Chapter 6
Alternatives Comparisons and Summary of Findings

This chapter summarizes major findings regarding alternatives for resolving safety concerns with the Truckee Canal while providing a desired level of water supply reliability for Newlands Project water rights holders.

Alternatives Comparisons

This section includes comparisons of the alternatives described and evaluated in Chapter 5, "Alternatives." The following types of comparison summaries are included:

- Overall features, accomplishments, and performance for all alternatives and the Without-action alternative.
- The estimated construction costs and annual cost developed for each alternative.
- The payment capacity for the Newlands Project water supply beneficiaries.
- Evaluations of each alternative based on the planning criteria of completeness, effectiveness, efficiency, and acceptability.

Features, Accomplishments and Performance

All Study alternatives were developed to achieve both the safety objective, which is to reduce risk from operating the Truckee Canal, and the water supply objective, which includes serving water rights holders at the Desired Reliability level. However, alternatives differ with regard to their additional achievements and effects, such as effects on various categories of water users or on hydropower generation.

Table 6-1 summarizes the information presented in the descriptions and evaluations in Chapter 5 to allow for cross-comparison of the features, accomplishments, and performance of each Study alternative. Where useful and available, information is also provided for the Without-Action Alternative and the Desired Reliability condition.

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Table 6-1. Summary of Study Alternatives

		Alternative 600	Alternative 350.a	Alternative 350.b	Alternative 350.d	Alternative 250.a	Alternative 250.b	Alternative 250.d	Without-Action Alternative	Desired Reliability Scenario
Major Features	Truckee Canal Flow Stage	600 cfs	350 cfs	350 cfs	350 cfs	250 cfs	250 cfs	250 cfs	150 cfs	900 cfs
	Truckee Canal HDPE Cutoff Wall or Lining	HDPE Cutoff Wall	HDPE Cutoff Wall	HDPE Cutoff Wall	Lining	HDPE Cutoff Wall	HDPE Cutoff Wall	Lining	-	NA
	Other Features	-	-	Lining 45 miles of Carson Division canals	-	Fallowing 25% in Dry Years	Lining 45 miles of Carson Division canals	Fallowing 10% in Dry Years	-	NA
Safety		Meets RR3	Meets RR3	Meets RR3	Meets RR3	Meets RR3	Meets RR3	Meets RR3	Uncertain[1]	NA
Average Annual Project Water Delivery[2] (percent)		96.5%	95.6%	97.3%	96.3%	95.7%	96.2%	95.5%	90.5%	94.6%
Average Annual Project Water Delivery by User Category	Ag/Irrigation (TAF)	118.3	117.2	119.2	118.0	112.4	118.0	115.4	111.2	NA
	M&I (TAF)	13.3	13.3	13.4	13.3	13.3	13.3	13.3	13.2	NA
	Lahontan Valley Wetlands[3] (TAF)	68.0	67.3	68.6	67.8	67.4	67.8	67.2	63.6	NA
Annual Cost[4] (millions)		$2.90	$2.90	$15.00	$4.20	$6.50	$15.00	$5.60	NA	NA
TCID Ability-to-Pay[5] (millions)		$7.30	$6.90	$7.40	$7.20	$6.90	$7.00	$6.90	$5.00	NA[6]
Hydropower Generation Revenue (millions)		$1.35	$1.35	$1.25	$1.35	$1.30	$1.25	$1.30	$1.20	-
Environmental and Other Effects	Avg. Annual Spill to Stillwater NWR from Lahontan Dam (TAF)[7]	12.6	12.1	14.3	13.2	11.6	13.9	12.7	11.0	12.5
	Carson Division Groundwater and Agricultural Drain Flows[8]	Significant change not anticipated	Significant change not anticipated	Reduced by lining Carson Division canals	Significant change not anticipated	Reduced by fallowing	Reduced by lining Carson Division canals	Reduced by fallowing	Reduced in comparison to current conditions	Similar to current conditions
	City of Fernley Demand Met[9] (percent)	115%	108%	108%	56%	105%	105%	56%	99%	121%
	Avg. Annual Flow to Pyramid Lake (TAF)	480	487	505	491	498	512	501	516	460[10]

Notes:

[1] The 150 cfs flow stage is believed to pose a lower risk to the Fernley area because the water elevation in the canal would be maintained at a level low enough to minimize the risk of destabilizing the canal embankment. However, this is not a solution specifically designed to reduce risk of operating the canal, and thus the degree to which it meets the Study's safety objective (RR3) is unknown.

[2] Long-term average annual percent of Newlands Project demand met.

[3] Includes deliveries to Carson Lake and Pasture, the Fallon Paiute-Shoshone Tribal wetlands, and Stillwater NWR.

[4] Annual costs include interest and amortization of the capital cost estimated over 50 years at the current federal discount rate of 4 percent. Costs also include annual operations and maintenance estimated at 0.2 percent of the field cost. For some alternatives with the Dry-Year Fallowing, annual costs for the program were estimated at $100 per acre of land fallowing plus an administrative cost at 20 percent of the fee. For additional information, see Appendix E3.

[5] Ability to pay estimates represents potential maximum increases to charges that TCID could apply to their customers while maintaining farm profitability, and are not reasonable to use as the sole basis for capital investment decisions. Ability to pay has been estimated using Reclamation guidelines and relies substantially upon the 5-year average for crop prices, which are volatile and presently on the higher end of historical ranges. For example, if alfalfa prices fell from current levels ($155/ton) to levels experienced a decade ago ($125/ton), TCID ability to pay could be reduced by as much as $8.7 million per year. The estimated current ability of TCID to pay for projects and improvements beyond current obligations is $6.50 million per year. (See Appendix G.)

[6] Assessment of financial conditions was not conducted for the Desired Reliability scenario. This scenario was developed to estimate a historical water supply reliability under current regulations and does not represent a current or future ability to pay..

[7] Spills are not considered a Project delivery, but are included in the calculation of benefits to wetlands.

[8] Effects of alternatives on Carson Division groundwater and agricultural drain flows are not quantifiable, and are described in comparison to current conditions.

[9] The City of Fernley's municipal supply relies on groundwater available through incidental recharge from the Truckee Canal. While this is not a valid Project delivery, some alternatives would have the effect of reducing the availability of this groundwater. The demand met for the City of Fernley is noted as an environmental outcome. For additional information on how the Study evaluated the effects of Study alternatives on Fernley's ability to meet future demand, see Appendix B4.

[10] Because the Desired Reliability scenario is based upon current demands, which are greater than the future demands used for Study alternatives, the flow to Pyramid Lake will automatically be somewhat higher for the alternatives than for the Desired Reliability scenario.

Key:

Ag. = agricultural

Avg. = average

M&I = municipal and industrial

RR = risk rating

TAF = thousand acre-feet

TCID = Truckee Canal Irrigation District

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Costs

Table 6-2 summarizes estimated construction and annual costs for each of the Study alternatives. Total capital cost is the sum of total construction costs and IDC. IDC is the interest that accrues on a loan financing the construction of an alternative. It is computed over an estimated construction period for all alternatives, which varies from 2 to 8 years. Total annual costs for each alternative were estimated by interest and amortization of the capital cost over 50 years and at the current federal discount rate of 4 percent. Annual O&M costs were also estimated at 0.2 percent of the field cost, as well as program costs for alternatives that include dry-year fallowing programs.

Table 6-2. Cost Summary Comparison of Alternatives ($ Millions)

	600	350.a	350.b	350.d	250.a	250.b	250.d
Truckee Canal Safety Measure	Cutoff Wall	Cutoff Wall	Cutoff Wall	Lining	Cutoff Wall	Cutoff Wall	Lining
Water Supply Measure	-	-	Lining Carson Div.	-	Dry-Year Fallowing	Lining Carson Div.	Dry-Year Fallowing
Capital Cost[1]	$61.0	$61.0	$320.0	$87.0	$61.0	$320.0	$87.0
Construction Cost[2]	$59.0	$59.0	$270.0	$80.0	$59.0	$270.0	$80.0
Field Costs	$44.0	$44.0	$210.0	$59.0	$44.0	$210.0	$59.0
Non-contract Costs[3]	$15.0	$15.0	$60.0	$21.0	$15.0	$60.0	$21.0
Interest During Construction[4]	$2.0	$2.0	$50.0	$7.0	$2.0	$50.0	$7.0
Annual Cost[5]	$2.9	$2.9	$15.0	$4.2	$6.5	$15.0	$5.6

Notes:

Cost estimates are appraisal-level and subject to change in the future. Appraisal-level cost estimates are not suitable for requesting project authorization and/or construction fund appropriations. Cost estimates are presented in January 2012 dollars, and may have discrepancies due to rounding. Additional detail is discussed in Appendix E3 of this Report.

[1] Total capital cost is sum of construction costs and interest during construction (IDC). IDC was estimated over duration of the construction period, which ranges 2 to 8 years, and at the current federal discount rate of 4 percent.

[2] Total construction cost is the sum of field and non-contract costs.

[3] Non-contract costs includes estimates for the following: 5 to 12 percent of the field cost was estimated for Planning and Environmental Compliance non-contract costs. 10 percent of the field cost was estimated for Engineering and Design non-contract costs. 10 percent of the field cost was estimated for Construction Management non-contract costs. 1 percent of the field cost was estimated for Easements non-contract costs. 3 percent of the field cost was estimated for Cultural Resources non-contract costs.

[4] Interest during construction is estimated using the current Federal discount rate of 4 percent and the construction period, which varies by alternative. Additional detail is included in Appendix E3 of this Report.

[5] Annual costs include interest and amortization of the capital cost estimated over 50 years at the current federal discount rate of 4 percent. Costs also include annual operations and maintenance estimated at 0.2 percent of the field cost. For some alternatives with the dry-year fallowing program, annual costs for the program were estimated at $100 per acre of land fallowing plus an administrative cost at 20 percent of the fee.

Federal Planning Criteria

Table 6-3 compares the Study alternatives using the four P&G planning criteria described in chapters 2 and 4: (1) completeness, (2) effectiveness, (3) efficiency, and (4) acceptability (WRC 1983). The following section describes each criterion and comparative rankings for the alternatives.

Table 6-3. Relative Performance of Alternatives Against Federal Planning Criteria

		600	350.a	350.b	350.d	250.a	250.b	250.d	Without-Action
Completeness		High	High	High	High	Medium-to-Low	High	High-to-Medium	Does not achieve Study objectives
Effectiveness		High	High	High	High	High-to-Medium	High	High	
Efficiency		High	High	Medium-to-Low	Medium	Medium	Medium-to-Low	Medium	
Acceptability	M&I Users	High	High	Medium	Low	High	Medium	Low	Low
	Wetlands Users	High	High	Medium	High	Medium-to-Low	Medium	High	Low
	Agricultural Users	High	High	High-to-Medium	High	Medium-to-Low	High	Medium	Low
	Truckee River WQSA Interests	Low	Medium-to-Low	Medium-to-Low	Medium	Medium	Medium	Medium	High

Key:
M&I = municipal and industrial
WQSA = Water Quality Settlement Agreement

Completeness

Completeness is the extent to which a given alternative provides and accounts for all necessary investments and other actions to ensure realization of the planned effects. The completeness of each alternative is identified through determining that all necessary components of actions are taken into account, including the degree to which it relies on other public or private plans, or the actions of others, to be successful. Assessing completeness is conceptual for this Study, as information also related to completeness on specific mitigation needs, and detailed designs and cost estimates would be developed at a future phase of study.

All alternatives developed by the Study are considered complete, however alternatives 250.a and 250.d rank lower for completeness because they rely on reducing overall agricultural demand in dry years through voluntary fallowing

programs. The level of interest in these programs among irrigators is not certain or known.

The Without-Action Alternative was not ranked for completeness, as it does not meet the Study objectives.

Effectiveness

As described in Chapter 4, effectiveness is the extent to which an alternative addresses planning objectives and alleviates identified problems.

All Study alternatives are considered to be very effective, because they have been designed to meet both of the Study objectives, safety and water supply. Six of the 7 Study alternatives rank high for effectiveness. Alternative 250.a ranks slightly lower than the rest, because it relies heavily on the largest amount of dry-year land fallowing to achieve the water supply objective. While, from a technical standpoint, this provides a level of water supply reliability as high as other Study alternatives, it meets overall Project demand by encouraging one group of users not to exercise their water rights for the benefit of others. If part of the Study's water supply objective is to allow for the exercise of Project water rights, this alternative may provide a somewhat less-effective means of achieving that goal.

The Without-Action Alternative was not ranked for effectiveness, as it does not achieve the water supply objective and its effectiveness in meeting the safety objective is uncertain.

Efficiency

Chapter 4 describes the efficiency planning criterion as the extent to which an alternative is the most cost-effective and/or least complex means of alleviating the identified problems. As Study alternatives have a mostly high degree of effectiveness, the efficiency criterion is used to rank the combined expense, effort, or difficulty for each alternative to achieve that effectiveness. The most efficient plans would best address the Study objectives with the least cost, complexity, or potential environmental effects.

Alternatives 600 and 350.a are both judged as highly efficient, as they achieve both of the Study objectives through application of only one measure, the HDPE cutoff wall along portions of the Truckee Canal. These two are also the lowest-cost alternatives. Alternatives 350.b and 250.b are highly effective, but include an additional measure, lining portions of the Carson Division, to achieve the water supply objective that makes them the most expensive of the group; as a result, they are ranked medium-to-low for efficiency. The remaining alternatives are ranked medium for efficiency; they each include 1-3 measures to achieve both objectives at middle-range costs, but also carry potential environmental concerns for the communities in the primary study area.

The Without-Action Alternative was not ranked for efficiency, as it does not meet the Study objectives.

Acceptability

As described in Chapter 4, acceptability is the workability and viability of the alternative with respect to acceptance by Federal, State, and local entities and the public, as well as compatibility with existing laws, regulations, and policies. An alternative with less support is not infeasible or unacceptable; rather, it is simply less preferred.

An aggregate rank for acceptability was not developed for each alternative out of respect for the diversity of perspectives and interests with a stake in the Project's future. Instead, acceptability rankings are given for each board category of users or interests, both within the Project and without.

Each of the Study alternatives evaluated is compatible with existing laws, regulations, and policies.

Alternatives 600 and 350.a are judged to have a high level of acceptability for Project users and communities within the primary study area. For Truckee River users in the extended study area, Alternative 600 is likely to have a low level of support because it diverts the highest volume of flow from the Truckee River of any alternative. Acceptability for the Without-Action Alternative is the inverse mirror of Alternative 600: it may receive high support from upstream Truckee River environmental users, but it will reduce the Project's overall viability and may not fully address risk from the Truckee Canal.

For all other alternatives, acceptability is mixed and varies from high to low depending on how the measures included in each affect water supply for different uses or environmental conditions, especially for Project water rights holders.

Key Findings

Development of the above alternatives to meet the dual objectives of safety and water supply for the Newlands Project was the primary goal of this Study. However, the research and analysis conducted to support the planning process uncovered a number of other findings that are likely to be important considerations for additional studies related to the Project or to any alternative going forward. The Study's key findings are summarized as follows:

- **Canal Repairs are Possible to Address Safety Concerns** – The repair of the Truckee Canal such that it meets the Federal safety performance level (RR3) has been found technically possible in previous studies (see Chapter 1).

- **Project Demand Will Remain Steady** – While the complexion of the Project continues to change through implementation of ongoing water rights retirement and transfer programs, the fulfillment of these programs will not substantially diminish the potential volume of future water demand by Project water rights holders (see Chapter 3 and Appendix C).

- **Without Action, Canal Safety Issues Will Continue to Worsen** – A continuing significant need exists to implement actions to provide safety for the Truckee Canal. Without significant investments to improve the canal, its condition is expected to gradually worsen (see Chapter 3).

- **Action is Necessary to Preserve Water Supply Reliability** – Without addressing safety issues on the Truckee Canal, more stringent restrictions to canal conveyance capacities may gradually be implemented as the canal's condition worsens. These restrictions will significantly reduce the reliability of Project water supplies to levels significantly below expectations of agricultural, municipal and industrial, and environmental water users (see Chapter 2 and 3).

- **Alternatives Exist for Meeting Both Study Objectives** – Seven Study alternatives have been identified to satisfy the Study's objectives of safety and water supply, and are recommended for further development (see Chapter 5). The development of these alternatives revealed many constraints and potential opportunities for meeting the Study objectives, including:

  – **The Truckee Canal is Fundamental to the Project** – Plans that included either: (1) decommissioning the Truckee Canal and Derby Dam, or (2) allowing the canal conveyance capacity to be reduced over time to 150 cfs as a result of insufficient progress toward Reclamation safety requirements; were eliminated as viable alternative plans because the resulting conditions require far more extensive and expensive programs to support Project water rights than refurbishing the canal. For example, decommissioning the canal requires that between 50 percent and 80 percent of the Project's agricultural water rights would need to be retired permanently to meet the necessary level of reliability for the Project's remaining users, and cost three to 18-times as much as the cheapest alternative (see Chapter 4 and Appendix D3).

  – **Upstream Storage Looks Promising** – The use of upstream storage on the Truckee River for long-term storage of Project water was not evaluated, but appears very promising as an option for achieving the water supply objective. Allowing for Project credit water to be stored in Truckee River reservoirs may be a low-cost

option for making flow stages below 600 cfs viable Truckee Canal capacities, but require substantial discussion with stakeholders to frame operational conditions (see Chapter 4 and Appendix D6).

  - **OCAP Limits Enhancements to Lahontan Reservoir Storage** – The regulations in OCAP that limit diversions from the Truckee River relative to storage targets in Lahontan Reservoir also limit the value of developing additional storage in Lahontan Reservoir. For example, a larger Lahontan Reservoir does capture more water during wet conditions but, because of OCAP storage target limitations, higher carry-over storages result in lower Truckee River diversions instead of higher water supply availability for the Project (see Chapter 4 and Appendix D7).

  - **Enhancing Carson River Inflows to Lahontan Reservoir Would Yield Marginal Benefit** – Acquisition of water rights from lower segments of the Carson River was considered because these would be the easiest to transfer to the Project; however, these rights are the least secure and provide little assistance during dry years, when additional supplies are needed most. The *Alpine* Decree prevents the secure transfer of rights from upper segments to Lahontan Reservoir, but even if it were possible, OCAP storage targets would reduce Truckee River diversions instead of improving Project supplies (see Appendix D5).

- **Study Alternatives Present Complex Tradeoffs** – Each of the alternatives is expected to appeal to different stakeholders and potential cost-share partners in different ways, because no single alternative benefits all groups or water uses equally. Selection of any alternative for implementation would also require balancing tradeoffs among broader, related issues within the region. For example:

  - **Higher Truckee River Flows Have Highest Cost** – The alternative with the lowest cost also has the lowest flow to Pyramid Lake (see Chapter 5).

  - **Some Alternatives Reduce Ancillary Supplies** – Alternatives that reduce diversions from the Truckee River also reduce spills from Lahontan Reservoir, which reduces the overall supply for the Lahontan Valley wetlands. Likewise, alternatives that include efficiency improvements may reduce regional groundwater resources (see Chapter 5 and Appendix F).

- **Reclamation is a Required Partner** – The implementation of any alternative to improve safety of the Truckee Canal and serve Project water rights will require leadership from Reclamation, due to the Federal government's: interest in serving water rights of Project users;

interest in serving water rights to Tribes and Stillwater NWR; interest in operations that affect habitat for listed or special status species at Pyramid Lake; and, ownership of facilities requiring rehabilitation, such as the Truckee Canal.

- **Implementation will Require Partners and Proponents** – Benefits of alternatives affect more than one party and include public safety, water supply reliability, and the possibility of addressing other related regional issues. Further, it is uncertain whether any singular entity is capable of paying for the alternatives identified by the Study. Potential cost-share partners with Reclamation include:

  – **TCID** and the Project's water right holders, for their shared interest in maintaining Project water supply reliability;

  – **City of Fernley**, for their shared interest in improving the safety of the Truckee Canal along its corridor through the city; and

  – **Pyramid Lake Paiute Tribe**, for their potential interest in how various alternatives influence flows on the lower Truckee River and other related issues, such as endangered species recovery and recoupment.

Given (1) the necessity to implement an alternative in order to reduce risk and serve water rights, (2) the complexity of preferences and benefits related to all alternatives, and (3) the unlikely ability of any single entity to fund an alternative without assistance, this Study recommends that TCID, the Pyramid Lake Paiute Tribe, the City of Fernley, Reclamation, and any other potential cost-share partners collaboratively develop a proponent-preferred alternative. A shared vision for a proponent-preferred alternative, with agreement among the potential partners that have been identified, has a higher potential for success.

Potential Next Steps for Implementing an Action

This Study identifies a range of alternatives for reducing risk from the Truckee Canal while providing for the reliable exercise of Project water rights in the future. Funding and legal authorization would need to be specified for any role that Reclamation plays in the implementation of a Study alternative.

At this time, Reclamation does not have funding allocated for the implementation of Study alternatives. Additionally, it is likely that any funding made available for Reclamation participation or implementation of any Study alternative would require both cost-share partnership(s) and repayment for Federal participation.

Some Study alternatives could be implemented under existing Reclamation authorizations, while others would require a new congressional authorization. Specific features of Study alternatives affect the ability of Federal and non-Federal partners to fund, finance, and implement them. The sections below describe potential pathways for implementing the alternatives presented in this Study.

Reclamation Implementation

The following sections describe potential funding sources and authorizations for Reclamation to participate in implementation of an alternative. Depending on the project and the source of authorization, some level of environmental compliance review will also be required.

Funding Sources

Reclamation could receive funds to implement an action from either (1) the Federal budget or (2) a cost-share partner. Reclamation's budget process is conducted in three-year cycles, meaning that, at the time that this report is released, the soonest that an alternative could be incorporated into Reclamation's budget would be Fiscal Year 2016. Funds received through the Federal budget process are subject to repayment conditions.

Reclamation Authorities

Reclamation has various authorities to implement projects, and each authority has specific limitations and requirements. Three authorizations may provide Reclamation with the authority to pursue Study alternatives, including (1) Replacements, Additions and Extraordinary Maintenance activities, (2) Extraordinary Operations & Maintenance, and (3) Construction. All of these options require repayment, cost-share with a local partner, and environmental compliance consistent with NEPA. Implementation of any Study alternative through Reclamation's Construction authorization would require an additional study to determine project feasibility. Reclamation must receive congressional approval before conducting a feasibility study.

Environmental Compliance

Authorizations that require environmental compliance and review under NEPA could also require the detailed development of Study alternatives, completion of environmental baseline studies, identification of potential impacts and mitigation features, development of a tentatively selected plan, completion of environmental compliance investigations, and, conduct of supporting technical analyses. These tasks will serve both Federal decision-making and NEPA compliance purposes.

As described in Chapter 5, the extent of environmental review necessary for implementation of any Study alternative is dependent on the potential environmental effects in the study area. Some alternatives may only require preparation of an EA, while others would be subject to more extensive analysis of an EIS.

EA/Finding of No Significant Impact Preparation of an EA helps an agency determine whether an EIS is required; if environmental impacts of an action are not considered significant, the agency issues a Finding of No Significant Impact before commencing construction. An EA may be the appropriate extent of environmental review for Study alternatives that are not anticipated to result in significant impacts in the study area, such as those that rely primarily on a cutoff wall to resolve safety issues with the Truckee Canal.

An EA may be sufficient for two Study alternatives, 600 and 350.a, as described in Chapter 5.

EIS Preparation of an EIS is likely appropriate for Study alternatives that include actions anticipated to affect groundwater, air quality, or socioeconomic conditions, or which would result in concerns related to environmental justice.

As noted in Chapter 5, an EIS would likely be required for Study alternatives 350.b, 350.d, 250.a, 250.b, and 250.d.

Local Proponent Implementation

Implementation of an alternative by a local proponent would require proponent funding and the review and approval of planned actions by Reclamation. TCID's 2012 Truckee Canal conduit repair project is one example of a local proponent implementation.

Potential Funding Sources

Funding could be developed by a local entity or group of local entities, or provided by a state or the Federal government. Congressional approval of a Federal funding may require any or all of the following: a demonstration of feasibility, consistent with Federal planning guidelines; cost-share partner(s); documentation of environmental review and compliance; and repayment. Congress specifies which of these potential requirements are applicable for funding requests.

Federal funding requires an approximately 2-year lead time to insert line-items into the President's budget. While this option may extend the overall schedule for implementation of any action, it offers more flexibility for financing.

Actions included in all Study alternatives could be authorized and funded by Congress.

Reclamation Review and Approval

Before being implemented, Reclamation must review and approve any plans that would modify or alter its facilities, or alter the ability of the Project to meet its objectives. Facilities of the Newlands Project that are discussed in Study alternatives include: Derby Dam, the Truckee Canal, Lahontan Dam, Carson River Diversion Dam, V and T Canals, and other Federally owned distribution and drainage canals within the Newlands Project.

Considerations for Future Study

Based on the public comments on the Draft Special Report that Reclamation received in February 2013, stakeholders and the public have identified a number of considerations for future studies focused on refining or implementing any Study alternative. These comments, which appear in Appendix H (Public Participation and Outreach Report), suggest the following activities be in future studies:

- Develop information to provide greater detail regarding the effects of alternatives on:
  - Specific water quality objectives in the Truckee River (WRWC 2013).
  - Regional air quality (Churchill County 2013; City of Fernley 2013).
  - Recreation at Lahontan Reservoir (CWSD 2013; Churchill County 2013; TCID 2013).
  - Habitat and vegetation at Lahontan Reservoir (Churchill County 2013).
  - Wildlife at Lahontan Valley wetlands (Churchill County 2013).
  - Groundwater and agricultural return flows within the Carson Division (CWSD 2013; Churchill County 2013; TCID 2013).
  - Water supply reliability for the City of Fernley (TCID 2013; City of Fernley 2013) and the cost of resolving the city's potential future shortages (City of Fernley 2013).
  - Regional partners' financial conditions and ability to pay (CWSD 2013; Churchill County 2013; City of Fernley 2013).
- Identify the requirements of consultation in regards to CWA and other regulations with the USACE, USFWS, tribes, and other agencies for implementation of alternatives (NDEP 2013; Pyramid Lake Paiute Tribe 2013).
- Provide further consideration for the assumptions surrounding the appropriate extent of water rights that will need to be met in the future for the Newlands Project (Pyramid Lake Paiute Tribe 2013).
- Explore the suitability and possibility of upstream Truckee River credit storage for the Project, in coordination with appropriate regional stakeholders (CWSD 2013; Churchill County 2013; TCID 2013).

- Provide a cost-allocation recommendation that appropriately characterizes the relative benefits received by implementing alternative plans, and each beneficiary's ability to pay (CWSD 2013).

- Determine the economic benefits of increased flows in the Truckee River and to Pyramid Lake (WRWC 2013).

- Evaluate the potential effects of climate changes on hydrology in the Carson River Basin (CWSD 2013).

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Chapter 7
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Chapter 8
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The following agencies, groups, and individuals are thanked for generously giving their time and effort in support of the Study and preparation of this Special Report[1]:

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