

PROVO RIVER DELTA RESTORATION PROJECT

Final Environmental Impact Statement

Executive Summary



April 2015

UTAH RECLAMATION
MITIGATION
AND CONSERVATION
COMMISSION



PROVO RIVER DELTA RESTORATION PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT

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EXECUTIVE SUMMARY

The Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission), the Central Utah Project Completion Act (CUPCA) Office of the U.S. Department of the Interior (Interior), and the Central Utah Water Conservancy District (CUWCD) are joint lead agencies (JLAs) preparing an Environmental Impact Statement (EIS) under the provisions of the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.) and Council on Environmental Quality regulations (40 CFR 1500-1508).

The Final EIS document evaluates alternatives for a proposed river channel and delta restoration project (proposed action) within the lower Provo River and its interface with Utah Lake to facilitate the recovery of the endangered June sucker (*Chasmistes liorus*) fish species. Figure S-1 illustrates the project study area in relation to Utah Lake and the lower 4.9 miles of the Provo River below the Lower City Dam/Tanner Race Diversion; this portion of the river was identified as critical habitat under the Endangered Species Act (ESA) when the June sucker was listed as endangered in 1986 (51 FR 10857, April 30, 1986).



S.1 Purpose and Need

The proposed action is needed to facilitate recovery of June sucker in Utah Lake by restoring habitat conditions essential for spawning, hatching, larval transport, survival, rearing, and recruitment of June sucker on a self-sustaining basis.

The purposes of the proposed action are to:

- implement the specific criteria of the June Sucker Recovery Plan (USFWS 1999) to restore a naturally functioning Provo River Delta ecosystem essential for recruitment of June Sucker;
- provide recreational improvements and opportunities compatible with the habitat restoration project; and
- adopt flow regime targets for the lower Provo River and provide delivery of supplemental water to the lower Provo River, including additional conserved water.

S.2 Proposed Action and Preferred Alternative

The proposed action involves restoring a more natural river/lake interface in the lower Provo River and reestablishing essential rearing habitat for June sucker. This rearing habitat would support juvenile June sucker until they are capable of surviving in the larger Utah Lake environment.

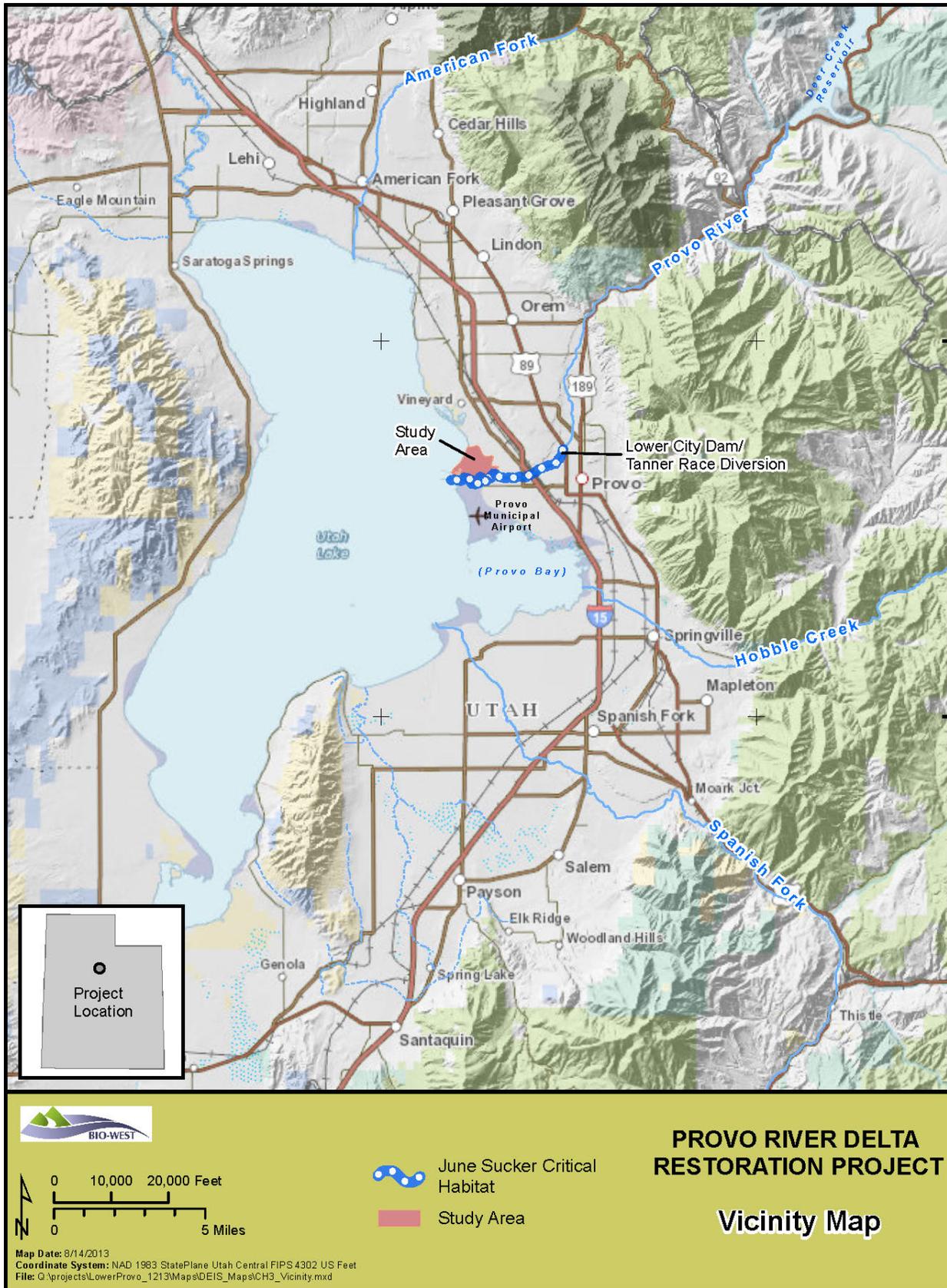


Figure S-1. Vicinity map.

Historically, a broad delta and floodplain existed at the lower Provo River/Utah Lake interface. In a naturally functioning delta ecosystem, such as the schematic illustration in Figure S-2, the river zone is characterized by a meandering channel across a broad floodplain. As a river approaches a body of water (a lake or ocean), it slows down and suspended sediments drop out of the flow. When these sediments accumulate over time, the river begins to braid into a series of distributary channels. Sediment accumulation causes the threaded channels to shift position over time, creating a diversity of aquatic habitat features in the delta plain zone such as abandoned channels and oxbow wetlands. These shallow and warmer areas off the main channel support growth of submerged and emergent vegetation that in turn provides food resources for larval fish as well as cover from predators. In the case of historic Utah Lake tributaries, these off-channel habitat zones would have been critical to June sucker survival and recruitment to more mature life stages (USFWS 1999).

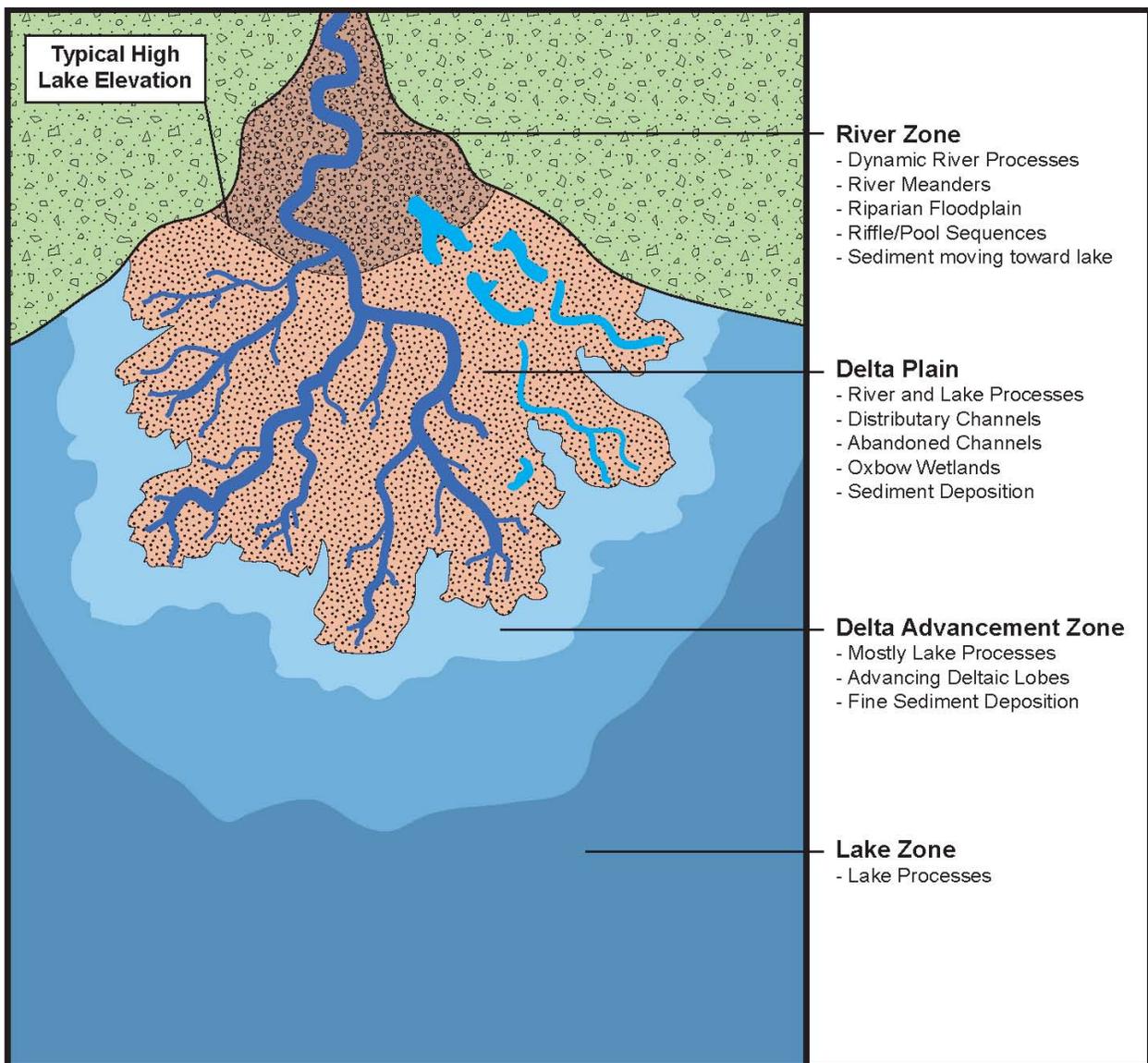


Figure S-2. Schematic drawing of typical river delta zones.

To fulfill the purpose and need, three action alternatives were advanced for detailed analysis; these are labeled Alternatives A, B, and C, and are described in detail in Chapter 2 of the Final EIS. A No-Action Alternative is also evaluated. Under any of the action alternatives, the majority of the water in the Provo River would be routed north of the existing channel corridor into a newly created riparian river corridor and river delta area.

S.2.1 Preferred Alternative

The alternative preferred by the JLAs is Alternative B, which is illustrated in Figure S-3. Alternative B is preferred because it would minimize the amount of private agricultural lands to be acquired while still providing adequate space for a naturally functioning river delta and sufficient habitat enhancement for achieving the project purpose (URMCC 2011). The majority of the river would flow into the restored river delta area, promoting the development of a diverse, vegetated aquatic and wetland environment capable of supporting young-of-year and juvenile June sucker and other aquatic life. This natural area would also provide a variety of public recreation opportunities, described in Section S.2.3. The minimum property acquisition boundary for Alternative B, also shown in Figure S-3, is 310.3 acres.

A close-up of the proposed diversion point for Alternative B is illustrated in Figure S-4, which also illustrates a necessary realignment of Boat Harbor Drive, a realignment of existing trails underneath a new bridge over the existing channel, and construction of a pedestrian bridge over the new river channel. With any of the action alternatives, the existing trails along the lower Provo River would be retained.

S.2.2 Existing Channel Options

The river bed of the existing lower Provo River is owned by Utah County and several private land owners. Because the project would divert the main flow of the lower Provo River from its current location, it was important to develop a plan for the future use of the existing channel as a component of the proposed action. Numerous options were considered, as described in Chapter 2, and two of those options were advanced for detailed analysis. These options are illustrated in Figure S-5. Either of the two options would keep the existing river channel in place with a guaranteed flow of 10–50 cubic feet per second. Under Option 1 the existing river channel would remain open to Utah Lake, allowing for fluctuating water levels at various times of the year. Under Option 2 a small dam would be constructed at the downstream end of the channel near Utah Lake State Park. This dam would maintain the water level in the existing channel at a relatively constant elevation year round.

Under either option the existing channel corridor would be managed to support existing uses. However, as evaluated in Chapter 3, recent water quality monitoring in the lower Provo River has indicated that current water quality conditions on the lower Provo River are poor for aquatic life during the summer due to low concentrations of dissolved oxygen (DO). Dissolved oxygen standards are currently not being met during extended periods of the hot summer months. Dissolved oxygen concentrations have been recorded below the published lethal limits for most fish species. Current conditions indicate an impairment of designated beneficial uses such as recreation, aesthetics, cold water fisheries, and warm water fisheries. Measures for improving water quality in the existing channel are proposed as part of this project.



Figure S-3. Alternative B (Preferred Alternative).

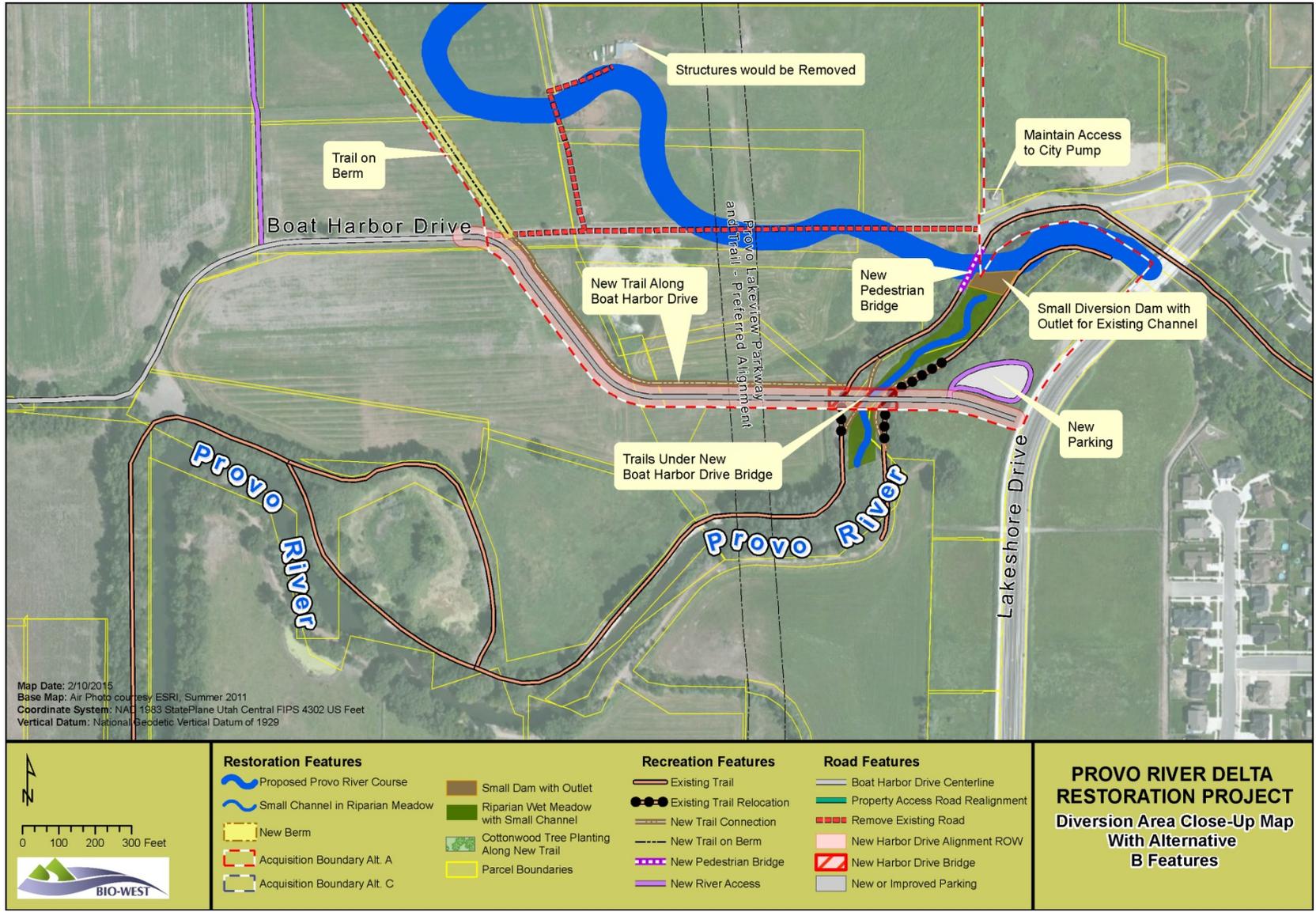


Figure S-4. Alternative B close-up.

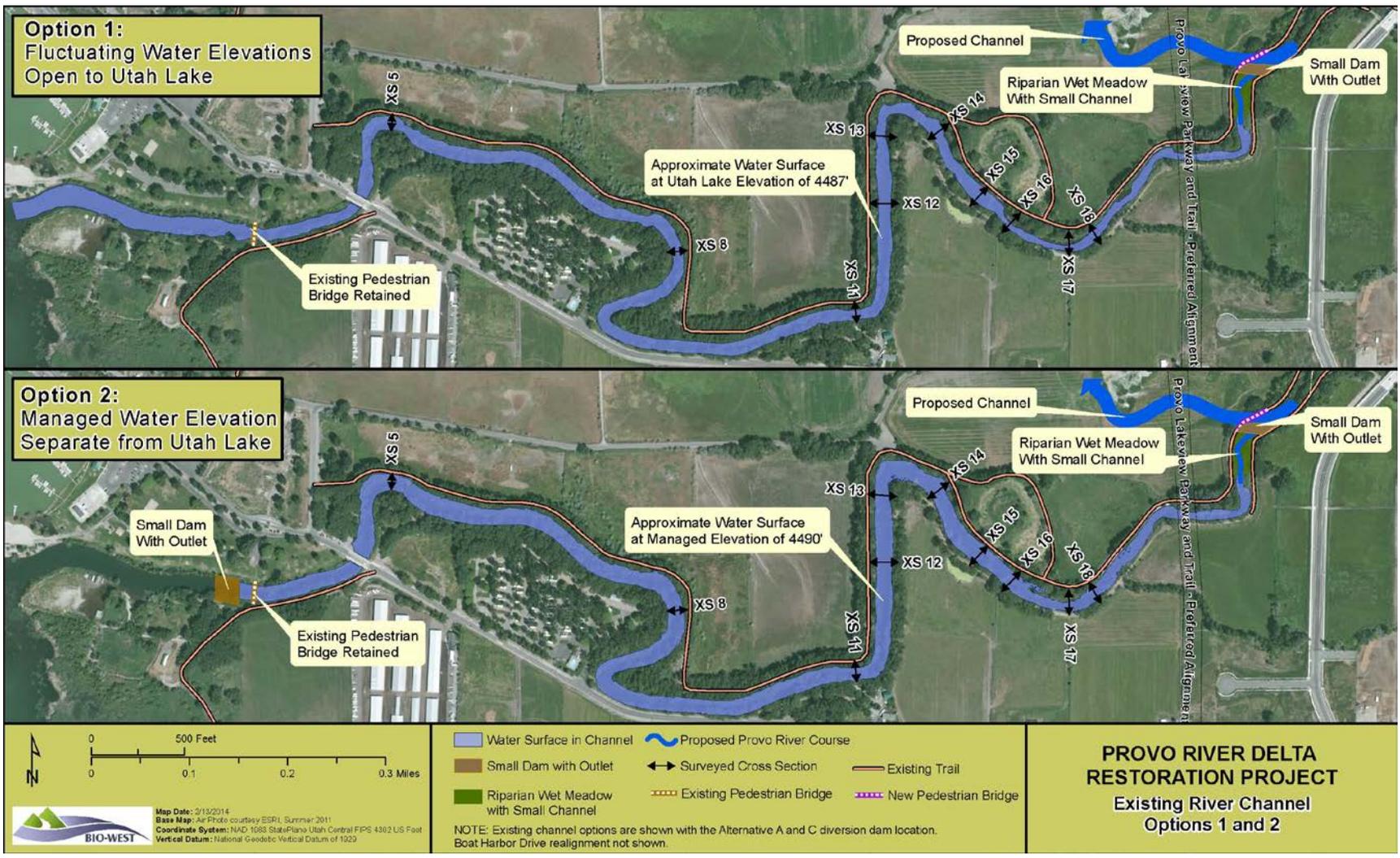


Figure S-5. Existing river channel options.

S.2.3 New and Enhanced Public Recreation Opportunities

Under Alternative B (or any of the action alternatives), additional trails would be created and connected with the existing Provo River Trail system. As illustrated in Figures S-3 and S-4, a berm would be constructed along a portion of the property acquisition boundary to prevent lake inundation and river channel migration onto the privately-owned agricultural lands that would not be acquired. This would also provide an opportunity to construct a trail on top of the berm that would connect with the remaining portion of the Skipper Bay dike trail. A parallel, unpaved trail intended for equestrian use is also proposed at the base of the berm. A viewing tower is proposed at the point where the existing and new trails would merge near the Utah Lake shoreline (Figure S-3). The Skipper Bay dike trail connects with the Provo River Parkway Trail via a short segment of 4200 West. A complete paved trail loop would thus be created (and is proposed) with inclusion of a trail connection along the realigned segment of Boat Harbor Drive (Figure S-4). The other two action alternatives (Alternative A and C, discussed later here and in Chapter 2) would have similar trail facilities.

Public access to the new river delta area is proposed via a river access easement and parking area, as illustrated in Figure S-3. This location would provide access into the river delta area for nonmotorized activities, such as canoeing and fishing, and potentially for waterfowl hunting, as would be determined in cooperation with Utah State Parks and Recreation and the Utah Division of Wildlife Resources. While the proposed delta is designed to provide prime habitats for the early stages of development for June sucker, these habitats would also benefit sport fishes found in Utah Lake, including various bass species (*Micropterus* sp.) and catfish species (*Ictalurus* sp.).

Lands within the new river corridor and delta area would convert from agricultural use to a combination of riparian woodlands, grass uplands, wet meadows, emergent marsh wetlands, and open water, providing a natural setting as the delta is reestablished. The project area would not be developed for commercial, industrial, or residential purposes; it would be maintained as open space and natural settings valuable for outdoor recreation.

Riparian vegetation along the existing river channel corridor provides a canopy over the Provo River and Provo River Trail (Figure S-5). Since the project would not involve any changes to the riparian vegetation community along the existing river channel, this area would be maintained as



a valuable public recreation and aesthetic asset. A detailed evaluation of potential effects to riparian vegetation is included in Chapter 3 of the Final EIS.

S.2.4 Supplemental Flows for the Provo River

The proposed action is tied to mitigation commitments from previously approved water development projects associated with the CUPCA, which was enacted on October 30, 1992, to provide for the successful completion of the Central Utah Project (CUP), the largest water development project undertaken in Utah. The CUPCA included an increase in authorized funding for the CUP, as well as requirements for mitigating impacts to fish, wildlife, and recreation resources. These mitigation commitments are described in greater detail in Chapter 1 (Section 1.3.7) and include a variety of provisions for supplementing flows within the lower Provo River and Hobble Creek to support June sucker spawning and rearing.

In addition to already-committed baseline supplemental flows, the proposed action would include the following:

- adopting seasonal flow regime targets identified in the **Lower Provo River Ecosystem Flow Recommendations Report** (Stamp et al. 2008);
- delivering up to an additional 4,500 acre-feet of conserved water, on a space-available basis, under the Utah Lake Drainage Basin Water Delivery System (ULS) Project to Provo River to help meet the target flow regime recommendations; and
- dividing the flow so that the first 10 cubic feet per second (cfs) and up to 50 cfs is delivered to the existing lower Provo River channel to help maintain aesthetics, water quality, and recreational values.

Greater details regarding these supplemental flows are included in Chapter 1 (Section 1.3.8) and Chapter 2 (Sections 2.5.1 and 2.6.2).

S.2.5 Other Action Alternatives Evaluated in Detail

Two other action alternatives, Alternatives A and C, include similar features to Alternative B but would utilize different portions of the overall study area and have different environmental and socioeconomic impacts.

Alternative A, illustrated in Figure S-6, is the largest-acreage alternative (507.3 acres) and maximizes the potentially available rearing and spawning habitat for June sucker north of Boat Harbor Drive, based on topography and expected area of seasonal inundation. Figure S-7 provides a close-up view of the diversion area, which is proposed to be the same for either Alternative A or C.

Alternative C was designed to exclude an area of wetlands supported by peat soils while still providing sufficient June sucker spawning and rearing habitat improvements. This would be accomplished by acquiring a minimum of 298.3 acres of agricultural lands to the south and east of these peat soil areas. However, accomplishing this would require construction of a berm through other types of existing wetlands.



Figure S-6. Alternative A.

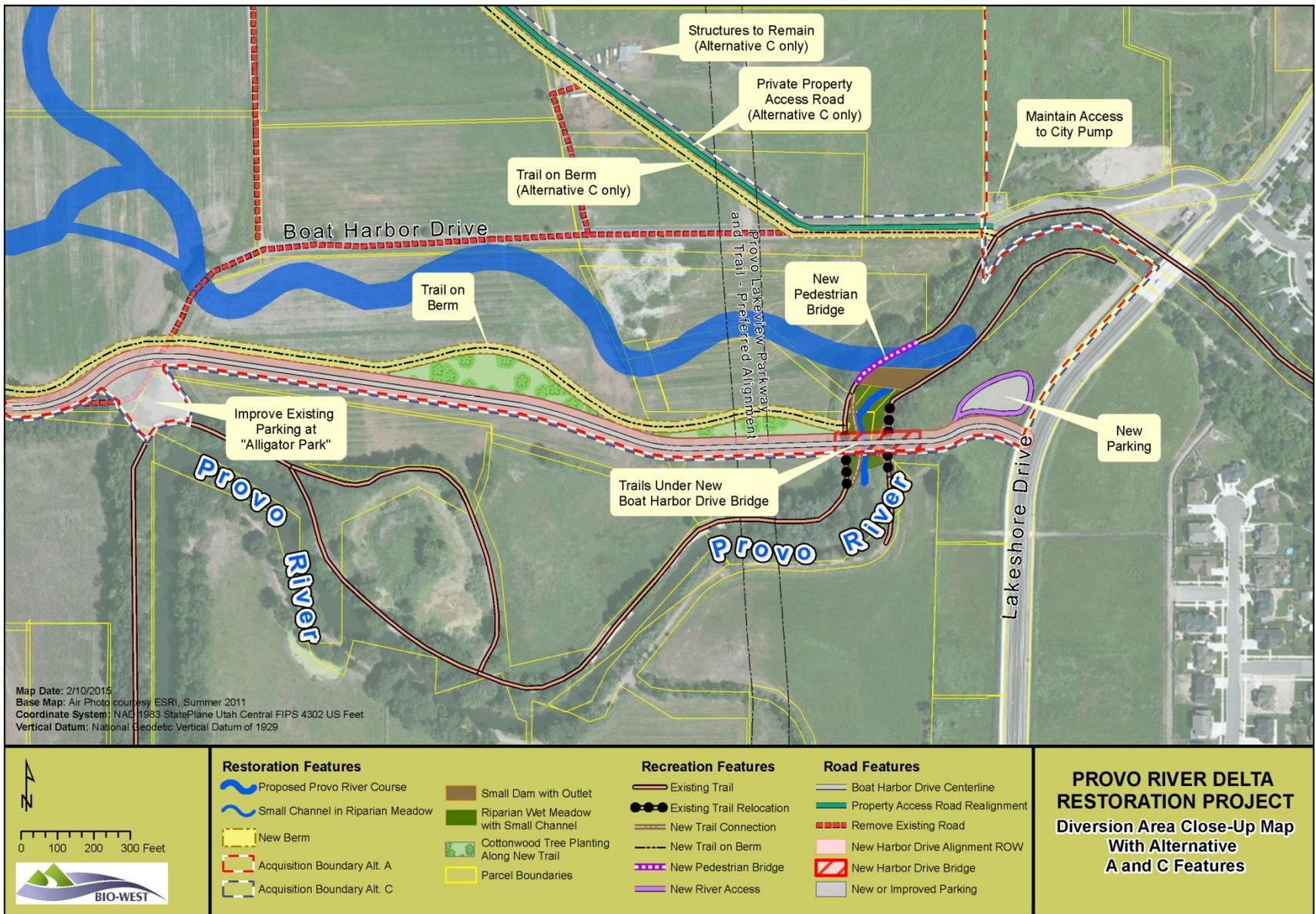


Figure S-7. Alternatives A and C close-up.

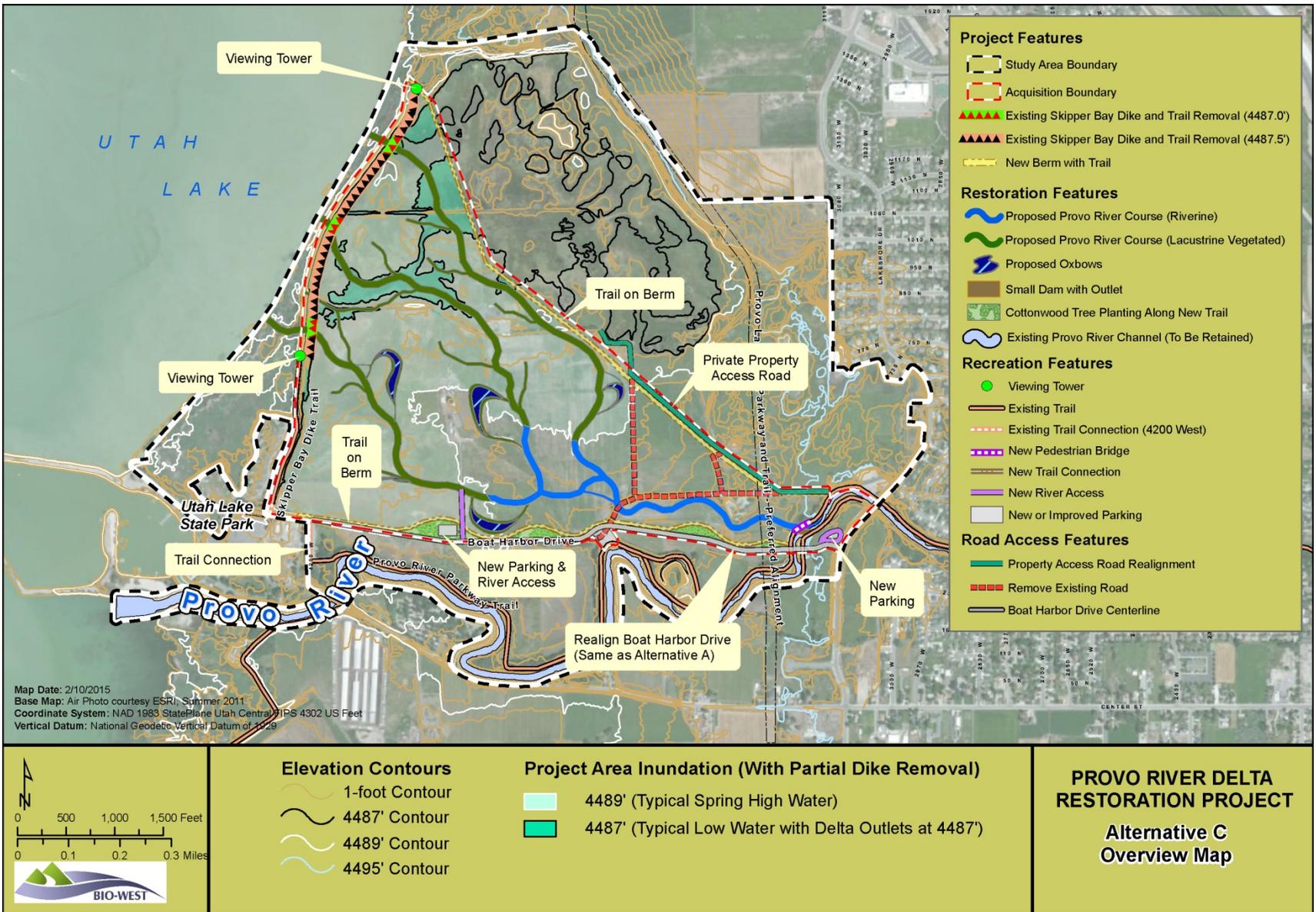


Figure S-8. Alternative C.

S.2.6 Accommodation of Provo City Transportation Planning

The preliminary designs for all of the action alternatives have accommodated Provo City's preferred alignment for the proposed Provo Lakeview Parkway and Trail. This preferred alignment was provided by Provo City and is illustrated on the maps of each alternative. The JLAs met with Provo City staff periodically throughout the EIS process to discuss designs for project alternatives to accommodate the future transportation facility. Design requirements for modifications to Boat Harbor Drive were also discussed and accommodated. A short trail segment at the north end of the study area that would be built only if and when the Provo Lakeview Parkway and Trail is constructed by Provo City has been evaluated as part of Alternatives A and B, as shown on Figures S-6 and S-3, respectively.



S.2.7 Proposed Action Summary

Any of the alternatives for the proposed action are intended to address the lack of natural recruitment of June sucker in Utah Lake. The proposed action responds directly to recovery criteria of the June Sucker Recovery Plan (USFWS 1999) and aids in accomplishing goals of the June Sucker Recovery Implementation Program (JSRIP) to achieve sufficient progress toward the recovery of the June sucker (CUWCD et al. 2002). The project also provides an opportunity to enhance public recreation facilities and provide supplemental flows for the lower Provo River.

S.3 No-Action Alternative

Consideration of a No-Action Alternative is required in regulations for implementing NEPA (40 CFR 1502.14). This alternative considers the consequences of taking "no action" with respect to the purpose and need of the proposed action. Under the No-Action Alternative, the planned project would not be implemented, but remaining actions in the June Sucker Recovery Plan (USFWS 1999) and JSRIP would proceed as planned, subject to NEPA compliance as appropriate. The underlying need for the project would not be achieved under the No-Action Alternative and the commitment to restore the Provo River delta as a necessary step toward delisting the June sucker as an endangered species would remain.

S.4 Alternatives Development Process

Within the study area, seven preliminary designs for alternatives were initially developed and evaluated through a collaborative process (URMCC 2011). Four of these preliminary designs were selected as reasonable and feasible alternatives and presented to the public at an open house meeting in December 2011. Based on public input, the largest-acreage alternative, which



included acquisition of lands between the existing river channel and Boat Harbor Drive for recreational enhancements, was eliminated from consideration.

Input obtained from the public, local landowners, and agencies also helped with revision of the alternatives carried forward for detailed analysis. In particular, Alternative B was revised through an iterative process in consultation with study area landowners and business operators. As previously stated, Alternative B was developed with the intention of minimizing the amount of private, agricultural land necessary to be obtained in order to meet project needs.

S.4.1 Project Alternatives Considered but Not Advanced

In addition to the alternatives already mentioned, numerous other potential alternatives for meeting the project need were carefully considered and evaluated including consideration of all Utah Lake tributaries; alternative geographic locations were also considered for restoring the lower Provo River. Chapter 2 includes a detailed summary of alternatives considered but dismissed. A separate report, the *Alternatives Development Technical Memorandum* (URMCC 2011), provides more information about the alternatives development process. The report is available on the project website at www.provoriverdelta.us or may be obtained by contacting the Mitigation Commission.

S.4.2 Existing Channel Options Considered but Not Advanced

Various options for the existing Provo River channel were also considered, ranging from the idea of filling in the channel to having a series of connected ponds supporting a community fishery. Following public workshops in January 2012, additional information was obtained regarding the existing Provo River channel vegetation community and groundwater elevations. Expanded water quality data were also collected. The JLAs also evaluated available surface water supplies to determine amounts that would potentially be available to maintain flow in the existing river channel. Numerous and detailed comments and suggestions for the future of the existing channel were received through scoping and subsequent public involvement activities. Representatives of the JLAs appreciate the thought and consideration that went into the preparation of the ideas and believe that many could and would be implemented in concert with final design. A common sentiment expressed by the public was to “keep the existing channel as it is,” because the existing river corridor and trails provide recreation amenities for the local community. Options 1 and 2 were, in part, selected for detailed consideration because these options maintain the existing channel corridor as a community recreation resource that would be connected with and integral to recreation opportunities created in the new river delta area. These efforts resulted in improved and more detailed designs for the two existing river channel options carried forward in the Draft and Final EIS documents.

S.5 Cooperating Agencies

A cooperating agency has the responsibility to assist the JLAs by participating in the NEPA process at the earliest possible time, participating in the scoping process, assisting with developing information and preparing environmental analyses for the EIS related to the cooperating agency's special expertise, and making staff support available at the lead agency's request to enhance its interdisciplinary capabilities (40 CFR 1501.6). Serving as a cooperating agency neither constitutes endorsement nor approval of the project, approval of the alternatives evaluated in the EIS, nor does it relieve an agency of any other duties or responsibilities it may have under local, state, or federal law. Rather, a cooperating agency helps identify relevant issues early in the planning process and verify the data and information used in the impact evaluations.

Cooperating agencies in preparing this EIS are as follows:

- U.S. Fish and Wildlife Service (USFWS),
- U.S. Army Corps of Engineers (Corps),
- U.S. Bureau of Reclamation (Reclamation),
- Federal Aviation Administration (FAA),
- State of Utah,
- Provo City, and
- Utah County.

S.6 Issue Scoping, Consultation, and Coordination

Under federal regulations for implementing NEPA, "scoping" is the process of identifying the issues that must be addressed in an EIS (40 CFR 1501.7). For the current project, a Notice of Intent to prepare an EIS and announcement of public scoping were published in the Federal Register on March 16, 2010. The initial issues that were identified by the public, agencies, local government officials, and other stakeholders were summarized in a scoping report (URMCC 2010). Ongoing consultation and coordination efforts throughout the EIS process helped to identify additional issues and to determine appropriate impact assessment methods. Agency coordination and public involvement activities are described in detail in Chapter 4.



The previously mentioned project website, www.provoriverdelta.us, was developed to provide public access to project documents and an opportunity to provide comments. A newsletter was distributed periodically to update all interested parties regarding project developments. Copies of past newsletters, press releases, technical memoranda, and other documents are available on the project website.

S.6.1 Relevant Issues

Through scoping, relevant issues to be evaluated in detail included the potential for the proposed action to result in changes or impacts to the following:

- groundwater and surface water flows;
- flooding potential;
- water quality in the lower Provo River and Utah Lake;
- water rights;
- wetland resource types and functions;
- fisheries, wildlife, and special status species;
- introduction or spread of invasive species;
- land ownership and use;
- agriculture and agriculture-related activities;
- compatibility with adjacent land uses, transportation planning, Provo Airport, and public utilities;
- recreational uses of the existing river channel and associated businesses;
- cultural resources;
- public health and safety; and
- bird-aircraft strike risk for the Provo Airport.

S.6.2 Controversial Issues

Understanding the importance of the lower Provo River to the community, the JLAs engaged key stakeholders early on and throughout the process to help define the range of alternatives and potential ways of enhancing the recreational values and opportunities afforded by the project. A Technical Assistance Team met on multiple occasions and helped determine a broad range of project alternatives for the proposed project, including options for the existing channel.

Though subsequent public involvement efforts, several key issues emerged that required additional consideration. These included the following:

- effects to existing lower Provo River recreation uses,
- potential water quality effects to the existing channel,
- property acquisition and effects to agricultural land use,
- mosquito abatement, and
- bird-aircraft strike risks.

Existing Provo River Recreation

Even though a broad range of potential options were proposed for the future of the existing river corridor, a perception emerged that the project was proposing to “shut down” or “close” the lower Provo River. There were also concerns that changes in the flow of the existing channel would negatively affect mature trees that provide shade for the Provo River Parkway Trail, and that existing recreational uses and recreation businesses that utilize the river corridor would be adversely affected.

Responding to these concerns, the JLAs undertook a detailed investigation of riparian vegetation to evaluate potential effects to mature tree stands. In consultation with partners, the JLAs also made a commitment to a minimum flow and flow regime for the existing river channel, which would be retained in its current location with any action alternative (Chapter 2, Section 2.5). The JLAs coordinated with Utah Lake State Park managers and local business owners to keep them informed of these efforts and to solicit their input.

Following release of the Draft EIS, the JLAs met with representatives of Provo City and Utah County to determine additional recreation facilities and long-term ownership and management of facilities that would be constructed as part of the proposed project. In response to comments from Provo City, an additional new parking area and trailhead were added to the project near the existing river channel. Also in response to Provo City comments, an additional trail segment to the Utah Lake shoreline was added as a component of Alternatives A and B. In response to public comments, an unpaved trail that would be appropriate for equestrian use was also added. Provo City and Utah County agreed that the equestrian trail would be an asset and could be integrated into their plans for recreation facilities in the area. Provo City and Utah County were also agreeable to assuming long-term ownership and management of trails and parking areas that would be constructed within their respective jurisdictions.



Provo River Water Quality

Water quality in the existing channel was a concern for Provo City and other users of the river and trail system before the project was proposed. Although water quality in the existing channel is currently impaired during extreme low-flow conditions in the summer, the frequency and duration of poor water quality conditions would increase in the existing channel following flow diversions into the newly constructed Provo River and delta area. The existing river channel is heavily used for recreation, including biking, jogging, walking, running, and roller-blading on the Provo River Parkway Trail and fishing and canoeing in the river. A commercial ropes course and a campground are also located adjacent to the river in this reach. The quality of the riverside recreational experience could suffer if further degraded water quality were to lead to more frequent unsightly algae blooms and/or unpleasant odors. Furthermore, the fishery could be impacted if DO concentrations were to drop below lethal levels for a longer duration during the heat of the summer than it currently does.



Responding to these concerns, the JLAs undertook a detailed investigation of existing water quality in the lower Provo River. A resulting technical memorandum describes the current water quality conditions along the existing lower Provo River channel-Utah Lake interface, including quality effects of interactions between Utah Lake levels, Provo River discharge, and both daily and seasonal air temperature cycles. The JLAs also made a commitment to a minimum flow and flow regime for the existing river channel and incorporated artificial aeration as a measure to improve water quality conditions in the existing river channel, which would be retained in its current location with any action alternative (Chapter 2, Section 2.5). The aeration method and features are described in more detail in Chapter 2 (Section 2.6.3).

Following release of the Draft EIS, the JLAs responded to comments from the U.S. Environmental Protection Agency by conducting additional studies regarding sediment oxygen demand to further understand causes of existing water quality problems in the lower Provo River and the feasibility of relying on aeration in the lower Provo River to maintain State water quality standards for DO. These studies supported the feasibility of the proposed aeration method.

Property Acquisition and Effects on Agricultural Land Use

Landowners and local citizens value lands near the Provo River/Utah Lake interface for their agricultural character and heritage. Landowners suggested alternatives, including use of existing canals and alternate project locations. All suggestions were considered; however, it was determined that many would fall short of meeting the project need. Through multiple



meetings with landowners, revisions were made to one project alternative that would reduce the level of effects to existing land uses and most landowners from what had been proposed to date while still having sufficient habitat creation to meet the project need. That revised alternative is Alternative B, the JLA's Preferred Alternative.

Mosquito Abatement

During the scoping process, concern was expressed that the project would increase mosquitoes. The JLAs coordinated with and funded the Utah County Health Department to complete a baseline assessment of mosquito populations in the study area. The JLAs developed a mosquito management plan that would be implemented with any of the action alternatives that is consistent with Utah County methods and strategies.



Bird-Aircraft Strike Risk

Provo City identified a concern that the project would attract more birds to the area and would increase the bird-aircraft strike risk at the Provo Airport. During meetings with Provo City and the FAA, the JLAs learned that Provo City had plans to conduct a Wildlife Hazard Assessment for Provo Airport in 2013. As a result of these meetings, the JLAs invited FAA to become a cooperating agency and review the portions of the EIS that evaluate bird-aircraft strike risks at Provo Airport. Several meetings were held with Provo City, FAA, and the U.S. Department of Agriculture's Wildlife Services to coordinate studies and share information regarding existing and predicted bird communities, their risk to aircraft, and potential mitigation measures. A detailed technical report was prepared. The JLAs have committed to conduct monitoring and mitigation to address potential increases in bird-aircraft strike risk at Provo Airport that might be associated with the delta restoration project.



As previously mentioned, all technical reports supporting these evaluations are available from the project website, www.provoriverdelta.us, or may be obtained by contacting the Mitigation Commission.

S.7 Design Features and Impact Assessment Summary

S.7.1 Project Alternatives Summary

Table S-1 presents a comparison of the three project action alternatives and the No-Action Alternative, including design features that are described in detail in Chapter 2, as well as environmental and socioeconomic impacts that are evaluated in detail in Chapter 3.

Table S-1. Project alternative design features and impact assessment summary.

FEATURES/IMPACT INDICATORS	NO-ACTION ALTERNATIVE	PROJECT ACTION ALTERNATIVES		
		A	B	C
Design Features				
Property acquisition boundary (acres)	None	507.3	310.3	298.3
Length of new berm (feet)	None	5,306	5,229	11,780
Riverine channel length (existing or enhanced spawning habitat within the study area portion of the lower Provo River, in feet)	2,180	2,600	2,360	2,600
Channel slope (riverine section)	0.3%	0.2%	0.3%	0.2%
Width of floodplain/riparian corridor in spawning reach (feet)	100	800	800	800
Relative width available for dynamic delta processes (feet)	100	5,225	3,030	3,285
Up to 4,500 acre feet of additional conserved water annually for delivery to Provo River for instream flows for June sucker	Not available	Available		
Consultation with June Sucker Recovery Implementation Program and Flow Workgroup to coordinate target flow regimes according to <i>Lower Provo River Ecosystem Flow Recommendations Final Report</i> (Stamp et al. 2008), on an adaptive basis	No change	Adopt flow report and adaptive approach		
Hydrology and Flood Risk				
Change in 100-year water surface elevations in the Provo River- immediately below Lakeshore Drive Bridge. Modeled Parameters: Provo River = 2,700 cubic feet per second (cfs) Utah Lake = 4,489.045 feet	Existing flood elevation is 4,500.51 feet	-0.07 feet (negligible positive effect)	-1.16 feet (positive effect)	-0.07 feet (negligible positive effect)
Change in 100-year water surface elevations in the Provo River near Alligator Park. Modeled Parameters: Provo River = 2,700 cfs Utah Lake = 4,489.045 feet	Existing flood elevation is 4,493.24 feet	-1.05 feet (positive effect)	-2.68 feet (positive effect)	-1.05 feet (positive effect)
Change in consumptive use and evaporation	No change	339 acre-feet (20% increase)	190 acre-feet (11% increase)	224 acre-feet (13% increase)

Table S-1. Continued.

FEATURES/IMPACT INDICATORS	NO-ACTION ALTERNATIVE	PROJECT ACTION ALTERNATIVES		
		A	B	C
Water Rights				
Water right acquisition and accommodation	No effects	Some water rights acquired with property acquisition; accommodation for adjacent property water rights to be determined in final design.		
Water Quality				
Wetland and riparian floodplain acres that filter sediments and pollutants	31.4 acres	443.7 acres	265.2 acres	253.8 acres
Utah Lake phosphorous load reductions	No change	-5.2 tons/year	-5.1 tons/year	-5.1 tons/year
Metals	Utah Lake and Provo River not impaired	Reduced loads to Utah Lake		
Cumulative water-quality improvement	No improvement	Nutrient uptake with wetlands at the river/lake interface		
Wetlands				
Wetlands filled and converted to uplands (acres)	None	None	0.5	1.6
Wetland converted to deep water ponds (acres)	None	1.1	3.6	None
Net wetland gain (acres)	None	+174.6	+25.2	+154.9
Wetland functional unit gain (percent)	No change	+146%	+64%	+99%
Other Waters of the U.S.				
Diversion structure(s)	None	<p>Approximately 2,250 cubic yards of fill placed below the Ordinary High Water Mark (OHWM) over approximately 0.20 acre in the Provo River associated with new delta diversion structure (Option 1 or 2).</p> <p>With Option 2, an additional 4,000 cubic yards of fill placed below the OHWM over an additional 0.20 acre in the Provo River/Utah Lake associated with lower “outlet” dam.</p>		
New Boat Harbor Drive Crossing and Riparian Wet Meadow with Small Channel	None	Approximately 556 cubic yards of fill placed below the OHWM over approximately 0.17 acre in the Provo River immediately downstream of the delta diversion structure to accommodate the new 10–50 cfs flow regime.	Approximately 1,340 cubic yards of fill placed below the OHWM over approximately 0.41 acre in the Provo River immediately downstream of the delta diversion structure to accommodate the new 10–50 cfs flow regime.	Same as Alternative A.

Table S-1. Continued.

FEATURES/IMPACT INDICATORS	NO-ACTION ALTERNATIVE	PROJECT ACTION ALTERNATIVES		
		A	B	C
Other Waters of the U.S.				
Fill removal	None	Approximately 7,676 cubic yards of fill removed below the OHWM in Utah Lake associated with partial removal of Skipper Bay dike.	Approximately 6,382 cubic yards of fill removed below the OHWM in Utah Lake associated with partial removal of Skipper Bay dike.	Approximately 7,367 cubic yards of fill removed below the OHWM in Utah Lake associated with partial removal of Skipper Bay dike.
Existing Channel Vegetation Community				
Net riparian forests gain (acres)	None	+36.6	+19.4	+27.3
Fisheries				
New aquatic habitat conversion or creation (acres)	None	+481.5	+325.2	+313.9
Species supported	No change	Native and nonnative warm water species benefit; angling opportunity increases		
Wildlife				
Wetland and riparian woodland habitat gain (acres)	No change	+181.1	+23.7	+168.1
Upland habitat loss (acres)	No change	-229.2	-69.3	-208.0
State-listed special status species	Not affected	No significant effects		
Threatened and Endangered Species				
June Sucker	No effect	Possible negative impacts from predation to a small number of drifting larvae and young fish that are entrained into the existing channel. Significant direct and cumulative benefits for June sucker in the lower Provo River (critical habitat reach) and Utah Lake by restoring a naturally functioning river delta to the Utah Lake-Provo River interface. Spawning habitat would also be improved in a portion of the lower Provo River. These enhancements would contribute directly toward achieving criteria of the recovery plan and would contribute substantially toward downlisting and eventual delisting of the species.		
Ute Ladies'-tresses	No effect	Possible short-term negative impacts if existing occurrences cannot be avoided during construction or if occurrences are inundated, submerged, or the hydrology is altered sufficiently to render the habitat less suitable or unsuitable. However, the restoration of a more natural hydrologic regime in the project implementation area would be considered beneficial to the species in the long-term because natural flood events are important for creating new habitat and for reducing the cover of competing vegetation.		

Table S-1. Continued.

FEATURES/IMPACT INDICATORS	NO-ACTION ALTERNATIVE	PROJECT ACTION ALTERNATIVES		
		A	B	C
Threatened and Endangered Species (Continued)				
Yellow-billed Cuckoo	No effect	Avoid short-term impacts by conducting vegetation clearing outside of the typical nesting/brood-rearing period or performing a nest clearance survey prior to disturbance. Over the long-term the project is expected to have positive effects for the species by supporting a net gain in riparian forest and improvement in habitat quality.		
Land Use				
Compatibility with local and regional land use and transportation planning	No change	The proposed action is compatible with Utah County and Provo City planning and the Utah Lake Master Plan. Ongoing coordination with Utah County, Provo City, the Utah Lake Commission, the Federal Aviation Administration, and other entities would be necessary as land uses surrounding the project implementation area change over time.		
Agriculture and Farmlands				
Lands primarily used for grazing (existing and acquired for the project) (acres)	516.7	-413.0	-284.5	-209.5
Lands primarily used for crops (acres)	90.6	-79.4	-18.2	-74.3
Lands in agricultural structures (acres)	5.2	-5.2	-1.4	-3.9
Farmland conversion impact rating (significant impact rating = 160 or higher)	No change	127.9	121.9	130.9
Noxious Species				
Noxious weeds, including common reed (<i>Phragmites australis</i>)	No change	Potential for invasion following construction; ongoing management required.		
Utilities				
Natural gas pipeline present in study area	No change	Need to determine avoidance and mitigation measures in final design.		
Socioeconomic Impacts				
Regional socioeconomic effects	No impact	Temporary construction employment, less than significant regional effects.		
Private property acquisition (acres)	None	417.8	221.4	248.6
Environmental justice	No change	Would not have disproportionate effects or unequal distribution of benefits.		

Table S-1. Continued.

FEATURES/IMPACT INDICATORS	NO-ACTION ALTERNATIVE	PROJECT ACTION ALTERNATIVES		
		A	B	C
Recreation Resources				
Length of new paved trail (feet)	None	5,306	6,365	11,780
Dike/paved trail removal (feet)	None	-3,454	-2,872	-3,315
Net increase in paved trail (feet)	No change	+1,852	+3,493	+8,465
Unpaved trail intended for equestrian use on all new berm trail segments parallel to paved trail	Not included	Included	Included	Included
Unpaved trail segment from planned Provo Lakeview Parkway and Trail to Utah Lake shoreline (approximate length: 1,660 feet)	Not included	Included	Included	Not included
Change in other facilities/opportunities	No change	Additional parking, river access, fishing opportunity, nonmotorized boating, trail loop created, viewing towers.		
Public Health and Safety				
Mosquito abatement	No change	Potential to increase mosquito production; ongoing coordination with Utah County mosquito abatement required.		
Bird-aircraft strike risk—impact evaluation	No impact	Slight decrease in total bird abundance and potential corresponding decrease in strike risk. Potential increase in strike risk associated with some species.	Decrease in total bird abundance and potential corresponding decrease in strike risk. Potential increase in strike risk associated with some species.	Increase in total bird abundance and potential corresponding increase in strike risk. Potential increase in strike risk associated with some species.
Bird-aircraft strike risk – monitoring and mitigation commitments	Not included	<p>The JLAs will commit to conducting a bird monitoring and movement study and mitigate any increased bird-aircraft strike risk caused by the proposed project. The Mitigation Commission will execute an agreement or contract to conduct the baseline monitoring/movement study and mitigation efforts.</p> <p>The JLAs will endeavor to execute an Memorandum of Agreement among Provo City, Provo Airport, USDA Wildlife Services, and the FAA to establish cooperation and coordination among the parties for implementing the monitoring and mitigation efforts.</p>		

Table S-1. Continued.

FEATURES/IMPACT INDICATORS	NO-ACTION ALTERNATIVE	PROJECT ACTION ALTERNATIVES		
		A	B	C
Cultural Resources				
Cultural Resources	No effect	It is probable that historically-eligible buried prehistoric sites are located within the project implementation area for any action alternative. There is a probability that one or more of these sites would be inadvertently discovered during ground disturbing activities associated with any of the three action alternatives. A Programmatic Agreement has been developed in consultation with the Utah State Historic Preservation Office and the Consulting Parties and represents a commitment on the part of the JLAs to mitigate for the effects of the undertaking.		
Energy and Climate Change				
Energy and Climate Change	No impact	No significant impacts		
Commitment of Resources				
Irreversible and Irretrievable Commitment of Resources	No impact	No significant impacts		

S.7.2 Existing Channel Options Summary

Table S-2 presents a summary of existing channel design features and impacts.

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Table S-2. Existing channel option design features and impact assessment summary.

FEATURES/ INDICATORS	NO-ACTION	OPTION 1	OPTION 2
Flow range (cubic feet per second [cfs])	0–1,800 (typical)	10–50	10–50
Water quality	Recent measurements of dissolved oxygen are at times below state standard.	<p>Extreme low flows during the hot summer months during dry years would be improved with a minimum flow of 10 cfs.</p> <p>Debris, suspended and bedload sediment, and pollutants associated with runoff events would be redirected into the new channel and delta.</p> <p>Limited opportunity to make improvements to the bed and banks that could improve water quality and recreation.</p> <p>Aeration would improve dissolved oxygen, reduce algal blooms, improve aesthetics, improve fishery.</p>	<p>Extreme low flows during the hot summer months during dry years would be improved with a minimum flow of 10 cfs.</p> <p>Debris, suspended and bedload sediment, and pollutants associated with runoff events would be redirected into the new channel and delta.</p> <p>Greater opportunity (with permanent dam structure) to make improvements to the bed and banks that could improve water quality and recreation.</p> <p>Aeration would improve dissolved oxygen, reduce algal blooms, improve aesthetics, improve fishery.</p>
Existing channel riparian forest	No impact.	Minimal loss (approximately 0.23 acre) of riparian vegetation for construction of delta diversion dam in existing channel.	Minimal loss (approximately 0.46 acre) of riparian vegetation for construction of delta diversion dam and outlet dam in existing channel.
Fishery	No change; existing water quality at times does not support fish. Most common species at present (brown trout) is a cold water species.	With improving summer water quality (dissolved oxygen levels) the habitat and environmental conditions would become more suitable for brown trout, as well as warmwater fishes (e.g., channel catfish, white bass, bluegill, largemouth bass), but would also likely provide excellent habitat for common carp at times and given open connection to the lake.	Opportunity to actively manage as a fishery and potential to exclude carp. With improvements in summer water quality and dissolved oxygen levels, maintenance of a trout fishery might be possible.

Table S-2. Continued.

FEATURES/ INDICATORS	NO-ACTION	OPTION 1	OPTION 2
Wildlife	No change.	No significant impacts.	No significant impacts.
Socioeconomic	Water quality may negatively affect existing channel and private recreation businesses associated with the channel.	There would be an opportunity to improve water quality over existing conditions, as well as a potential positive impact for the existing channel and private recreation businesses associated with the channel.	There would be an opportunity to improve water quality over existing conditions and manage the water elevation in the channel, as well as a potential positive impact for the existing channel and private recreation businesses associated with the channel.
Recreation opportunity changes	No impact.	Improved parking/access to existing channel; would not change any of the recreational resources associated with the existing channel currently in place.	Improved parking/access to existing channel; opportunity to maintain a constant water elevation in the channel, but boats would not be able to reach Utah Lake directly from the existing channel (portage would be necessary).

S.8 Environmental Commitments

Measures to avoid and minimize impacts will be implemented during final design of the project prior to construction, during the construction phase, and as long-term commitments for management of the project area. The following sections describe the environmental commitments that will be included in the Record of Decision if an action alternative is selected. Additionally, Chapter 2 Section 2.6 specifies certain commitments and management responsibilities that are included with the proposed action.

S.8.1 Requirements for Final Design (Prior to Construction)

Property Acquisition

Ownership of lands in the study area is a mix of private, municipal, County, State, and federal. In order to implement the proposed action, lands needed for the project will be acquired by the federal government if not already in public ownership and available for full use for project purposes. Various easements, title disputes, and so on (see Chapter 3, Section 3.10.4) will each be addressed in turn in accordance with relevant statutes. Acquisition will follow a standard process required by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 USC 61). The purpose of this act is to provide uniformity and fairness in the treatment of property owners. The JLAs must comply with the federal regulations to acquire private property and water rights. The full range of available land acquisition flexibility allowed under law will be explored with landowners to ensure, to the extent reasonable, that project goals

can be achieved by means of land acquisitions that are mutually agreeable. With any of the action alternatives, every reasonable effort will be made to complete land acquisitions on a willing-seller basis. If properties needed for the delta restoration component of the project could not be acquired on a willing-seller basis, then property will be acquired through exercise of eminent domain.

In addition to lands necessary for project implementation, additional lands could be acquired on a willing-seller basis, either in conjunction with an action alternative or at a later time. Such lands could be acquired to enhance the habitat values for June sucker, to preserve habitat values for other wildlife, or to provide additional recreation opportunities. In accordance with 43 CFR Part 10005, the Mitigation Commission is authorized to construct recreation projects that increase the quality of or access to outdoor recreation opportunities that rely on the natural environment, or provide opportunities that have been reduced through federal reclamation projects.

Before any property could be acquired, a Phase I Real Estate Environmental Site Assessment will be required.

Water Rights

The Utah Water Rights Database will be queried during the final design and property acquisition process to determine current ownership of water rights. The final design of any action alternative will need to accommodate access to wells, ditches, pipes, and other water right conveyance structures for any water rights not acquired as part of the alternative. Water will be maintained in the existing channel under all action alternatives. Currently, there are no guaranteed minimum flows in the lower Provo River. All action alternatives include providing a minimum flow of 10 cfs in the existing channel, which will improve streamflow during the summer irrigation season when flows otherwise can drop to near zero.

Consumptive Use and Evaporation of Water

Increased consumptive uses and evaporation of water caused by implementation of any action alternative will be covered by water rights owned by or to be acquired by the JLAs for this purpose.

Boat Harbor Drive

A final road design will be developed in consultation with Provo City and Utah County.

Natural Gas Pipeline

Additional coordination with Questar Gas will occur during final design to determine necessary avoidance and mitigation measures for the buried natural gas pipeline. Additional survey work may be needed prior to construction to more accurately determine the location and depth of the pipeline.

Vegetation Management

Vegetation mapping will be completed during the design phase and then again periodically during the monitoring and management phase (post revegetation) to determine level of effort needed to control weeds during and after construction.

Wetlands

The JLAs anticipate that the project will be permitted under a Nationwide 27 permit (aquatic habitat restoration, establishment, and enhancement activities). A detailed survey of the property acquisition area will be completed as part of the final design and Clean Water Act Section 404 compliance process. An effort will be made to identify any degraded peat mounds that may exist; these will be avoided with any project fill or excavation and construction staging areas associated with the selected alternative. The overall impact of any action alternative will be an increase in the quantity and quality of aquatic habitat, restoring wetlands in the study area to a more natural condition with a significant increase in wetland functions provided. An increase in weedy vegetation is possible immediately following project implementation of any action alternative, especially prior to establishment of native vegetation. Aggressive measures contained within the Vegetation Management Plan (Appendix B of the Final EIS) will be followed to control the spread of invasive species.

With implementation of either Alternative A or B, the Provo City Wetland Mitigation Site will be maintained as a high-quality wetland within the overall restoration area, with an added function of June sucker rearing habitat. The BLB Drywall Mitigation site will also be maintained as a wetland within the overall restoration area, but is higher in elevation and therefore will not be anticipated to function as June sucker rearing habitat. The intent of the JLAs is that both Provo City and BLB Drywall will be “kept whole” with respect to their wetland mitigation sites within the delta restoration project (Alternative A or B). If the U.S. Army Corps of Engineers determines there is an adverse effect on the credits achieved by either site, the JLAs will work cooperatively with the parties involved to achieve an acceptable solution. The two wetland mitigation sites are outside the proposed land acquisition boundary for Alternative C and will not be affected under that alternative.

Threatened and Endangered Species

Ute Ladies'-tresses (Pre-Construction)

In consultation with the USFWS, the following conservation measures for Ute ladies'-tresses have been developed and will be applied to the proposed project:

1. Perform at least one additional survey for Ute ladies'-tresses prior to construction to meet the USFWS guidance of 3 years of surveys. This survey will determine whether any changes have occurred to known populations since the last survey in 2013. Survey the project area for additional occurrences. Additional surveys may be required, depending on the time between construction implementation and the last survey. The last survey should be performed no later than 3-years from construction initiation.



2. Avoid direct impacts to all identified occurrences during the final design and project implementation, to the extent possible.
3. Fence locations of known occurrences using environmental fencing and the assistance of a qualified biologist prior to construction activities in the project implementation area. Have the qualified biologist establish ingress, egress, and staging areas to avoid known occurrences.

Other additional commitments associated with threatened and endangered species are listed under the construction phase environmental commitments (Section S.8.2) and the long-term environmental commitments (Section S.8.3).

Land Owners and Agriculture

Because land uses in the study area are predominately agricultural under baseline conditions, the JLAs identified a number of possible mitigation measures to reduce the impacts to landowners and agricultural operations caused by acquisition of their private property for the project.

1. **Scheduling.** A project the magnitude of the proposed delta restoration project will take several years to plan, design, fund, construct and implement if approved. The JLAs will coordinate closely with landowners to identify reliable target dates for ranchers/landowners to count on for planning purposes so they know when they might need to begin adjusting herd size, or whether or not to invest in reseeded an alfalfa crop, for example.
2. **Temporary Retained Use.** The JLAs will exercise as much flexibility as allowed by law to enable landowners/ranchers to retain use of their property as long as possible, which in some cases may extend even after they have sold it to the government for the project.
3. **Temporary Replacement Property.** The JLAs have a limited amount of agricultural land in another region of Utah County that has been acquired contiguous to another project. The JLAs will consider the temporary or permanent use of those properties as replacement for properties sold to the government for the delta restoration project, to ease the transition out of agricultural production or from the study area to another location.

Airport Hazards (Pre-Construction)

The JLAs will coordinate with FAA and Provo Airport prior to project construction activities to alert them of pending land use changes that may require recalibration of radar systems.

The JLAs will invite USDA Wildlife Services, Provo Airport, and FAA to participate in design of the selected alternative to help identify any wildlife hazard reduction measures (e.g. plant species, design features) that might be compatible with the delta restoration project

The JLAs will implement a bird monitoring and movement study during the final design phase of the selected alternative to maximize data collection opportunities for establishing baseline conditions.

Cultural Resources

It is probable that buried prehistoric sites eligible for listing in the National Register of Historic Places are located within the Provo River Delta Restoration Project area. Prehistoric residential sites can be large, and considering the project area's proximity to previously documented sites of this type, there is a high probability that one or more of these sites will be inadvertently discovered during ground-disturbing activities associated with any of the three action alternatives. A Programmatic Agreement has been developed in consultation with the State Historic Preservation Officer and the consulting parties (signed copy to be included with the Record of Decision). The Programmatic Agreement represents a commitment on the part of the JLAs to mitigate for the effects of the undertaking.

South Levee Operation and Maintenance

During the planning process for the project, Provo City requested consideration of ways to temporarily provide higher water surface elevations in the existing channel to allow the City to examine the south levee under high water conditions. Under either Option 1 or Option 2, the JLAs will coordinate with Provo City during final design and construction of the existing channel to provide opportunities to periodically and temporarily raise water levels for the purpose of testing the structural integrity of the south levee for operation and maintenance purposes. Strategies will be sought to raise water levels in the existing channel where possible without flooding adjacent properties or impacting other uses/users of the existing Provo River corridor.

Other Required Permits, Approvals, and Agreements

Chapter 1, Section 1.6 provides a description of required permits, approvals, and agreements that will be necessary for implementing the proposed action.

S.8.2 Construction Phase Environmental Commitments

Access for Private Property Owners and Construction

Construction activities will be designed to maintain access to all nonproject parcels under agricultural production or that hold livestock. All nonproject irrigation conveyances will be maintained or modified so that crop and pasture irrigation is not interrupted for significant periods of time or during critical irrigation times.

Construction workers and equipment will gain access to the Provo River corridor and the project area from public road access points. Negotiations will be conducted with landowners to determine whether temporary construction access could be obtained if needed. Procedures to avoid conflicts with adjacent property access and uses during construction will be established and followed to prevent conflicts. Unavoidable or unintentional damage to any facilities such as irrigation gates will be replaced or restored.

Natural Gas Pipeline Avoidance

The natural gas pipeline located in the study area will be clearly marked and avoided during construction.

Air Quality

Generation of fugitive dust could be expected in the vicinity of project construction areas as a result of earth excavation, vegetation removal, equipment operation, and traffic activity. Fugitive dust emissions will vary depending on the level of activity, specific construction techniques, soil characteristics, and weather conditions. Fugitive dust is composed of relatively large particles that settle out quickly, thus localizing the effect to air quality. Proper construction techniques, such as utilizing water, mulching, or applying surfactants on areas with high fugitive dust potential, will minimize dust emissions.

The constructor will be required to contact the Utah Division of Air Quality and obtain any needed emissions permitting for construction and will implement best management practices to minimize emissions as practicable.

Noise

Temporary noise disturbances will occur as a result of project construction. Effects will be limited in scope and duration, causing limited and temporary inconvenience to local residents. A Provo City noise ordinance restricts work to between the hours of 7:00 a.m. and 10:00 p.m.

Hazardous Materials and Hazardous Waste

During construction, if workers encounter any previously unknown soil contamination or other hazardous materials or waste, construction activity will cease until the hazard is evaluated and appropriate protection measures were implemented.

Visual Quality

The visual quality of the area will be temporarily affected by excavation, fill, vegetation clearing, and presence of construction vehicles. Staging areas will need to be maintained in an orderly manner and, where practical, off-shift equipment will be parked in designated areas to reduce visual clutter.

Noxious Weed Control

The introduction of noxious weeds will be minimized by requiring that all construction equipment be pressure washed before arriving and leaving the project area. Weeds will be sprayed with herbicide prior to ground disturbance.

To minimize the potential for the establishment of State-listed and other noxious weeds, an aggressive revegetation plan will be implemented. Newly excavated channel banks, backwater pools, and marsh areas will be seeded with a wetland seed mix containing a variety of grass, sedge, and perennial emergent species. Species known to provide high-quality rearing habitat for larval and juvenile June sucker will be emphasized. Planting and seeding will occur during the appropriate season for plant germination and survival.



Obtain clean material for any fill that may need to be brought on site to avoid introductions of noxious species, particularly phragmites.

Following revegetation, invasive weed species will be controlled using spot treatment with an herbicide licensed for safe use in aquatic habitats. Long-term vegetation management is specified in the project-specific vegetation management plan (Appendix B of the Final EIS).

Water Quality

Potential short-term, water-quality impacts associated with construction of stream channel and floodplain pond features will be mitigated through the use of appropriate temporary stormwater and erosion control best management practices. Most construction activities in the delta restoration portion of the project area will occur prior to diverting water into the delta and prior to removal of Skipper Bay dike.

Existing Channel Riparian Forest

When constructing diversion structure(s)/dam(s) in the existing Provo River channel, minimize the footprint and impacts to riparian trees to the extent practicable. Replant disturbed areas with native riparian vegetation.

Wildlife

To comply with the Migratory Bird Treaty Act:

- Complete any vegetation clearing between August 30 and April 1, which is outside the typical nesting/brood rearing period for migratory birds.
- Alternatively, have a qualified wildlife biologist perform a nest clearance survey immediately prior to construction activities if any nesting trees/artificial structures have to be removed during the nesting/brood rearing season.

Appropriate spatial buffers (generally 100 feet) should be established around any active nests and nests should not be touched until the young have fledged. To comply with conservation commitments of the Section 7 consultation process (Chapter 3, Section 3.9.17), particular attention will be paid to surveying riparian disturbance areas for potential occurrence of yellow-billed cuckoo, a threatened species.

- Survey for raptor nests within the range of disturbance of project activities (refer to the USFWS *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances* [2002]). Identify nests prior to trees leafing out and surveying again after nesting has begun to determine which nests are active, and what species are utilizing them. If the construction will occur during the nesting season, then surveys should be conducted again prior to construction activity to determine nesting activity. If an active



raptor nest is identified, establish appropriate buffer distances and duration given the species and nest location.

Threatened and Endangered Species

June Sucker

- Do not conduct construction activities in the existing Provo River channel during the June sucker spawning period from April 1 to July 31 to avoid adverse effects on the species.
- Take care to minimize sedimentation inputs associated with stream-disturbance activities during construction.

Ute Ladies'-tresses (Construction Phase)

1. Document the extent of the impacted area when avoidance of direct impacts to Ute ladies'-tresses occurrences is not possible. Direct impacts include excavation for river channels or other proposed project features and placing fill material on known occurrences. Direct impacts do not include inundation because the species has survived prolonged periods of past inundation. Based on lake elevation levels, all occurrences except #4 would have been inundated with water for an extended period of time during 1983–1985. Many of the existing occurrences were also inundated for several months during a 10-year flood event that occurred during the 2011 growing season. Additionally, occurrence #6 was observed to be underwater in 2013 during the wetland delineation site visit with the Corps during a time when the Despain property was not being aggressively drained.
2. Salvage soil when avoidance of direct impacts is not possible and relocate it to another portion of the project area where the hydrology is sufficient to support Ute ladies'-tresses. The potential transplant areas are mutually agreeable to the USFWS and identified in the Biological Assessment for this project. Relocation methods will attempt to keep the upper 2 feet of the soil profile intact if the salvage area(s) are small (less than 100 square feet); however, this method may not be feasible if larger areas are salvaged. For larger impact areas, the top 12 inches of soil will be relocated to the transplant site. Because salvage efforts have a high failure rate, this activity is considered an impact-minimization strategy, but the salvaged area would still be included in the impact calculation. If Ute ladies'-tresses are found in the transplanted areas during the post-construction surveys, then the salvaged area would be removed from the impact calculation.
3. Minimize soil and vegetation disturbance by operating equipment on top of temporary earth fills above geotextile mats when avoidance of temporary impacts (soil compaction by vehicles and machinery) to an occurrence is not possible.

4. Abstain from construction within 300 feet of known occurrences during the Ute ladies'-tresses flowering period of July 31–September 15. A qualified botanist may perform weekly surveys to document the beginning and ending of the flowering period to narrow this timing requirement based on the specific flowering period at the project area. Implement other best management practices for dust control during the Ute ladies'-tresses flowering period if any known occurrences are being impacted by dust. Follow best management practices for sediment control throughout construction to ensure that bare soil and sediment are not transported to Ute ladies'-tresses areas.
5. Avoid, to the extent feasible, construction impacts to peat wetlands, including degraded springs.

The following best management practices or general conservation measures will be followed to protect Ute ladies'-tresses in the study area:

1. Use boulders, root-wads, and other natural materials from local sources to stabilize streambanks and in the active stream channel rather than using concrete, asphalt, steel, other human-made materials.
2. Use erosion-control environmental commitments where project construction will disturb soil. These areas are expected to be along channel-construction and -modification areas, construction access roads, floodplain grading areas, setback berms, and stockpile areas. The procedures will be designed to stabilize soils, restore vegetation to a desired plant community, and to prevent infestation by noxious plants and to avoid erosion.
3. Remove and stockpile topsoil to a depth of 1 foot (or less if topsoil layer is less than 1 foot deep) for site restoration.
4. Secure additional topsoil of suitable quality for revegetating disturbed sites from areas that will have minimal impacts on important fish and wildlife habitats.
5. Implement the weed-control program in the vegetation management plan (Appendix B of the Final EIS) to control noxious weeds resulting from project implementation.
6. Examine and wash equipment and vehicles, if necessary, to reduce the possibility of introducing toxic materials and undesirable plant species from previous work sites into the project area.
7. Fuel machinery off site or in a confined, designated area to prevent spillage into the soils, waterways, and wetlands.
8. Monitor disturbed areas for weeds and undesirable plant species during construction and implement necessary weed-control actions.

9. Control noxious weeds and undesirable plants by chemical, mechanical, and hand removal, as well as biological means, as may be appropriate, giving due consideration to compatibility with wildlife management plans, needs for protecting native plant communities, and avoidance of environmental contamination. Obtain approval for procedures and required permits for the controls that are used. See Appendix B of the Final EIS for more details.
10. Burn or properly dispose of weeds removed by mechanical- or hand-control methods to prevent their spread to other areas.
11. Control noxious and undesirable vegetation in the vicinity of Ute ladies'-tresses orchid occurrences by methods provided by the USFWS.
12. Manage stockpiles of top soil that would remain barren for extended periods to control erosion and avoid proliferation and spread of noxious weeds and undesirable plants.
13. Reclaim disturbed areas to desired riparian, agricultural, and upland plant communities as soon as possible after construction. Require the contractor to use specified plant materials and reclamation techniques.
14. Implement erosion-control measures to prevent or reduce wind and water erosion and help establish vegetation in areas subject to erosion.
15. Conduct a site analysis on areas where there is a potential erosion problem to determine appropriate procedures that are needed (i.e., soil stabilizing materials, seeding mixtures, and mulching and fertilizing treatments).
16. Select plant species for rehabilitating disturbed areas and erosion control based on soil type, root-stabilizing characteristics, consistency with composition of contiguous native plant communities, ability to compete with undesirable vegetation, and compatibility with restoration goals.
17. Develop a comprehensive revegetation plan for the project implementation area and monitor the area 3 years following implementation to determine success and make recommendations regarding follow-up seeding, planting, and weed-control efforts that may be necessary.
18. Implement USFWS-provided specific herbicide treatment recommendations within Ute ladies'-tresses occurrence areas as detailed in the updated vegetation management plan (Appendix B of the Final EIS).

Yellow-billed Cuckoo

- Comply with the Migratory Bird Treaty Act by completing any vegetation clearing between August 30 and April 1, which is outside of the typical nesting/brood-rearing period for migratory birds.

- Alternatively, have a qualified wildlife biologist perform a nest clearance survey prior to construction activities, paying particular attention to surveying riparian disturbance areas for potential occurrence of yellow-billed cuckoo.

Bird-Aircraft Strike Risk Monitoring and Mitigation (Construction Phase)

- The JLAs will continue the bird monitoring and movement study during the construction phase of the selected alternative to maximize data collection opportunities for establishing baseline conditions.
- The JLAs will implement appropriate mitigation measures for any increased bird-aircraft strike risk caused by construction of the proposed project using measures appropriate to the species causing the risk. The JLAs will coordinate the measures with FAA, Provo City/Provo Airport, USDA Wildlife Services, and others.

S.8.3 Long-Term Environmental Commitments

Long-term commitments for management of the project include Provo River flow management, a vegetation management plan, a mosquito management plan, bird strike risk mitigation, and long-term water quality enhancement for the existing channel.

Provo River Flow Management

With implementation of an action alternative, the JLAs through the JSRIP will: adopt the Lower Provo River Ecosystem Flow Recommendations Report (Stamp et al. 2008) and associated flow regime targets; divide the flow into the restored lower Provo River delta so that the first 10 cfs and up to 50 cfs is delivered to the existing lower Provo River channel to help maintain aesthetics, water quality, and recreational values; and deliver up to an additional 4,500 acre-feet of conserved water annually to either Hobble



Creek and/or Provo River to help meet target flow regime recommendations for June sucker. Meeting flow regime targets will be an adaptive process, and the JLAs will commit to work with the June Sucker Flow Work Group of the JSRIP to discuss the flow outlook for the upcoming water year, to coordinate flow patterns and discuss the needs of the June sucker, taking into account the target flow recommendations, available water supplies, and respective commitments for delivery of water to the Provo River and Hobble Creek. The Flow Work Group is a subcommittee of the JSRIP and advises the broader JSRIP group regarding the upcoming water year. Based on these factors the JSRIP will recommend a flow pattern to the U.S. Department of the Interior.

Threatened and Endangered Species

Ute Ladies'-tresses (Post-construction)

1. Report all documented direct impacts to known Ute ladies'-tresses occurrences to the USFWS within 6 months of completion of construction. The report will include map locations, areas of impact, and location(s) of salvaged soils from occurrences that could not be avoided during construction.
2. Use Utah Lake water elevation data to determine inundation periods for known Ute ladies'-tresses occurrences.
3. Perform three consecutive years of post-construction monitoring throughout the project implementation area, paying special attention to known occurrences and salvage and relocation areas. Post-construction begins once the hydrology has been restored to the project implementation area (i.e., removal of Skipper Bay dike and Provo River levee). Provide an annual monitoring report to the USFWS with information consistent with the 2010–2013 survey report for the study area (BIO-WEST 2013), and include an occurrence number, count, location, elevation, wetland type, associated vegetation, and representative photo.
4. Follow USFWS-specific weed-control recommendations for known occurrences. Amend the vegetation management plan (Appendix B of the Final EIS), if needed, to include the USFWS measures.

Vegetation Management Plan

The purpose of the Vegetation Management Plan (Appendix B of the Final EIS) is to direct the delta project area vegetation management to provide habitat for June sucker recovery and to restore, preserve and improve other native vegetation and riparian and wetland habitats. The goal of vegetation management in the project area is to maintain diverse plant communities and includes the control of noxious weeds or other undesirable vegetation in the delta project area, predominantly common reed (*Phragmites australis*) and, to a lesser degree, reed canarygrass (*Phalaris arundinacea*) and others.

Mosquito Management Plan

The Mitigation Commission conducts mosquito control on mitigation properties under the auspices of the Utah Pollution Discharge Elimination System (UPDES) general permit number UTG170000, administered by the Utah Division of Water Quality, Department of Environmental Quality. A Mosquito Management Plan for the proposed action (Appendix C of the Final EIS) has been developed in coordination with the Mitigation Commission's 2012 Pesticide Management Plan (URMCC 2012a) as required under the UPDES permit.

A proposed cooperative approach to mosquito management associated with the proposed project will be implemented as follows:

1. Larval monitoring and control: Responsibility of the JLAs, in consultation with Utah County Health Department. This could be contracted to Utah County Health Department or other third-party entity.
2. Adult mosquito monitoring and control: Responsibility of Utah County Health Department with cooperation and assistance from the JLAs.
3. Communication and education: Cooperative effort among the JLAs, Utah County Health Department, and others.

Bird-Aircraft Strike Risk Monitoring and Mitigation (Post-Construction)

1. The JLAs will commit to conducting a monitoring and movement study and to mitigating any increased bird-aircraft strike risk caused by the proposed project. The Mitigation Commission will execute an agreement or contract to conduct the baseline monitoring/movement study and mitigation efforts.
2. The JLAs will endeavor to execute an Memorandum of Agreement among Provo City, Provo Airport, USDA Wildlife Services, and the FAA to establish cooperation and coordination among the parties for implementing the monitoring and mitigation efforts.

The mitigation measures will be appropriate to the species causing the risk and coordinated with FAA, Provo City/Provo Airport, USDA Wildlife Services, and others. The measures could include temporarily closing the public access to the project area to safely and effectively haze or remove problem birds; installing and implementing bird-detection and warning systems; conducting research; or implementing other measures yet to be determined to ensure an effective mitigation program.

Long-term Water Quality Enhancement for the Existing Channel

As discussed in Chapter 2, Section 2.6.3, measures for improving water quality in the existing channel (minimum instream flows and aeration of the water column) are included as part of the proposed action. The JLAs will construct and install an aeration system in the lower Provo River channel that will be retained and managed for recreational, aesthetic and fishery uses. The aeration system will increase DO concentrations and improve water quality during the hot summer, low-flow months compared with existing baseline conditions. The aeration system will also reduce or eliminate blue-green algae and reduce the release of manganese, iron, nitrogen, and phosphorous from the bottom sediments.

The aeration system would be intended for year-round use, initially. It would be used to oxygenate the bottom sediments and improve conditions for beneficial microbes, which will reduce the muck layer that is currently on the channel bottom. The aeration system would then be operated as needed to maintain State water quality standards for DO. The JLAs will continue to pursue additional measures if needed to meet these objectives.

As a participating project under the Colorado River Storage Project Act, the Bonneville Unit of the Central Utah Project is authorized to utilize Colorado River Storage Project power for project purposes. Therefore, power for the proposed aeration facilities could be obtained from this power allocation.

Dredging the organic-rich sediment layer at the bottom of the existing channel would not likely be necessary to maintain State water quality standards for DO. However, portions of the organic-rich sediments would likely be removed during construction as the aeration system is installed. Other aesthetic and recreational improvements to the existing channel could also be made at that time. The JLAs will coordinate with Provo City, Utah County, and stakeholders in this regard during the final design phase.

The sediment oxygen demand study (Goel et al. 2014) indicates that the decay of organic matter from the watershed is the primary source of sediment oxygen demand in the lower Provo River. With implementation of the proposed project, most organic matter from the watershed would be diverted away from the existing channel and into the delta. Accumulations of both coarse and fine organic matter and sediments are anticipated in the delta. However, with enough space for the delta channels to adjust and migrate over time and with a delta that is more open to wind and the exchange of oxygen from the atmosphere, organic matter accumulations are not expected to cause the same DO problems throughout the water column and across the entire delta that occur in the existing channel.

The JLAs recommend that State and local governments and organizations develop a task force/study group to investigate sources of fine organic matter, nutrients, and other pollutants in the watershed that may degrade water quality conditions in the lower Provo River. The JLAs would participate with and support the efforts of such a group if it is formed.

S.9 Public Review Periods

A 60-day comment period was provided when the Draft EIS was released for public review in February 2014. Comments received assisted the JLAs in making revisions, clarifications, and updates to the project alternatives, impact assessments, and mitigation measures, as presented in the Final EIS. Individualized meetings were held with cooperating agencies between publication of the Draft and Final EIS to clarify the comments provided by each of the agencies and propose to address comments. Appendix F of the Final EIS includes copies of all comments received; JLAs have provided responses indicating how comments have been addressed.

The Final EIS will be available in electronic form on the project website at www.provoriverdelta.us, or a CD-ROM may be obtained by contacting the Mitigation Commission. Print copies have been made available for on-site public review at the following locations:

Provo City Library
550 North University Avenue
Provo, Utah 84601

Salt Lake City Public Library
210 East 400 South
Salt Lake City, Utah 84111

Department of the Interior, Central Utah Project Completion Act Office
302 East 1860 South
Provo, Utah 84606-7317

Central Utah Water Conservancy District
355 West University Parkway
Orem, Utah 84058

Utah Reclamation Mitigation and Conservation Commission
230 South 500 East, Suite 230
Salt Lake City, Utah 84102

S.10 Decision to be Made

Based on the analysis in the Final EIS, and comments received during the Draft EIS public comment period, the responsible officials will determine which action alternative, if any, should be implemented. The JLAs may also select components from the various alternatives that have been evaluated in detail. The selected alternative will be identified at the time the federal agencies issue their Records of Decision (ROD). The RODs will be issued no sooner than 30 days following release of the Final EIS.

The EIS is intended to satisfy public involvement and disclosure requirements of the NEPA process and to serve as the compliance document for Clean Water Act Section 404 permitting, compliance with Section 7 of the ESA, coordination requirements of the Fish and Wildlife Coordination Act, and compliance with Section 106 of the National Historic Preservation Act.

S.11 References

[CUWCD] Central Utah Water Conservancy District, Utah Department of Natural Resources, U.S. Fish and Wildlife Service, Utah Reclamation Mitigation and Conservation Commission, U.S. Department of the Interior, U.S. Bureau of Reclamation, Provo River Water Users Association, Provo Reservoir Water Users Company, and Outdoor and Environmental Interests. 2002. Program document for the June Sucker Recovery Implementation Program. Orem (UT): Central Utah Water Conservancy District. 29 p.

Goel, R., M. Hogsett, and S.T. Mukherjee. 2014. Sediment oxygen demand in the lower Provo River. Final Report. Salt Lake City: University of Utah.

Headwaters Economics. 7/24/2013. Demographic Profile of the State of Utah, Provo-Orem Census County Division, and Utah County, Utah, generated from available data sources using the Economic Profile System-Human Dimensions Toolkit [software], developed and distributed by Headwaters Economics, Bozeman, MT. (<http://headwaterseconomics.org/tools/eps-hdt>).

Stamp, M., D. Olsen, and T. Allred. 2008. Lower Provo River ecosystem flow recommendations. Final report by BIO-WEST, Inc., and Allred Restoration, Inc. Salt Lake City (UT): Utah Reclamation Mitigation and Conservation Commission. 69 p. plus appendices.

[URMCC] Utah Reclamation Mitigation and Conservation Commission. 2012. Pesticide management plan. 276 p.

[URMCC] Utah Reclamation Mitigation and Conservation Commission. 2011. Provo River Delta Restoration Project alternatives development technical memorandum. Report prepared by BIO-WEST, Inc., Logan, Utah. 183 p.

[URMCC] Utah Reclamation Mitigation and Conservation Commission. 2010. Provo River Delta Restoration Project scoping summary. Report prepared by BIO-WEST, Inc., Logan, Utah. 66 p.

[USFWS] U.S. Fish and Wildlife Service. 1999. June sucker (*Chasmistes liorus*) recovery plan. Denver (CO): Region 6, U.S. Fish and Wildlife Service. 61 p.