sundance sandstone. The abutments of the dam are Dakota sandstone and shale (Reclamation 2010). There are no known commercial mineral deposits within the project boundaries (Reclamation 2007).

The Natural Resource Conservation Service (NRCS) has mapped the soils in the project area as Baller-rock outcrop complex, 15 to 45 percent slopes (NRCS 2009). Baller soils occur on hogbacks and ridges, and are composed of material weathered from sandstone. These soils typically are comprised of shallow stony, sandy loam over bedrock. Rock outcrops are composed of unweathered bedrock. These soil types are susceptible to erosion due to steep slopes, and have low available water capacity. The soils in the project area have been previously disturbed by construction of the St. Vrain Supply Canal, Carter Lake Dam Number 1, and the supplemental outlet.

3.5.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed hydropower facility would not be constructed. There would be no change from existing conditions and there would be no effects on geology and soils.

Proposed Action

Construction of the hydropower facility would include activities such as ground clearing and excavating for the penstock, power house, substation, and power lines. These activities would occur mostly within previously disturbed areas, but also would affect a very small portion of undisturbed soils. Construction of the hydropower facility would result in a surface disturbance of less than 1 acre, including less than 0.10 acre within a previously undisturbed area. Exposed soil material during construction would be subject to erosion until stabilized or revegetated. A short-term loss of soil productivity would occur until soils are replaced and disturbed areas are fully revegetated. The planned use of temporary erosion-control BMPs would reduce the potential for short-term erosion and soil loss during construction. A Stormwater Mitigation Plan (SWMP) would provide short- and long-term measures to control runoff and reduce the potential for erosion and soil loss. Impacts to geology and soils would be localized, short-term, minor, and adverse.

3.5.3 Cumulative Impacts

No Action Alternative

There would be no effects to geology and soils under the No Action Alternative and, therefore, there would be no cumulative impacts.

Proposed Action

Construction of the supplemental outlet involved excavation and other construction activities that disturbed soils in the project area. Ongoing operation of the original outlet, supplemental outlet, and St. Vrain Supply Canal has had a negligible effect on soils. The Proposed Action involves soil-disturbing activities and would result in cumulative impacts to soils when added to the effects of past and ongoing actions. Cumulative impacts to soils from the Proposed Action and other past and present activities would be local, short-term, minor, and adverse.

3.6 Vegetation

3.6.1 Affected Environment

The project area is in the foothills of the Front Range in the transition zone where the Great Plains and Rocky Mountains meet. The most common plant communities surrounding the reservoir, including the area surrounding Carter Lake Dam Number 1, are montane shrublands and grasslands. Montane shrublands are dominated by shrubs such as mountain mahogany (*Cercocarpus montanus*), Woods' rose (*Rosa woodsii*), rabbitbrush (*Chrysothamnus nauseosus*), and three-leaf sumac (*Rhus trilobata*). Grassland species include orchardgrass (*Dactylis glomerata*), sand dropseed (*Sporobolus cryptantha*), cheatgrass (*Bromus tectorum*), big bluestem (*Andropogon gerardii*), smooth brome (*Bromus inermis*), and side oats grama (*Bouteloua curtipendula*). These two plant communities often occur together with scattered shrubs in the grasslands.

Most of the project area has been previously disturbed by construction of the Carter Lake Supplemental Outfall Project and by construction of the St. Vrain Supply Canal and the existing access road. Vegetation in the project area is generally dominated by nonnative species such as smooth brome and mullein (*Verbascum thapsus*), and by native species typical of disturbed areas, such as rabbitbrush. A small area of native shrub-grassland occurs in the southeast corner on the proposed power house and substation site. Several mountain mahogany shrubs and four small (less than 6-inch-diameter) ponderosa pine (*Pinus ponderosa*) trees occur in this area.

3.6.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed hydropower facility would not be constructed. There would be no change from existing conditions and, therefore, there would be no effects on vegetation.

Proposed Action

The hydropower facility would be constructed mostly within existing disturbed areas, but effects on vegetation would occur from land clearing and excavating to construct the

penstock, power house, substation, and power line. Vegetation would be cleared on less than 1 acre at the power house and substation site, of which less than 0.10 acre is native shrub-grassland with several mountain mahogany shrubs and four small ponderosa pines. Construction of new facilities would result in a long-term loss of vegetation on 0.1 acre. Construction activities would be confined to the smallest area necessary to complete the work, and all areas of temporarily disturbed vegetation would be restored with native vegetation following construction.

The infestation and spread of invasive exotic plants during and after construction is possible. Weeds frequently invade disturbed ground where they are easily established and outcompete native species if not monitored. Implementation of BMP weed-control practices would minimize the potential for weed establishment and long-term impacts. Revegetation of disturbed areas is expected to take more than one year because of the dry climate. The Proposed Action would have local short-term minor adverse effects from disturbance of less than 1 acre of vegetation, with a long-term minor effect from the loss of 0.1 acre of vegetation and a negligible effect to temporarily disturbed lands following revegetation.

3.6.3 Cumulative Impacts

No Action Alternative

There would be no new effects to vegetation under the No Action Alternative and, therefore, there would be no cumulative impacts.

Proposed Action

Construction of the supplemental outlet resulted in vegetation clearing in the project area and nearby areas. The supplemental outlet project area has since been revegetated, but construction disturbance may have allowed invasive, nonnative plant species to become established or spread. Most of the construction of the supplemental outlet occurred during a draw-down period below the high-water mark in Carter Lake. There was also construction of several new associated facilities and roads in upland areas, which resulted in a long-term loss of vegetation on approximately 1 acre. . The ongoing operation of the original outlet, supplemental outlet, and St. Vrain Supply Canal has had a negligible effect on vegetation. Cumulative impacts to vegetation from the Proposed Action, in combination with past and present activities, would be local, short-term, minor, and adverse.

3.7 Fish and Wildlife

3.7.1 Affected Environment

Carter Lake is a year-round fishing destination and provides habitat for a mix of warmwater and coldwater fish species, including black crappie, rainbow trout, largemouth bass, walleye, white sucker, yellow perch, and kokanee (Reclamation and Larimer County Parks and Open Lands Department 2007). Trout populations in the reservoir are maintained by stocking. Stocking also is used to supplement populations of walleye and largemouth bass.

Fish are currently prevented from entering the original and supplemental outlets by a fish screen. Smaller fish may occasionally pass through the screen and enter the outlet structure. Small fish entering the outlet would either perish in the energy dissipation structure or pass through to the St. Vrain Supply Canal.

The diverse vegetation communities surrounding the reservoir support a variety of wildlife species. Carter Lake is in a transition zone between the Great Plains and Rocky Mountain biotic communities. Habitat types present include grasslands, montane shrublands, ponderosa pine woodlands, and rock outcrops. Riparian habitat and shoreline areas along the reservoir edge are especially important habitat for wildlife.

Golden eagles, red-tailed hawks, and great-horned owls have been reported to nest in the Carter Lake area (Reclamation and Larimer County Parks and Open Lands Department 2007). Other bird species likely to occur nearby include American kestrel, Lincoln's sparrow, savannah sparrow, vesper sparrow, scrub jay, spotted towhee, mountain bluebird, western bluebird, mountain chickadee, Stellar's jay, dark-eyed junco, pygmy nuthatch, chipping sparrow, and numerous shorebirds and waterfowl.

During initial coordination with the Colorado Division of Wildlife (CDOW), CDOW recommended pre-construction raptor surveys for the project. Raptor surveys were completed by Reclamation biologists on July 9 and 13, 2010. All possible nesting habitat within 0.25 mile of the project area was surveyed and no nests were found. An unidentified owl flushed from a cliff area north of the project area on July 13, 2010. Reclamation biologists determined that the cliffs nearby are used by owls for hunting and roosting. Reclamation received an email from CDOW on July 14, 2010 confirming that Reclamation had fulfilled raptor survey requirements for the project.

The area surrounding Carter Lake provides habitat for mule deer and has been mapped as a mule deer winter concentration area by CDOW. A mule deer concentration area is defined as that part of the winter range where densities are at least 200 percent greater than the surrounding winter range density during the same period used to define winter range in the average 5 winters out of 10. The area to the east of the reservoir has been mapped as mule deer severe winter range, which is defined as that part of the overall range where 90 percent of the individuals are located when the annual snowpack is at its maximum and/or temperatures are at a minimum in the 2 worst winters out of 10 (NDIS 2010).

The Carter Lake area also provides elk habitat. Elk winter range occurs just north and west of the reservoir (NDIS 2010). Elk winter range is defined as that part of the overall range of a species where 90 percent of the individuals are located during the average 5 winters out of 10 from the first heavy snowfall to spring green-up, or during a site-specific period of winter, as defined for each data analysis unit.

Black bear and mountain lion are occasionally in the Carter Lake area. Other mammals likely to occur include coyote, red fox, raccoon, striped skunk, ground squirrel, and several species of bats.

Suitable habitat is in the Carter Lake area for several species of reptiles including common gartersnake, lined snake, milk snake, racer, many-lined snake, ringneck snake, and short-horned lizard.

Wildlife habitat in the project area has been disturbed by past vegetation clearing and construction of the St. Vrain Supply Canal, construction of the supplemental outlet, and construction of the existing access road.

3.7.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed hydropower facility would not be constructed. There would be no change from existing conditions and, therefore, there would be no effects on fish and wildlife.

Proposed Action

After completion of the hydropower facility, fish from Carter Lake would continue to be prevented from entering the outlets by a screen. Small fish occasionally passing through the screen would continue to the hydropower facility turbines and would either perish or pass through to the St. Vrain Supply Canal. This would be similar to existing conditions where small fish may occasionally perish in the energy dissipation device.

Construction activities would directly disturb less than 1 acre. Most of the project area has been previously disturbed, but existing vegetation provides potential habitat for birds, small mammals, and reptiles. Human presence and construction noise would temporarily disturb and displace resident wildlife during or following construction. For example, raptors could be temporarily disturbed from their hunting or perching areas and deer and elk from grazing areas. If construction occurs in the winter, bald eagles foraging activities could be temporarily impacted. Since there are very few large trees and no nests observed near the site, it is unlikely any nests would be abandoned due to construction activity. Also, the transmission lines pose an electrocution threat to raptors. The construction of the lines will be in a raptor-friendly manner that will reduce risks to raptors. If project construction occurs during the winter, mule deer in the area could be temporarily displaced. Following construction, most disturbed vegetation would be restored, reducing the net permanent loss to less than 0.1 acre of wildlife habitat. Generally, wildlife would be expected to move and find alternative forage and cover areas, returning after construction and rehabilitation activities have been completed. Other mitigation measures listed in Table 3 would reduce potential wildlife impacts. The Proposed Action would have local short-term and long-term minor adverse effects on fish and wildlife from construction-related activities, resulting in a small loss in habitat.

3.7.3 Cumulative Impacts

No Action Alternative

There would be no effects to fish and wildlife under the No Action Alternative and, therefore, there would be no cumulative impacts.

Proposed Action

Construction of the supplemental outlet resulted in a short-term disturbance to wildlife. The ongoing operation of the original outlet, supplemental outlet, and St. Vrain Supply Canal likely has had negligible effects to wildlife. Cumulative impacts to wildlife from

the Proposed Action and other past and present activities would be local, short-term, minor and adverse.

3.8 Threatened, Endangered, and Special Status Species

3.8.1 Affected Environment

The USFWS lists several threatened and endangered species with potential habitat in Larimer County, or that could be potentially affected by projects in Larimer County (USFWS 2010) (Table 6). Additionally, several species listed by Colorado as state threatened, endangered, or species of special concern are known to occur or have the potential to occur in Larimer County (NDIS 2010).

Table 6. Federal or state threatened, endangered, and candidate species or state species of special concern potentially found in Larimer County.

Common Name	Scientific Name	Status*	Habitat	Potential Habitat within Project Area
Mammals				
Black-footed ferret	*Mustela nigripes*	FE, SE	Prairie dog colonies	No suitable habitat in the project area
Black-tailed prairie dog	*Cynomys ludovicianus*	SC	Shortgrass prairie	Not present in the project area
Canada lynx	*Lynx canadensis*	FT	Boreal forest	No suitable habitat in the project area
Northern pocket gopher	*Thomomys talpoides*	SC	Cultivated fields and prairie meadows with moist, sandy soils	Low quality habitat in the project area
Northern river otter	*Lutra canadensis*	ST	Riparian habitats with permanent water	No suitable habitat in the project area
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	FT, ST	Riparian habitats	No suitable habitat in the project area
Swift fox	*Vulpes velox*	SC	Shortgrass prairie	No suitable habitat in the project area
Townsend's big-eared bat	*Plecotus townsendia*	SC	Roosts in caves and mines; forages in open woodlands	Limited habitat in the project area
Birds				
Bald eagle	*Haliaeetus leucocephalus*	ST	Trees near rivers and lakes; forages in open water, at times in prairie dog towns	No known roosts or nests in the project area
Ferruginous hawk	*Buteo regalis*	SC	Shortgrass prairie and other grasslands in northwestern and eastern Colorado	Limited suitable habitat in the project area
Greater sandhill crane	*Grus canadensis tabida*	SC	Mudflats around reservoirs, moist meadows, and agricultural areas in eastern Colorado; Grand Valley	No suitable habitat in the project area

Common Name	Scientific Name	Status*	Habitat	Potential Habitat within Project Area
Least tern (interior population)	*Sternula antillarum*	FE, SE	Platte River in Nebraska (potentially affected by depletions)	Not applicable
Long-billed curlew	*Numenius americanus*	SC	Nesting occurs in shortgrass prairies in southeastern Colorado but requires lakes or reservoirs nearby for foraging	No suitable habitat in the project area
Mexican spotted owl	*Strix occidentalis lucida*	FT, ST	Canyons with clumps or stringers of mixed conifer vegetation and a high percentage of ground litter and woody debris	No suitable habitat in the project area
Mountain plover	*Charadrius montanus*	SC	Shortgrass prairie in eastern plains and mountain valleys	No suitable habitat in the project area
Peregrine falcon	*Falco peregrinus*	SC	Nests on steep rock faces	No suitable habitat in the project area
Piping plover	*Charadrius melodus*	FT, ST	Platte River in Nebraska (potentially affected by depletions)	Not applicable
Plains sharp-tailed grouse	*Tympanuchus phasianus jamesii*	SE	Short- and mid-grass prairie in Douglas and northern Weld counties	Project area is not within known range of the species (NDIS 2010)
Sage grouse	*Centrocercus urophasianus*	SC	Large patches of sagebrush	No suitable habitat in the project area
Whooping crane	*Grus americana*	FE, SE	Platte River in Nebraska (potentially affected by depletions)	Not applicable
Western burrowing owl	*Athene cunicularia*	ST	Prairie dog colonies	No suitable habitat (prairie dog colonies) in the project area
Western snowy plover	*Charadrius alexandrius nivosus*	SC	Shores of lakes and reservoirs	No suitable habitat in the project area
Fish				
Greenback cutthroat trout	*Oncorhynchus clarki stomias*	FT	Cold, fast-flowing, high-elevation streams	No suitable habitat in the project area
Pallid sturgeon	*Scaphirynchus albus*	FE	Platte River in Nebraska (potentially affected by depletions)	Not applicable
Amphibians				
Boreal toad	*Bufo boreas*	SE	Wetlands and riparian habitat above 8,500 feet in elevation	No habitat in the project area
Northern leopard frog	*Rana pipiens*	SC	Wetlands and other aquatic habitat	No suitable habitat in the project area

Common Name	Scientific Name	Status*	Habitat	Potential Habitat within Project Area
Reptiles				
Common gartersnake	*Thamnophis sirtalis*	SC	Marshes, ponds, and edges of streams	No suitable habitat in the project area
Plants				
Colorado butterfly plant	*Gaura neomexicana* spp. *coloradensis*	FT	Subirrigated alluvial soils in floodplains and drainage bottoms; 5,000 to 6,400 feet in elevation	No suitable habitat in the project area
North Park phacelia	*Phacelia formosula*	FE	Known only from the Coalmont formation, Jackson County, Colorado	No suitable habitat in the project area
Ute ladies'-tresses orchid	*Spiranthes diluvialis*	FT	Below 6,500 feet in elevation in moist to wet alluvial meadows and floodplains of perennial streams	No suitable habitat in the project area
Western prairie fringed orchid	*Platanthera praeclara*	FT	Platte River in Nebraska (potentially affected by depletions)	Not applicable

*FT = Federally Threatened Species, FE = Federally Endangered Species, FC= Federally Candidate Species, SE = Colorado Endangered Species, ST = Colorado Threatened Species, SC = Colorado Species of Special Concern.

The black-footed ferret, Canada lynx, northern river otter, swift fox, greater sandhill crane, long-billed curlew, Mexican spotted owl, mountain plover, peregrine falcon, plains sharp-tailed grouse, sage grouse, western burrowing owl, western snowy plover, greenback cutthroat trout, boreal toad, northern leopard frog, common gartersnake, Colorado butterfly plant, North Park phacelia, and Ute ladies'-tresses orchid are unlikely to occur in the project area due to the lack of suitable habitat. Black-tailed prairie dogs are not present in the project area.

Preble's meadow jumping mouse (Preble's) is known to occur near Flatiron Reservoir more than 3 miles from the project area. Potentially suitable habitat for Preble's occurs on Dry Creek, downstream from Carter Lake Dam Number 1; however, a trapping survey downstream from the project area on Dry Creek in 2007 did not capture Preble's (USFWS 2009). No suitable habitat for this species is present in the project area.

The target Platte River species (least tern, piping plover, whooping crane, and pallid sturgeon) do not occur in the project area.

Northern pocket gopher could potentially occur in the project area. This species is often conspicuous when present because it creates distinctive mounds and soil casts (eskers). No evidence of northern pocket gophers was observed in the project area during a site visit on March 11, 2010.

Townsend's big-eared bat forages in open montane forests and roosts in caves, mines, and buildings (Harvey et al. 1999). The ponderosa pine woodlands near the project area may provide foraging habitat for this species. There are no suitable roosting sites for this species in the project area.

Bald eagles are known to forage at Carter Lake, especially during the winter; however, there are no known nests or roost sites within 1 mile of the project area, there are no prairie dog colonies that would likely attract bald eagles to the project area, and there are no large trees that could provide hunting perches in the project area.

It is possible that ferruginous hawks could occasionally frequent the project area to forage; however, there are no prairie dog colonies or other food sources that would likely attract ferruginous hawks to the project area, and there are no large trees that could provide hunting perches in the project area.

3.8.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed hydropower facility would not be constructed. There would be no change from existing conditions and there would be no effects on threatened, endangered, and special status species.

Proposed Action

Threatened and Endangered Species

There is no habitat for black-footed ferret, black-tailed prairie dog, Canada lynx, northern river otter, Preble's, swift fox, greater sandhill crane, long-billed curlew, Mexican spotted owl, mountain plover, peregrine falcon, plains sharp-tailed grouse, sage grouse, western burrowing owl, western snowy plover, greenback cutthroat trout, boreal toad, northern leopard frog, common gartersnake, Colorado butterfly plant, North Park phacelia, or Ute ladies'-tresses orchid in the project area; therefore, there would be no effect to these species from the Proposed Action. The Proposed Action would have no effect on any federally listed threatened or endangered species.

The Proposed Action would not result in depletions to the Platte River system; therefore, the project would have no effect on the least tern, piping plover, whooping crane, pallid sturgeon, or western prairie fringed orchid.

Reclamation contacted the USFWS and notified them of the project. They had no concerns about the project and agreed with the determination of no effects to Threatned and Endangered species as a result of proposed project activities.

Special Status Species

The Proposed Action would introduce noise and human disturbance during construction that could potentially affect several special status species. Construction of the hydropower facility would generate noise and disturbance greater than current activities from heavy equipment and excavation necessary to prepare the building site and other construction activity. In addition to temporary impacts during construction, the project would result in temporary disturbance to less than 1 acre of previously disturbed grassland and a permanent loss of less than 0.10 acre of native shrubland vegetation. Species-specific impacts are described below.

The project would result in the temporary loss of less than 1 acre of potentially suitable habitat for the northern pocket gopher. Habitat loss would be a minor impact due to the relatively small amount of foraging habitat loss compared to the amount of habitat

available in the surrounding area. In addition, this species, if present, could be directly affected by noise, disturbed by human activity, or could be crushed by construction equipment. Impacts to pocket gophers would be local, short-term, minor, and adverse.

If present, Townsend's big-eared bat, bald eagle, and ferruginous hawk would potentially be affected by noise and human disturbance during construction. Foraging behavior would be affected by increased noise. The project would result in a short-term loss of less than 1 acre of potential foraging habitat for these species. Habitat loss would be a minor impact due to the relatively small amount of foraging habitat loss compared to the amount of habitat available in the surrounding area. Impacts to Townsend's big-eared bat, bald eagle, and ferruginous hawk would be local, long-term, minor, and adverse.

3.8.3 Cumulative Impacts

No Action Alternative

There would be no effects to threatened, endangered, and special status species under the No Action Alternative and, therefore, there would be no cumulative impacts.

Proposed Action

Construction of the supplemental outlet may have resulted in short-term minor disturbance to Townsend's big-eared bat, bald eagle, and ferruginous hawk during construction. Ongoing operation of the original outlet, supplemental outlet, and St. Vrain Supply Canal has had no effect on threatened, endangered, and potentially negligible effects on special status species. Therefore, the Proposed Action is expected to have no cumulative impact on threatened and endangered species or their habitat. The cumulative impacts of the Proposed Action on special species status would be local, short-term, negligible to minor, and adverse.

3.9 Cultural Resources

3.9.1 Affected Environment

The National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. §§ 470 *et seq.*), and the Advisory Council on Historic Preservation's (ACHP) implementing regulations, 36 CFR Part 8000 (Section 106 regulation), require federal agencies to take into account the effect their actions may have on historic properties that are within the proposed project's area of potential effect (APE). The APE is the geographic area or areas within which a proposed project may cause changes in the character or use of historic properties. A historic property is any prehistoric or historic district, site, building, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). A historic property includes, for the purposes of the Section 106 regulation, artifacts, records, and remains that are related to and located within such properties. The term "eligible for inclusion in the National Register" includes both properties formally determined eligible by the Secretary of the Interior and all other properties that meet the NRHP listing criteria.

A file and literature review for the project APE and the planning area was conducted with the Colorado Historical Society, Office of Archaeology and Historic Preservation (CHS OAHP) to determine whether previous cultural resource inventories have been conducted or whether

cultural resources have been previously documented within the planning area. The file and literature review of the proposed project APE resulted in the identification of two previous cultural resource inventories conducted in the project area (Table 7). One inventory covered the lands surrounding Carter Lake, and the other inventory was for the Carter Lake Dam Outlet works and an investigation of site 5LR42.

Table 7. Previous cultural surveys in the project APE.

Survey Report No.	Project	Cultural Resources
LR.R.R5	An Archaeological and Historical Inventory of Bureau of Reclamation Lands Surrounding Carter Lake, Northwest of Berthoud, Larimer County, North-Central Colorado	1
LR.WC.R1	Preliminary Report-Investigation of 5LR42 and the Carter Lake Reservoir Dam No. 1 Outlet Works, Project No. 4626, Larimer County, Colorado	1

Four cultural resources were located and documented during the inventories, and one cultural resource was not associated with any project inventory (Table 8). A segment of the St. Vrain Supply Canal (5LR11011.1) is recorded in the project APE, and has been determined officially eligible for inclusion to the NRHP. The Carter Lake Dam Outlet works (5LR12086) is also within the project APE and has been determined officially not eligible for inclusion to the NRHP. However, both of these sites are considered to be contributing elements to the Carter Lake Historic District (5LR1363), which is eligible for inclusion to the NRHP.

Table 8. Previously recorded cultural resources in or near the project APE.

Site No.	Site Type	Identification	NRHP Eligibility Status
5LR11011.1	Historical	St. Vrain Supply Canal - Segment	Officially Eligible, Contributes to Historic District
5LR12086	Historical	Carter Lake Water Outlet Works	Officially Not Eligible, Contributes to Historic District
5LR1363	Historical	Carter Lake Historic District	Officially Eligible
5LR42	Prehistoric	Bobcat Canyon/Carter Lake Burial	Officially Eligible
5LR9	Prehistoric	Open Camp	Unevaluated

Two prehistoric sites also are recorded as being within or near the project APE. The Bobcat Canyon/Carter Lake Burial site (5LR42) is northwest of the project APE, and has been determined officially eligible for inclusion to the NRHP. The exact location for site 5LR9, an open prehistoric camp that has not been evaluated for NRHP eligibility, is apparently unknown. However, this site was not relocated during an intensive cultural resource survey of surrounding Carter Lake, including the APE (Birney and Halasi 1990) and, therefore, the site is apparently outside the current project APE.

3.9.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed hydropower facility would not be constructed. There would be no change from existing conditions and there would be no effects on cultural resources.

Proposed Action

The St. Vrain Supply Canal (5LR11011.1) is officially eligible for inclusion to the NRHP. Design plans for the project call for one connection with the canal for each outfall from the two turbines. For each connection, a portion of the canal wall would be saw-cut most of the way from the outside. The concrete connection would then be poured up against the canal. The wall would then be removed from the outside. Any minor spalling of the concrete due to the saw cut would be patched, and there would be no construction inside the canal itself. The wall removal would be made during the routine annual inspection. Because the proposed connections to the St. Vrain Service Canal are relatively minor compared to the modifications during the 1990s (when the canal was enclosed); the proposed project would only affect two short sections of the canal; and would be consistent with the current use and industrial appearance of the canal—this historic property still retains integrity of location, setting, workmanship, feeling, association, design, and materials. Therefore, the Proposed Action would not affect the NRHP eligibility of this segment of the St. Vrain Service Canal.

Although the Carter Lake Dam Outlet works (5LR12086) is a contributing element to the Carter Lake Historic District (5LR1363), it is officially individually not eligible for inclusion in the NRHP. Although the exact location of unevaluated site 5LR9 is unknown, it is likely that the site is outside the project APE and, therefore, would not be affected by project activities.

The Proposed Action would result in additional disturbances to the St. Vrain Canal. However, because the integrity of the St. Vrain Supply Canal would not be seriously compromised, Reclamation recommended a finding of no adverse effect to historic properties as a result of the Proposed Action. The Colorado State Historic Preservation Officer (SHPO) concurred with this finding in a letter dated July 19, 2010. Reclamation also consulted with the appropriate local government on the Proposed Action. As a result, Larimer County Department of Natural Resources also concurred with the finding of no adverse effect in a letter dated July 6, 2010.

The Proposed Action would not have an adverse affect on other historic properties. There is a possibility that subsurface cultural materials that have no corresponding surface expression may be present in the project area. Should evidence of cultural resources be discovered during construction, ground-disturbing activities would cease until the site is evaluated (Table 3).

3.9.3 Cumulative Impacts

No Action Alternative

There would be no effects to cultural resources under the No Action Alternative and, therefore, there would be no cumulative impacts.

Proposed Action

Construction of the supplemental outlet connection, the St. Vrain Canal, and previous modifications to enclose the canal resulted in minor disturbances. Ongoing operations of the original outlet, supplemental outlet, and St. Vrain Supply Canal have had no effect on cultural resources. The Proposed Action would result in additional disturbances to the St. Vrain Canal in addition to those from previous modifications. However, because these actions have not seriously compromised the integrity of the St. Vrain Supply Canal, there would be no cumulative adverse effects to historic properties.

3.10 Recreation

3.10.1 Affected Environment

Recreation at the reservoir is managed by Larimer County Parks and Open Lands Department (LCPOLD). Carter Lake is bordered by 1,000 acres of public lands, and is a popular year-round recreation site that draws about 300,000 visitors annually. The primary recreational activity at the reservoir is motorized boating (LCPOLD 2007). Additional recreational activities available at the reservoir include sailing, windsurfing, fishing, picnicking, swimming, horseback riding, hiking, water skiing, camping, scuba diving, and rock climbing (LCPOLD 2007). Recreation facilities available at the reservoir include trails, five picnic areas, six campgrounds with more than 100 campsites, a swimming beach, three boat ramps, docks, and a marina (Carter Lake Marina). The Carter Lake Sail Club is on the west side of the reservoir and has a clubhouse, boat slips, and moorings. Visitation peaks on weekends and holidays from May to early September.

The hydropower project site is not open to the public, does not receive recreational use, and will not be directly visible to recreators. Access to the road leading to the existing outlet facility and proposed hydropower facility is controlled by a locked gate.

3.10.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed hydropower facility would not be constructed. There would be no change from existing conditions and there would be no effects on recreation.

Proposed Action

The Proposed Action would have no effect on water levels in the reservoir and, therefore, would not affect water-based recreation. During construction, recreation users may notice a slight increase in traffic and noise from construction activities. The project area is not open to the public and, therefore, there would be no change in recreational use during or after construction of the hydropower facility. Visitors entering from the east via County Road 8E might be temporarily inconvenienced by noise or traffic during

construction. Impacts would be confined to areas near the project area and would be limited to the construction period. Construction traffic would generally be limited to daylight hours and would not be earlier than 7 a.m. There would be no road closures. Impacts to recreation from the Proposed Action would be local, short-term, minor, and adverse.

3.10.3 Cumulative Impacts

No Action Alternative

There would be no effects to recreation under the No Action Alternative and, therefore, there would be no cumulative impacts.

Proposed Action

Construction of the supplemental outlet resulted in short-term impacts to recreation resources from temporarily drawing down the lake. Ongoing operation of the original outlet, supplemental outlet, and St. Vrain Supply Canal would have no effect on recreation. Cumulative impacts to recreation from the Proposed Action and other past and present activities would be local, short-term, minor, and adverse.

3.11 Visual Resources

3.11.1 Affected Environment

Carter Lake is in a scenic setting dominated by the reservoir and the prominent ridges to the east and west of the reservoir. The ridge to the west is forested with a dense stand of ponderosa pine. The landscape to the east of the reservoir is dominated by a complex of hogbacks and irregular ridges with cliffs and red rock outcrops. The landscape surrounding the reservoir generally retains a natural appearance, with the exception of several sites where residential development has occurred near the reservoir, several sites where rock was quarried for construction of the reservoir's dams, and areas that have been developed to provide recreation facilities.

The project area is within a canyon at the base of Carter Lake Dam Number 1, and is not visible from the reservoir or from public roads accessing the reservoir. The existing outfall, St. Vrain Supply Canal, access road, and a building housing the energy dissipation structure are visible near the project area. These structures are visible from three residences on a ridge to the north and northeast. The residences are 3,100 feet, 5,800 feet, and 7,400 feet from the proposed power house location.

3.11.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed hydropower facility would not be constructed. There would be no change from existing conditions and there would be no effects on visual resources.

Proposed Action

Temporary visual impacts would occur during construction from equipment, materials, and ground disturbances. The hydropower facility would be to blend with the landscape

with minimal visual intrusion. The power house would be constructed with an earth-tone architectural block veneer. Several components of the hydropower facility (power house, substation, and power line) would be visible from three residences located more than ½ mile from the project area on a ridge to the northeast. Outdoor lighting would be kept to a minimum and would consist of fixtures that point downward. Visual impacts also would be limited by the location of the hydropower facility at the base of the dam in a natural valley. Impacts to visual resources would be local, short- and long-term, minor, and adverse.

3.11.3 Cumulative Impacts

No Action Alternative

There would be no effects to visual resources under the No Action Alternative and, therefore, there would be no cumulative impacts.

Proposed Action

Construction of the supplemental outfall resulted in short-term visual impacts during construction and long-term visual impacts from construction of aboveground features such as the building housing the energy dissipation structure. The Proposed Action would new small structures to the site. Cumulative impacts to visual resources from the Proposed Action and other past and present activities would be local, long-term, minor, and adverse.

3.12 Noise

3.12.1 Affected Environment

Natural sounds heard in the undeveloped areas near the reservoir include waves on the shoreline, wind blowing through the trees, and bird calls. The most common human-caused sounds near the shoreline are from motorized watercraft. Noise from motorized watercraft is highest in the summer. Noise levels from motorboats can vary widely, from below 80 decibels (dBA) to 105 dBA or more. Other human-caused sounds include vehicles, voices, and radios. Larimer County law enforcement and park personnel enforce "quiet hours" from 10 p.m. to 6 a.m. to reduce noise from generators, music, and other human sources. Winters are generally quieter than summers because fewer people are present at the reservoir.

Existing sources of noise in the project area include traffic on County Road 8E, occasional traffic on the access road leading to the site, and the nearby Carter Lake Filter Plant. The existing energy dissipation structure generates considerable noise, but is enclosed within an insulated building. Noise produced by the energy dissipation structure generally is not noticeable outside the building.

3.12.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed hydropower facility would not be constructed. There would be no change from existing conditions and there would be no effects on noise.

Proposed Action

Construction activities would result in temporarily elevated noise levels near the hydropower facility. Equipment that generates noise includes graders, trucks, backhoes, and other smaller pieces of equipment or machinery. Limited blasting may also be required during construction. While most of the noise would occur in the project area, truck traffic delivering supplies would increase traffic-related noise along roads leading to the construction area. Construction traffic would be limited to daylight hours and would not be earlier than 7 a.m. Construction noise likely would be buffered by natural terrain and distance, and would not be noticeable to most visitors using the lake and campgrounds. Noise impacts from construction would be local, short-term, minor, and adverse.

Operation of the hydropower facility would generate machinery noise from the turbines and generators. The turbines and generators would be fully enclosed by the power house, which would be insulated to reduce noise outside the building. Noise generated by the facility would be comparable to noise generated by the current operation of the energy dissipation structure. No long-term noise impacts are anticipated.

3.12.3 Cumulative Impacts

No Action Alternative

There would be no new effects from noise under the No Action Alternative and, therefore, there would be no cumulative impacts.

Proposed Action

Construction of the supplemental outlet resulted in noise impacts during construction from machinery and equipment. Ongoing operation of the original outlet would result in some noise from the energy dissipation structure; however, this noise is contained within a building. Cumulative impacts to noise from the Proposed Action and other past and present activities would be local, short-term, minor, and adverse.

3.13 Transportation

3.13.1 Affected Environment

Vehicle access to Carter Lake is via County Roads 8E and 31. The reservoir can be reached from Interstate 25 by traveling west on State Highway 56 to County Road 8E or by traveling on a combination of paved county roads. Traffic on roads leading to the reservoir is highest at peak visitation times, typically weekends and holidays from May to early September.

An unpaved access road leads from County Road 8E to the existing outfall and the base of Carter Lake Dam Number 1. This access road runs parallel to the St. Vrain Supply Canal on the south side of the canal. A second access road leads from County Road 31 to the supplemental outlet meter structure. These access roads are not open to the public and are used by Northern Water and other authorized personnel traveling to the outfall or base of the dam to perform maintenance or monitoring activities.

3.13.2 Environmental Consequences

Construction would involve a temporary increase in construction traffic near the project area. Impacts would be confined to areas near the project area and would be limited to the construction period. Construction traffic would access the project area from County Road 8E, from the existing St. Vrain Supply Canal Road, and from the road to the supplemental outlet meter structure. Following construction, there would be a minor increase in vehicle traffic required to monitor the facility, with an additional one to two vehicle trips per day by Northern Water staff. It is anticipated that the hydropower facility would be monitored remotely. The Proposed Action would result in local short-term and long-term minor adverse impacts to transportation.

3.13.3 Cumulative Impacts

No Action Alternative

There would be no effects to transportation under the No Action Alternative and, therefore, there would be no cumulative impacts.

Proposed Action

Construction of the supplemental outlet resulted in a short-term increase in traffic from heavy trucks during construction and temporary traffic delays. Ongoing operation of the existing outlet has had a negligible impact on traffic. Cumulative impacts to transportation from the Proposed Action and other past and present activities would be local, short-term, minor, and adverse.

4.0 Consultation and Coordination

4.1 Scoping/Consultation

A press release describing the Proposed Action initiated public scoping on April 15, 2010, (Appendix A). Reclamation also sent scoping letters on April 15, 2010, to several organizations; state, county, and local governments; and federal agencies describing the Proposed Action and asking for comments (Appendix B). About 90 individual landowners with property surrounding the project area also were notified by email on April 15, 2010. Public scoping comments were solicited through May 7, 2010 and later extended to June 4, 2010. Reclamation held a public open house on April 21, 2010, to answer questions about the project and solicit comments. The public open house was attended by four individuals. As a result of the scoping process, Reclamation received verbal feedback and one written comment via email. Comments focused on the recreational opportunities and water levels in Carter Lake being maintained; water quality changes including dissolved oxygen and temperature; and fish and wildlife concerns (mainly raptor related). A Reclamation planning team considered these comments in order to define the scope of issues and impacts topics to be analyzed, and the details of the Proposed Alternative to be included in this document.

The undertakings described in this EA are subject to Section 106 of the National Historic Preservation Act, as amended (16 U.S.C. 470 et seq.). The office of the Colorado SHPO was notified by letter of the proposed project on June 8, 2010. SHPO concurred that the project would have no adverse effect on cultural resources in a letter dated July 19, 2010.

Four Native American Indian tribes (Northern Arapahoe, Southern Arapahoe, and Cheyenne and Arapaho of Oklahoma) were notified of the proposed project by letter on June 10, 2010. The tribes were involved because a Native American Indian burial site was recorded about 400 feet away from the proposed project area (the remains were repatriated to the tribes and reburied in the Loveland cemetery). The consultation with the tribes was to seek information regarding sacred sites, traditional use areas, historic properties, or any other concerns about the project. The Cheyenne and Arapaho of Oklahoma responded promptly with no objections. The Northern Cheyenne and Northern Arapahoe did not respond to the request for comments after repeated attempts to reach both the public affairs officer and Tribal Historical Preservation Officer (THPO) coordinator.

Reclamation contacted the U.S. Fish & Wildlife Service (USFWS) on March 16, 2010, and notified them of the project. The USFWS had no concerns about the project and agreed with the determination of no effects to threatened and endangered species as a result of project activities. They requested to be notified when the final EA is available. The Colorado Division of Wildlife and the Colorado Department of Public Health & Environment were also sent a scoping notification on the Proposed Action.

This EA will be made available to agencies and other interested public through the Reclamation website on Reclamation's Quarterly NEPA Actions Report at http://www.usbr.gov/gp/nepa/quarterly.cfm.

4.1.1 Federal Agencies

Agencies and organizations contacted to assist in identifying issues and providing an opportunity to review or comment on this EA include, but are not limited to, the following:

Susan Linner, Division of Ecological Services, U.S. Fish and Wildlife Service – Colorado Field Office

Kiel Downing, U.S. Army Corps of Engineers, Omaha District, Denver Regulatory Office

4.1.2 State Agencies

Ken Kehmeier, Colorado Division of Wildlife

Randy Ristau, Colorado Department of Public Health and Environment

4.1.3 Local Agencies

Gary Buffington, Director Larimer County Department of Natural Resources

Larimer County Board of Commissioners

Mark Maddox, Plant Manager, Carter Lake Filter Plant

Jim Hibbard, District Manager, Little Thompson Water District

John Zadel, General Manager, Central Weld County Water District

Michael Hart, Administrator, Town of Berthoud

Jim Byrne, Engineering, Poudre Valley Rural Electric Association

4.1.4 American Indian Tribes

Harvey Spoonhunter, Northern Arapahoe

Govenor Janice Prairie Chief Boswell, Cheyenne and Arapahoe of Oklahoma

Joe Fox, Northern Cheyenne

4.1.5 Organizations and Businesses

Nina Simmers, Carter Lake Sailing Club

4.1.6 Individuals

Approximately 90 individual stakeholders were notified by mail and by email.

5.0 References

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U.S. Fish and Wildlife Service (USFWS). 2009. Unpublished Preble's meadow jumping mouse trapping data.

U.S. Fish and Wildlife Service (USFWS). 2010. Colorado Field Office List of Threatened and Endangered Species by County. Available at: http://www.fws.gov/mountain-prairie/endspp/countylists/colorado.pdf. Last accessed: March 23, 2010.

6.0 Appendix A - Press Release

News Release RECLAMATION
Managing Water in the West

Eastern Colorado Area Office
Loveland, Colo.

Media Contact: Kara Lamb, klamb@usbr.gov
(970) 962-4326

For Release on: April 15, 2010

Reclamation Seeks Public Input on Proposed Hydropower Plant

The Bureau of Reclamation is hosting a public open house on Wednesday, April 21, 4-7 p.m. to receive public comment on a proposed power plant at Carter Lake Dam #1.

The open house will be held at the Larimer County Department of Natural Resources Headquarters, Bison Visitor Center, 1800 South County Rd. 31 in Loveland, Colo.

Carter Lake and its dams are part of the Colorado-Big Thompson Project, a federal water diversion and storage project owned and primarily operated by Reclamation. The Northern Colorado Water Conservancy District is proposing to construct the hydro-electric power plant under a contract with Reclamation.

Reclamation is preparing an Environmental Assessment in compliance with the National Environmental Policy Act. Comments will help Reclamation identify: (1) issues relevant to the proposal; (2) elements of the environment that could be affected by the proposal; and (3) possible alternatives to the proposal. Please send written comments by mail, e-mail or fax to:

Bureau of Reclamation
Attn: Laura Wheatley
11056 W. County Rd 18E
Loveland, CO 80537
ltwheatley@usbr.gov
Fax: 970-663-3212

The public comment period closes on May 7, 2010.

For additional information on the Carter Lake proposal, the Colorado-Big Thompson Project or the NEPA Process, please contact Kara Lamb, public information coordinator, at (970) 962-4326 or klamb@usbr.gov.

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Reclamation is the largest wholesale water supplier in the United States, and the nation's second largest producer of hydroelectric power. Its facilities also provide substantial flood control, recreation, and fish and wildlife benefits. Visit our website at http://www.usbr.gov.

7.0 Appendix B - Scoping Notice

RECLAMATION
Managing Water in the West

Scoping Notice
Environmental Assessment

Carter Lake Hydropower Facility

Carter Lake, Dam #1
Colorado-Big Thompson Project

Introduction

Reclamation is seeking public comment on a proposal by the Northern Colorado Water Conservancy District (Northern Water) for the construction of a hydropower facility at Carter Lake Dam #1, a feature of the Colorado Big-Thompson Project, or "C-BT." Reclamation owns and is the primary operator of the C-BT. Because the C-BT is a federal project, the National Environmental Policy Act requires Reclamation to perform environmental compliance for the proposal.

The Proposal

Northern Water is proposing to construct a new hydropower facility at the supplemental outlet of Carter Lake Dam #1 under a Lease of Power Privilege (LOPP). If completed, the hydropower facility and associated structures would include: (1) a 3,000 square-foot power house connected to the secondary outlet by a 200-foot long penstock and 48 inch bifurcation, (2) switch gear and transformers, and (3) a transmission line approximately 700-feet long, tying into an existing substation (See attached Project Overview map).

LOPP is a contractual right given to a non-Federal entity for use of a Reclamation facility in hydro-electric power generation development. An alternative to Federal power, LOPP must be consistent with Reclamation project purposes and be utilized where Reclamation has the authority to develop power on any or all features of a Federal project. Northern Water has been granted a Preliminary Permit to study and plan the proposed hydro-electric powerplant. LOPP could be awarded by Reclamation if the proposal is found to be feasible and if the development application, including this environmental compliance, is completed.

Currently, water from Carter Lake flows through Dam #1 via the outlet works and travels through an energy dissipation structure before being deposited into the Northern Water's St. Vrain Supply Canal. If the proposed hydro-electric powerplant is constructed, reservoir water would instead pass through the new powerplant before being deposited in the St. Vrain Supply Canal. Therefore, there would be no changes to Carter Lake water levels or operations. The process would not require additional impoundment of the water, nor would it alter the existing uses of the St. Vrain Supply Canal. Also, release rates from and water elevations in the reservoir would remain the same. The proposed power house will rely on current water demands which are driven by C-BT and Windy Gap projects. Following completion of the facility, areas of temporary construction activities would be re-contoured and re-vegetated.

Releases from the reservoir to the newly constructed powerplant are anticipated to be consistent, allowing for a power generation rate of approximately 2.6 Megawatts.

National Environmental Policy Act

"NEPA"— the National Environmental Policy Act of 1969 — is a public disclosure law. It provides a means by which federal agencies, or entities working with federal agencies, inform the public of proposed projects, analyze potential impacts resulting from those projects, and disclose analyses in an environmental document.

For the Carter Lake Hydropower Facility Proposal, Reclamation will prepare an Environmental Assessment, or "EA." The document will describe the proposal and its purpose, the proposed action and no-action alternatives, and whether there are any potential effects of the alternatives.

To begin its scoping process for the EA, Reclamation will host a public open house on April 21, 2010. The Open House will be held from 4-7 p.m.at the Larimer County Department of Natural Resources Headquarters, Bison Visitor Center, 1800 South County Rd. 31 in Loveland, Colorado.

Timing

Reclamation intends to complete the EA by July 2010.

Public Comments Requested

Reclamation is seeking comments from the interested public, organizations, and agencies regarding the proposed outlet work. Comments that will be most useful to Reclamation in preparing the EA include: (1) issues relevant to the proposal; (2) elements of the environment that could be affected by the proposal; and (3) alternatives to the proposal. Public comments must be received in writing no later than June 4, 2010. Please send written comment by mail, e-mail or facsimile transmission to:

Bureau of Reclamation
Attn: Laura Wheatley
11056 W. County Rd 18E
Loveland, CO 80537
ltwheatley@usbr.gov
Fax: 970-663-3212

For additional information on the Carter Lake proposal, the Colorado-Big Thompson Project or the NEPA Process, please contact Kara Lamb, public information officer, at either (970) 962-4326 or klamb@usbr.gov; or visit Reclamation on line at www.usbr.gov/gp.

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