DECEMBER 1997

METHOW VALLEY IRRIGATION DISTRICT PROJECT

Final Environmental Assessment
and Finding of No Significant Impact
DOE/EA - 1181

BONNEVILLE POWER ADMINISTRATION

In Cooperation with the Washington Department of Ecology, The Methow Valley Irrigation District,
the Yakama Indian Nation, and the Confederated Tribes of the Colville Reservation

Methow Valley Irrigation District Project

Finding of No Significant Impact (FONSI)

December 1997

6450-01-P

DEPARTMENT OF ENERGY

Bonneville Power Administration

Methow Valley Irrigation District Project

AGENCY: Bonneville Power Administration (BPA), Department of Energy (DOE).

ACTION: Finding of No Significant Impact (FONSI) and Floodplain Statement of Findings.

SUMMARY: This notice announces BPA's proposal to fund changes to the Methow Valley Irrigation District's (MVID) irrigation system in order to improve the efficiency of water use and to increase in-stream flows and fish passage for resident and anadromous fish in the Methow and Twisp rivers, Okanogan County, Washington. BPA has prepared an Environmental Assessment (EA) (DOE/EA-1181) evaluating the proposed project. Based on the analysis in the EA, BPA has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment, within the meaning of the National Environmental Policy Act (NEPA) of 1969. Therefore, the preparation of an Environmental Impact Statement (EIS) is not required, and BPA is issuing this FONSI.

The FONSI includes a finding that there is no practicable alternative to locating a portion of the project within a 100-year floodplain.

ADDRESS: For copies of this FONSI or the EA, please call BPA's toll-free document request line: 800-622-4520.

FOR FURTHER INFORMATION, CONTACT: Nancy Weintraub, ECN-4, Bonneville Power Administration, P.O. Box 3621, Portland, Oregon, 97208-3621, phone number 503-230-5373, fax number 503-230-5699.

SUPPLEMENTARY INFORMATION: BPA is proposing to assist with funding changes to the MVID's irrigation system in order to increase the efficiency of the system. BPA is

responding to a need to increase in-stream flows and fish passage in the Methow and Twisp rivers in partial mitigation for fish and wildlife impacts caused by the construction and operation of the Federal Columbia River Power System. The project is included in the Northwest Power Planning Council's (Council) Fish and Wildlife Program, and was recommended by the Council to BPA for funding in April of 1996. The Washington Department of Ecology (WDOE) would co-fund a major portion of the project in response to their need to promote more efficient use of water in the Methow River Basin.

The affected irrigators and the Methow Valley community have been strongly interested in the project. The existing irrigation ditch has created riparian vegetation and wildlife habitat, delivered water for over fifty years, and acted as a community fixture. BPA has participated in extensive discussions leading to alternatives that BPA seriously considered and included in this EA/FONSI (see below), even though they were not part of the original proposal supported by the MVID Board of Directors. BPA has remained open to the views of the community as well as those of original project proponents. We realize this project would result in changes in the lives of MVID members and those who depend on them. We believe the project would create beneficial changes—efficient and reliable water delivery systems and increased in-stream flows resulting in additional habitat for fish and wildlife in the Methow River Valley, all funded by the State and Federal agencies involved with little or no initial cost to the MVID. This FONSI documents that these benefits would be realized without significant environmental impacts.

Several possible alternative plans have been identified and are addressed in the EA (Chapter 2). Briefly, they are as follows:

- Alternative A (proposed action): Replace much of the current open-ditch canal with a piped system and both common and individual groundwater wells; use an acreage-based formula to compensate those who prefer to leave the MVID and supply their own water sources.

- Alternative B: Line portions of the canal with concrete to reduce losses and continue the existing gravity-fed system; compensate those who prefer to leave the MVID, either according to an acreage-based formula, or on an as-needed basis, to enable modification of existing wells or construction of new wells sufficient to irrigate.
- Alternative C: Dissolve the MVID, facilitate transfers of water rights to individual wells, and compensate all members according to an acreage-based formula.
- Alternative D: Continue the present system operation (No Action).

Alternatives A, B, and C all propose compensation to MVID members leaving the system. BPA is proposing to fund this compensation, as well as the rehabilitation of the irrigation system for those who stay in the MVID, because the two actions would together improve fish passage and conserve water for in-stream flows. BPA expects that most former MVID members who receive the monetary compensation would either install new wells or improve existing ones, so they can irrigate with groundwater.

Table 3-1 in the EA summarizes the impacts of each alternative. The impacts of two (A and C) of the three action alternatives differ somewhat, but are similar in nature and intensity. BPA has determined, based on the context and intensity of these impacts, that they are not significant, using the definition of this concept in section 1508.27 of the Council on Environmental Quality Regulations for implementing the National Environmental Policy Act. This determination is based on the following discussion of each point listed in section 1508.27:

1. Implementation of Alternatives A or C would have beneficial effects on habitat for anadromous and resident fish in the Methow and Twisp rivers. These effects would not be significant in the context of NEPA because there are other factors, both within and outside the basin, that affect fish habitat to a greater degree than the in-stream flows that would be enhanced (EA, section 1.1). The major limitations on production of anadromous fish in the Methow basin have been identified as overharvest in ocean and downstream fisheries and dam-related mortality of smolts and adults. Other in-

basin factors such as lack of large woody debris and winter icing conditions have also been cited. However, the benefits of the proposed project are important enough to fish in the Methow basin to warrant BPA assistance with funding this project.

2. Implementation of Alternatives A or C would not affect the overall health and safety of the people of the Methow Valley to a significant degree. The actions proposed would increase safety by eliminating a possible source of flooding from the failure of the canal and by eliminating a possible source of drowning, i.e., open water in the canals. Eliminating the open canals could have a detrimental effect on health and safety by eliminating a source of water occasionally used for fighting fires (EA, section 3.8.2). However, these issues are not significant in the context of NEPA because the risks are small, relative to other factors affecting health and safety in the local area.
3. Effects of the actions proposed on prime farmland would not be significant because they are fully compatible with existing agricultural use of the surrounding farmland (EA, section 4.7).

The Twisp River is considered a River of Statewide Significance and has been recommended for inclusion in the National Wild and Scenic Rivers System, and the Methow River has been recommended for inclusion in the Washington State Scenic Rivers Program. The actions proposed would not affect the status of these rivers. Removal of the diversions would cause short-term, localized disturbance to sediments, but would result in long-term benefits to the wild, scenic, and recreational values of the rivers (EA, section 4.9.1).

The actions proposed would not affect park lands, as there are none present in the vicinity.

Wetlands would be affected by the actions proposed. This is because the existing diversion, intake structure, and fish screening facilities that would be removed at the Twisp River diversion for the West canal are located in wetlands. A small amount of

fill may be needed to seal off the existing diversion. Also, construction of the new groundwater wells and associated facilities proposed under Alternative A could potentially affect wetlands, as these facilities must be located near the rivers. These impacts would be mitigated 1) by surveying areas proposed for new construction and avoiding construction in wetlands where practicable and 2) by the rewatering of historic wetland areas along the rivers as the diversions are reduced (EA, sections 3.4.2 and 4.6). Also, the areas of vegetation along the canals sustained by canal seepage were reviewed by the Army Corps of Engineers and determined not to be wetlands. Therefore, impacts on wetlands would not be significant.

Some of the actions proposed would take place in ecologically critical areas designated by Okanogan County (see section 4.2.3 of the EA), including wetlands, frequently flooded areas, and fish and wildlife habitat conservation areas. The significance of impacts on wetlands is discussed above. The construction of new well fields, pump houses, and reservoirs under Alternative A would avoid the 100-year floodplain. Frequently flooded areas would be only minimally affected as the diversions, intakes and fish screens are removed under Alternatives A and C. These impacts would be mitigated through the return of more natural floodplain functions as the diversions, intakes, and fish screens are removed, and therefore would not be significant. Wildlife habitat conservation areas for deer and riparian vegetation along the canal would be affected because the canal would no longer seep water that sustains vegetation and thereby creates wildlife habitat. These impacts would be mitigated 1) by allowing MVID members to use their water rights to water vegetation providing wildlife habitat previously fed by the canal seepage, and 2) by the rewatering of historic wetland and wildlife habitat areas along the rivers as the diversions are reduced.

Golden-eagle priority Level II habitat is only bordered by the canal; no impact would occur. Potential impacts on bald eagle and harlequin duck habitat areas as

diversion dams, intake structures, and fish screens are removed would be negligible, and would be mitigated as required by the County through protection of existing riparian vegetation and reseeding, if necessary, with native vegetation. Impacts on these habitats from the construction of well fields, pump houses, and reservoirs under Alternative A would be avoided if at all possible, and mitigated as discussed above if avoidance is not possible. Therefore, impacts on ecologically critical areas would not be significant.

4. The impacts of actions proposed under Alternatives A or C are not significant due to their controversy. The controversies that have surfaced originate from factors other than environmental impacts. Some comments on the preliminary EA objected to the use of data from the In-stream Flow Incremental Methodology studies, the MVID Water Supply Facility Plan, and other sources. These documents were reviewed by BPA-funded independent consultants who confirmed the validity of the data for use in this environmental assessment (EA, sections 3.1, 3.2, 3.4, and Appendices E, F, and H). There has also been concern over the ability of all members of the MVID to obtain water under the conditions for new wells that would be imposed by WDOE. Several options exist for those who would not be able to meet these conditions. WDOE is committed to working with MVID members and patrons to ensure that all who are entitled will have adequate access to water for irrigation. There has been little disagreement over the use of the affected natural resources—most of the interested parties agree that the MVID should improve the efficiency of its water use and return at least some of the water to the rivers to enhance fish and wildlife habitat.
5. The impacts of actions proposed under Alternatives A or C are not significant due to the degree of highly uncertain or unique or unknown risks. These issues have been raised by members of the public, particularly in regard to the impacts to groundwater, in-stream flows, aquifer recharge, wetlands, and wildlife, but they have been reviewed by BPA's independent consultant, the Washington Department of Ecology,

the Washington Department of Fish and Wildlife, the U.S. Army Corps of Engineers, and the Environmental Protection Agency, and found not to pose highly uncertain, unique, or unknown risks (EA, sections 3.1, 3.4, and 3.5, and Appendix J).

6. The actions proposed would not establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration. Contrary to the assertions of some, this project is independent of the Methow Valley Water Pilot Planning Project, and would not affect or influence decisions regarding the creation of a water bank in the Methow Valley. The water saved under this project would be placed in the existing State Water Rights Trust, unless and until a water bank is created.
7. The actions proposed are not related to other actions with individually insignificant but cumulatively significant impacts (Section 3.9 of the EA).
8. The MVID canal system has been recommended as eligible for inclusion on the National Register of Historic Places (Sections 3.7 and 4.4.1 of the EA). Changes to it proposed under Alternatives A or C have been determined to be an adverse effect on an historic resource by the Washington State Historic Preservation Office (SHPO). This impact would be mitigated through the preparation of an Historic American Engineering Record and through the execution, with the Washington SHPO, of a Memorandum of Understanding that complies with Section 106 of the National Historic Preservation Act. Surveys of the canal and existing facilities revealed no other cultural resources that would be adversely affected by the project. Final locations of new facilities under Alternative A would be surveyed before construction to insure that their construction would not adversely affect other cultural resources, including tribal traditional use areas.
9. No adverse effects on endangered or threatened species are anticipated (EA, sections 3.2.2, 3.4.1.5, 3.5.2, and 4.3.1). The actions proposed may benefit listed and proposed fish species.

10. The actions proposed would not threaten to violate Federal, State, or local law or requirements imposed for the protection of the environment. The following permits *may* be required and will be obtained, as needed: shoreline development permit and floodplain development permit (Okanogan County), hydraulic project approval permit (Washington Department of Fish and Wildlife), State water quality certification (Washington Department of Ecology), and Clean Water Act Section 404 permit (Army Corps of Engineers). Final determinations regarding the need for permits will be made after the MVID decides on its final course of action.

The impacts of Alternative B are more consequential than those of Alternatives A or C in that:

- although there would be some improvement over the existing situation, in-stream diversions would continue to adversely affect fish habitat in the reaches below the diversions;
- the diversion structures, while also somewhat improved from the existing situation, would continue to adversely affect fish passage past the diversions; and
- the costs far exceed the funds available from the agencies involved, which would leave the MVID saddled with major costs for construction under this alternative.

For these reasons, BPA has not included this alternative in this Finding of No Significant Impact. However, BPA has decided to adopt both options identified in Alternative B for possible use in compensating MVID members who leave the district. Both options are neutral with regard to their impact on the environment.

Floodplain Statement of Findings: This is a Floodplain Statement of Findings prepared in accordance with 10 C.F.R. Part 1022. A Notice of Floodplain and Wetlands Involvement was published in the Federal Register on October 30, 1996, and a floodplain and wetlands assessment was incorporated in the EA (section 4.6). BPA is proposing to remove or replace diversions, intake structures, and fish screens in the floodplains of the

Methow and Twisp rivers. The actions are proposed to be located in the floodplain because the diversions, intake structures, and fish screens already exist in the floodplain. Alternatives to the proposed action are listed above. The actions proposed would conform to applicable State or local floodplain protection standards; a county floodplain development permit would be obtained, if needed, for work in the floodplains of the Methow and Twisp rivers.

The steps to be taken to avoid or minimize potential harm to or within the affected floodplain include:

- In floodplains and shoreline areas, disturbed land would be restored as closely as possible to pre-project contours and replanted with native and local species. However, there might be locations where site topography would require bank disruption. A restoration and monitoring plan would be prepared before disturbing floodplains and shoreline areas.
- Erosion control measures would be implemented within the shoreline and floodplain area.
- Location of new structures within the identified shoreline and floodplain would be avoided.

BPA will endeavor to allow 15 days of public review after publication of this statement of findings before implementing the selected alternative.

Determination: Based on the information in the EA, as summarized here, BPA determines that the actions proposed, as described and analyzed in either Alternative A or C, are not major Federal actions significantly affecting the quality of the human environment within the meaning of NEPA, 42 U.S.C. 4321 et seq. Therefore, an EIS will not be prepared, and BPA is issuing this FONSI.

Issued in Portland, Oregon, on December 9, 1997.

*/s/ Alexandra B. Smith*_____
Alexandra B. Smith
Vice President
Environment, Fish and Wildlife Group

Methow Valley Irrigation District Project

Final Environmental Assessment

December 1997

Table of Contents

	Page
CHAPTER 1: PURPOSE OF AND NEED FOR ACTION	1
1.1 Underlying Need for Action	1
1.2 Background	2
1.3 Purposes	4
1.4 Relationship to Other Environmental Documents	4
1.5 Public Involvement	4
1.6 Key Issues	5
CHAPTER 2: ALTERNATIVES, INCLUDING THE PROPOSED ACTION	7
2.1 Introduction	7
2.1.1 Alternative A: Proposed Action	7
2.1.2 Alternative B: Partial Upgrade	14
2.1.3 Alternative C: Dissolution of MVID	17
2.1.4 Alternative D: No Action	18
2.2 Alternatives Not Examined in Detail	19
2.2.1 December 1996 Options	19
2.2.2 April 1997 Options	20
2.2.3 May 14 Options	21
2.2.4 Partial Lining Option under Alternative B	23
2.3 Comparison of Alternatives	23
CHAPTER 3: ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES	27
3.1 Water Quantity and Quality	27
3.1.1 Existing Environment	27
3.1.2 Potential Impacts	38

Page

3.2 Fish 46
3.2.1 Existing Environment 46
3.2.2 Potential Impacts 52
3.3 Soils 64
3.3.1 Existing Environment 64
3.2 Potential Impacts 64
3.4 Vegetation 66
3.4.1 Existing Environment 66
3.4.2 Potential Impacts 69
3.5 Wildlife 76
3.5.1 Existing Environment 76
3.5.2 Potential Impacts 82
3.6 Socioeconomics/Land Use 85
3.6.1 Existing Environment 85
3.6.2 Potential Impacts 87
3.7 Cultural Resources 93
3.7.1 Existing Environment 93
3.7.2 Potential Impacts 95
3.8 Safety and Liability 97
3.8.1 Existing Environment 97
3.8.2 Potential Impacts 97
3.9 Cumulative Impacts 99
3.9.1 Watershed Management Project Cumulative Impacts 99
3.9.2 Cumulative Groundwater and River Flow Effects 100
3.9.3 Cumulative Loss of Vegetation and Wildlife Habitat 101
3.9.4 Higher Assessment Costs and Shifts in Land Use 101
3.9.5 Potential for Future Growth and Development 102

	Page
CHAPTER 4: CONSULTATION, REVIEW, AND PERMITS	103
4.1 National Environmental Policy	103
4.2 State, Areawide, and Local Plan and Program Consistency	103
4.2.1 State Environmental Policy	103
4.2.2 State and Areawide Clearinghouses	103
4.2.3 Local Plans	104
4.3 Wildlife and Habitat	105
4.3.1 Endangered and Threatened Species and Habitats	105
4.3.2 Fish and Wildlife Conservation	105
4.4 Heritage Preservation/Native Americans	106
4.4.1 Historic and Archaeological Resources	106
4.4.2 Native Americans	107
4.5 Coastal Management, Shorelands and Wetlands	107
4.6 Floodplains/Wetlands Assessment	108
4.6.1 Floodplain Effects	108
4.6.2 Wetland Effects	109
4.7 Farmlands	110
4.8 Water Resources Protection	110
4.8.1 Permits for Structures in Navigable Waters	110
4.8.2 Permits for Discharges into Waters of the United States	110
4.8.3 State Laws	111
4.9 Public Lands	111
4.9.1 Wild and Scenic Rivers	111
4.10 Pollution Control	111
4.10.1 Air Quality	111
4.10.2 Water Quality	112
4.10.3 Noise	112
4.11 Other	112
CHAPTER 5: PERSONS AND AGENCIES CONSULTED	113
CHAPTER 6: REFERENCES	115

Page

LIST OF TABLES

Table 2-1 Alternatives Description Matrix 8-11

Table 2-2 Compensation Formula 12

Table 2-3 Predicted Performance Summary 24-25

Table 3-1 Environmental Analysis Summary 28-33

Table 3-2 Minimum and Maximum Values for Standard Water Quality Measures 37

Table 3-3 Anadromous and Resident Fish Species Using the MVID Project Area 47

Table 3-4 WDFW-Identified Priority Species in the MVID Project Area 48

Table 3-5 Comparison of In-stream Habitat (WUA) between No Action Conditions and Alternative A Using the 50-Percent Exceedance Flows for September 55

Table 3-6 Comparison of In-stream Habitat (WUA) between No Action Conditions and Alternative A Using the 90-Percent Exceedance Flows for September 57

Table 3-7 Comparison of In-stream Habitat (WUA) between No Action Conditions and Alternative B Using the 50-Percent Exceedance Flows for September 60

Table 3-8 Comparison of In-stream Habitat (WUA) between No Action Conditions and Alternative B Using the 90-Percent Exceedance Flows for September 62

Table 3-9 Federal Species of Concern 78

LIST OF FIGURES

After Page

Figure 1-1: Base Map 2

Figure 2-1: Alternative A: Proposed Action 12

Figure 2-2: Alternative B: Partial Upgrade 14

Figure 3-1: Topography 34

Figure 3-2: Irrigated Areas Served by the MVID 34

Figure 3-3: Schematic Diagram of MVID Alternatives 34

Figure 3-4: Anadromous Fish Habitat 46

Figure 3-5: Life History Timing of Salmonids 48

Figure 3-6: Riparian Areas 68

Figure 3-7: Wildlife Priority Habitat - Level 1 and 2 82

After Page

Figure 3-8: Wildlife Priority Habitat - Level 3 82

Figure 3-9: Land Ownership 86

Appendices

Appendix A: Water Rights Information

Appendix B: Engineering Cost Detail

Appendix C: Alternative Methods to Line Canals

Appendix D: WDOE Letter to Canal Associates (March 14, 1997)

Appendix E: Water Quality and Quantity Detailed Data

Appendix F: Vegetation Detail

Appendix G: Glossary

Appendix H: Comments on the Preliminary EA and Responses to Comments

Appendix I: Draft Mitigation Action Plan

Appendix J: Agency Consultation Letters

This page intentionally left blank.

CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

1.1 Underlying Need for Action

Bonneville Power Administration (BPA) is proposing to assist with funding changes to the Methow Valley Irrigation District's (MVID) irrigation system to increase the efficiency of that system. In doing so, BPA is responding to a need to increase in-stream flows and **fish passage**[1] in the Methow and Twisp rivers for **anadromous** and **resident** fish. The Pacific Northwest Electric Power Planning and Conservation Act of 1980 requires BPA to protect, mitigate, and enhance fish and wildlife that have been affected by the construction and operation of the Federal Columbia River Power System (FCRPS). Funding this project would be partial **mitigation** for the FCRPS' system-wide impacts. Also important is the need to promote more efficient use of water in the Methow River **Basin**. To this end, the Washington Department of Ecology (WDOE) would co-fund a major portion of the project.

This need to increase the efficiency of water use, improve in-stream flows, and correct fish passage problems has been identified in several recent studies of fish and water issues in the Methow Basin. The Columbia Basin System Planning Salmon and Steelhead Production Plan, Methow and Okanogan Rivers **Subbasin** (WDW et al., 1990) discusses fish production constraints for the anadromous species currently present in the Methow. While overharvest in ocean and downstream fisheries, and dam-related mortality of **smolts** and adults, are cited as the significant limitations for all of the stocks, in-basin limitations cited included the following:

- Steelhead - slow juvenile growth rates and losses from winter icing, spring flooding, lack of in-stream winter cover, and unscreened irrigation **diversion**s.
- Spring chinook - loss of rearing habitat from dewatering and low flows resulting from irrigation diversions; loss of juveniles as a result of substandard irrigation diversions and winter icing conditions; and habitat losses from **riparian** development.

One of the recommended strategies for correcting in-basin limitations on spring chinook is to implement water conservation and acquisition measures, including conversion to sprinkler irrigation systems, lining of earthen irrigation ditches, and/or conversion to pump irrigation systems. The conversion of the MVID canal system to individual wells is specifically mentioned.

The draft Methow River Basin Plan (Methow Valley Water Pilot Planning Project Planning Committee, 1994) included in its major conclusions, "4. Instream flow must be increased to improve fish and wildlife habitat and preserve and enhance the unique quality of the Methow Valley while allowing for growth." (page vii) They also state, ". . . the Committee recognized

[1] To help the reader, words that appear in the GLOSSARY (Appendix G) appear in bold at their first appearance in the text.

that existing in-stream flow levels are well below those needed to meet regional fish management objectives, and that significant opportunities exist to improve stream flows." (Ibid., page vii) Appendix D, which discusses Agricultural Conservation Alternatives, states, "While there are a host of factors contributing to the poor status of these stocks, irrigated agriculture is a significant contributing factor." (Appendix A, p. D.1) The MVID east and west canals are identified as having the highest potentials of the irrigation systems listed for increasing in-stream flows at the **points-of-diversion** through conversion to wells and/or enclosed pipe (Appendix A, Table A, p. D.2).

The Columbia River Anadromous Fish **Restoration** Plan of the Nez Perce, Umatilla, Warm Springs, and Yakama Tribes, WY-KAN-USH-MI WA-KISH-WIT Spirit of the Salmon (CRITFC, 1995) also states as its first recommendation for the Methow River System, "Irrigation diversions in combination with natural low flow occurrences and channel realignment in the basin create dewatering problems and upstream passage problems and significantly reduce available habitat. Instream flows will be significantly improved by implementing the recommendations of the *Draft Methow Basin Plan*." (page 83).

1.2 Background

MVID's gravity-fed, open-canal irrigation system has been vital to the Methow Valley's agricultural production since the MVID was organized and the system became operational in the early 1900s. Water diverted from the Methow River supplies the east side of the valley between Twisp and Carlton; water from the Twisp River supplies the west side in the same area. (See Figure 1-1.)

However, maintenance and repair of the MVID system has not occurred on a regular basis, and its efficiency has been compromised. Currently, the overall **conveyance efficiency** of the MVID system (i.e., current demand for irrigation water divided by the total amount of water diverted) is estimated at 20 percent (Montgomery Water Group (MWG), 1996, page 27). Consequently, a number of properties at the lower end of the MVID east and west canals are not delivered their share of irrigation water on a reliable basis, and landowners have had to drill their own wells to provide irrigation water. The MVID diversion structures are also in need of repair or replacement. The in-stream diversion dam on the Methow River is made up of wooden flashboards that must be adjusted by hand, and the diversion on the Twisp River is a rock levee dam that must be pushed up by a bulldozer each year.

By the 1930s, newspapers reported a decline in the fish population of the Methow and Twisp rivers. Much of the loss was attributed to fish being drawn out of the rivers and into the irrigation system, where they often died. **Fish screens**, which prevent the entry of fish into the irrigation system, were installed at both MVID canal intakes in 1937. The fish screens were periodically remodeled and eventually completely replaced. However, today they are outdated and ineffective. The irrigation diversions in the Methow and Twisp rivers, the outdated fish screens, and the inefficient canal system all contribute to reduced habitat and passage conditions for anadromous fish in the Twisp and Methow rivers.

In 1991, as a Tribe with fish management responsibilities, the Yakama Indian Nation (YIN) filed a lawsuit against the MVID for wasteful water practices. The YIN also filed a complaint against the WDOE for the latter's inaction in insisting that the MVID meet a reduced water consumption level that WDOE had required in 1989. In 1992, the YIN postponed its legal actions, with the assurance that WDOE and the MVID would begin working together on a comprehensive plan. In early 1996, the MVID Board of Directors identified a preferred plan, and filed and approved a State Environmental Policy Act (SEPA) checklist for that plan. Concurrently, the YIN proposed to the Northwest Power Planning Council (Council) that BPA help fund the MVID's efforts as part of BPA's responsibility for fish and wildlife mitigation. Upon approval of the project by the Council, BPA joined the project as a proposed co-funder and began this required analysis of environmental impacts to satisfy requirements of the National Environmental Policy Act (NEPA).

The WDOE's role and interest in this project is to manage and administer the water resources of the State of Washington, as defined in rules and regulations, including the Revised Code of Washington (RCW) Chapters 90.03, 90.14, 90.44, and 90.54. Under these laws, WDOE is responsible for insuring that the waters of the State of Washington are put to maximum net beneficial use. To do this, water uses must be measured against four tests:

1. Is water available?
2. Is the water use a beneficial use?
3. Is the water use in the public interest?
4. Would the use impair existing rights?

WDOE is interested in helping the MVID secure a reliable system that meets all of these standards. It is willing to help fund such a system for the MVID.

Several possible alternative plans have been identified and are addressed in this environmental assessment (EA). Briefly, they are as follows:

- Replace much of the current open canal with a piped system fed from new **groundwater** wells; use an acreage-based formula to compensate those who leave the MVID and supply their own water sources.
- Line portions of the canal to reduce losses and continue the river diversions and the existing gravity-fed system; and compensate those who leave the MVID either according to an acreage-based formula, or on an as-needed basis to enable modification of existing wells or construction of new wells sufficient to irrigate.
- Dissolve the MVID and compensate all members according to an acreage-based formula.
- Continue present system operation (No Action).

1.3 Purposes

BPA has identified the following purposes for participating in this project. BPA will base its choice among alternatives on these purposes:

- increase habitat for anadromous and resident fish in the Methow and Twisp watersheds;
- remove obstacles to fish passage,
- protect environmental resources:
  - * promote water conservation,
  - * assure MVID members access to adequate water supplies, and
  - * protect the landscape and aesthetics of the valley;
- achieve cost and administrative efficiency; and
- comply with all applicable laws, regulations, and Executive Orders.

1.4 Relationship to Other Environmental Documents

BPA recently completed the Watershed Management Program environmental impact statement (EIS). This programmatic EIS addresses the environmental issues associated with a wide range of watershed management techniques. In the Watershed Management Program Record of Decision (signed August 27, 1997), BPA adopted a set of prescriptions (goals, strategies, and procedural requirements) that apply to watershed management projects funded by BPA.

The MVID project is one of these watershed management projects. Although this EA was developed simultaneously with the Watershed Management Program EIS, it can be considered to be tiered to the Watershed EIS. The actions proposed in the EA were addressed in the Watershed EIS, and the project would meet the set of prescriptions adopted in response to that EIS.

1.5 Public Involvement

BPA became involved with the MVID project in July 1996, after the Council recommended the project to BPA for funding. The Agency began its environmental review with a letter to the public (October 25, 1996) announcing a scoping meeting to be held in Twisp. (Scoping is the gathering of topics and issues for consideration in an environmental study.) The scoping and information gathering period extended from October through December 1997, and included the following public meetings:

- November 6, 1996: meeting in Omak, Washington, with members of the Colville Confederated Tribes to present information, answer questions, and hear concerns about the project;

- November 14, 1996: open house meeting in Twisp, Washington, with all interested attendees to answer questions and gather scoping comments on the project;

- December 16-19, 1996: workshops with members of the MVID and other interested people to answer specific landowner questions about the effects of the project on water rights (requested by people attending the November 14 meeting).

A number of comment letters and phone calls have been received throughout the process. Those written comments received by January 1997, as well as the comments from the public meetings, were summarized in a "For Your Involvement" information bulletin and sent to people on the mailing list in February 1997. The comments were reviewed and used to design the alternatives and issues to be addressed in the EA. Whenever possible, we continued to consider comments received after January 1 in drafting the preliminary EA.

The preliminary EA was sent to all interested parties on June 16, 1997. An open house meeting was held in Twisp on June 30. A total of 141 comments was recorded at the public meeting. In addition, 20 written comment forms and letters and one phone call were received. All of the comments received on the preliminary EA have been considered in preparing this final EA. The comments and BPA's responses are included in Appendix H.

1.6 Key Issues

The following key issues for the MVID project were identified through the scoping process. Each issue is followed by a listing of the sections of the EA where these issues are addressed.

1. Effects on water and water supply (section 3.1)

    - Could cutting off the seepage from the canal to the groundwater affect groundwater levels below the canals, in turn possibly affecting existing wells and in-stream flows? (section 3.1.1.1, **Appendix E**, section 3.1.2)

    - Could increased groundwater pumping decrease groundwater and in-stream flow levels? (section 3.1.2)

    - How will the alternatives affect my ability to get irrigation water? (section 3.1.2)

2. Effects on fish (section 3.2)

    - How beneficial will increased flows be for fish? (section 3.2.2)

    - Is the In-stream Flow Incremental Methodology (**IFIM**) study valid? (section 3.2.2, **Appendix E**, part 4)

3. Effects on wildlife, habitat, wetlands, vegetation, and aesthetics (sections 3.4, 3.5, 4.3, 4.5, 4.6, 4.8 and **Appendix F**)

- Will cutting off the seepage from the canal affect riparian vegetation, including trees, and therefore also affect the aesthetics of the valley? (section 3.4.2, **Appendix F**)
- Will it affect wetlands, both those that occur naturally and those that are sustained by seepage from the canal? (sections 3.4.2, 4.5, 4.6, and 4.8.2)
- How will wildlife be affected? (sections 3.5.2 and 4.3)

4. Effects on socioeconomics (sections 3.6 and 3.8)

- How will operations and maintenance costs be affected for those remaining in the MVID? (section 3.6.2, **Appendix B**)
- Will growth increase in the valley as a result of the project? (section 3.6.2)
- How will the offer of compensation for those who leave the district affect people's decisions? (section 3.6.2)

5. Effects on cultural resources and Tribal treaty rights (section 3.7 and 4.4)

- Is the ditch itself a historical resource? (sections 3.7.1.3 and 4.4.1)
- How will other cultural resources be affected, such as archaeological sites and traditional Tribal sites? (sections 3.7.2 and 4.4.2)

6. Effects on water rights (**Appendix A**)

- What will happen to the collective **water rights** and **claims** of the MVID if they are divided up? Will the former MVID members be giving up rights if they opt to leave or dissolve the district? (**Appendix A**)
- Will every former MVID member be able to exercise the option to change their point of diversion to an individual well, or will lack of water availability result in some people not being able to retain their water rights? (section 3.1.2)

CHAPTER 2: ALTERNATIVES, INCLUDING THE PROPOSED ACTION

2.1 Introduction

This chapter describes, and then compares, four project alternatives. Section 2.2, below, provides basic descriptions of the four project alternatives and lists the assumptions behind each alternative. The section then discusses some options that we considered, and explains why we did not examine them in detail.

Section 2.3 compares the four alternatives to see how well each meets the project purposes (section 1.3). Eventual selection of one of these alternatives, as well as funding sources and amounts, depends on how well that alternative meets those purposes.

Table 2-1, following, presents and compares the details of Alternatives A - D.

2.1.1 Alternative A: Proposed Action

Alternative A would include the following elements:

- A new irrigation system would be built. It would use 46-centimeter (cm) (18-inch (in.)) groundwater wells in three separate well fields, one for the east canal and two for the west canal. About 21 kilometers (km) (13 miles (mi.)) of new low-pressure pipe would be placed in existing canal rights-of-way. (See Figure 2-1.)

- Three small concrete tanks would be built above-ground to act as reservoirs for the new system. Each tank would be about 6 meters (m) tall (20 feet (ft.)) by 6 m (20 ft.) in diameter.

- Several existing canal **reaches** would be abandoned: *east canal*: reaches 1, 2, lower 4, 5, 6; *west canal*: 1, middle of reach 3. (West reach 5 has already been abandoned.) Areas served by these canal reaches would be removed from the MVID and served by existing or new, privately owned groundwater irrigation wells.

- A portion of reach 2 on the east canal has been shared under an agreement with the Barkley Ditch users for many years. In order not to adversely affect the Barkley Ditch users, this potion of the reach would be replaced with a pipeline to provide them with the same amount of water they are currently using, and turned over to them.

Table 2-1: Alternatives Description Matrix [Page 1 of 4]

DESCRIPTION	ALT. A: PROPOSED ACTION	ALT. B: PARTIAL UPGRADE	ALT. C: MVID DISSOLUTION	ALT. D: NO ACTION
1. NEW CONSTRUC-TION NEEDED	New system built using groundwater wells and low-pressure pipe. Some drilling of new ground-water wells for individ-uals leaving MVID.	Canal rebuilt and lined with concrete. Upgraded in-stream diversions built. Some drilling of new groundwater wells for individuals leaving MVID.	Some drilling of new groundwater wells for individuals leaving MVID.	None.
2. BARKLEY DITCH	Section of canal serving Barkley users replaced with pipeline. Possible efficiencies in amount of water delivered to Barkley users.	Section of canal serving Barkley users relined with concrete as part of overall MVID canal relining. Possible efficiencies in amount of water delivered to Barkley users.	Section of canal serving Barkley users replaced with pipeline. Possible efficiencies in amount of water delivered to Barkley users.	No changes to section of canal serving Barkley Ditch users or to amount of water provided them.
3. NEED FOR SHORT-TERM REPAIRS (next 10 years)	No short-term canal system repairs antici-pated. Some repairs to or upgrading of existing individual wells for individuals leaving MVID.	No short-term canal system repairs antici-pated. Some repairs to or upgrading of existing individual wells for individuals leaving MVID.	No short-term canal system repairs antici-pated. Some repairs to or upgrading of existing individual wells for individuals leaving MVID.	Canal repairs needed in areas of high operational risk (7 mi.) to keep system operating even at its present level; additional short-term repairs likely.

Table 2-1: Alternatives Description Matrix [Page 2 of 4]

DESCRIPTION	ALT. A: PROPOSED ACTION	ALT. B: PARTIAL UPGRADE	ALT. C: MVID DISSOLUTION	ALT. D: NO ACTION
4. MVID MEMBERSHIP	MVID membership drops because (1) some reaches would not be served; (2) some members would elect to leave.	Same as Alt. A, though fewer reaches would be dropped.	MVID dissolved.	Assumed no MVID membership changes.
5. DIVERSIONS AND FISH SCREENS; WDFW FUNDING	In-stream diversions/fish screens removed. WDFW might help fund new system construction instead of new fish screens.	In-stream diversions and fish screens upgraded. WDFW might fund fish screen upgrade.	In-stream diversions and fish screens removed; costs covered by WDOE and BPA.	In-stream diversions not upgraded. WDFW might fund fish-screen upgrade.
6. WDOE FUNDING	WDOE is project manager, helps fund new system construction.	Questionable WDOE funding (if there are sufficient in-stream flow benefits, if there is concurrence from WDFW & YIN fish managers and if there are significant operational efficiencies consistent with Ref. 38).	WDOE funding for removal of in-stream diversions and fish screens and for new local improvement districts (LIDs) if they apply for money before the MVID dissolves.	No WDOE funding for anything, including any repairs or rehabilitation of future system failures.
7. BPA FUNDING	BPA helps fund new system construction, and compensates those leaving the MVID, based on an acreage-based formula (see Table 2-2).	Same as Alt. A, if significant in-stream flow benefits. Also, option to reimburse those leaving the MVID on an as-needed (rather than acreage-based) formula.	BPA compensates former MVID members, based on an acreage-based formula, up to a total of $2.2 million.	BPA provides no funding.

Table 2-1: Alternatives Description Matrix [Page 3 of 4]

DESCRIPTION	ALT. A: PROPOSED ACTION	ALT. B: PARTIAL UPGRADE	ALT. C: MVID DISSOLUTION	ALT. D: NO ACTION
8. MVID MANAGEMENT CONSIDERA-TIONS	Only alternative currently approved by MVID Directors.	Would require MVID Directors' vote and additional source(s) of funding; funds available from BPA would fall far short; WDOE funding questionable.	Would require dissolution petition from MVID members and membership vote.	Current MVID structure constant. Funding source for canal repairs/ deferred maintenance needed.
9. WATER RIGHTS AND CLAIMS	**9 (a)** MVID members leaving the district retain benefits under MVID water rights and claims. **(b)** MVID receives authorization to transfer from surface-water point-of-diversion to point-of-withdrawal from groundwater wells.	**9.** MVID member water rights remain unchanged. Members leaving the MVID would apply for new rights or changes to MVID rights from WDOE.	All former MVID members retain benefits under MVID water rights and claims through transfers from surface water point-of-diversion to point-of-withdrawal from individual groundwater wells.	MVID retains current water rights and claims pending outcome of potential litigation.
10. IRRIGATED ACREAGE IN/OUT OF MVID	About 930 ac. stay in MVID, irrigated by piped groundwater system. Up to 1,346 acres no longer in MVID, irrigated by existing or new, privately developed groundwater wells.	About 1,277 ac. stay within MVID, irrigated by open canal system. Up to 999 ac. no longer in MVID, irrigated by existing or new privately developed groundwater wells.	No acres stay in MVID. Up to 2,276 ac. no longer in MVID, irrigated by existing or new, privately developed groundwater wells.	About 776 ac. in the MVID currently irrigated by the canal system. Additional 1,500 ac. within the MVID not irrigated, or irrigated by existing or new, private well systems.

Table 2-1: Alternatives Description Matrix [Page 4 of 4]

DESCRIPTION	ALT. A: PROPOSED ACTION	ALT. B: PARTIAL UPGRADE	ALT. C: MVID DISSOLUTION	ALT. D: NO ACTION
11. WATER USAGE (estimated peak irrigation usage)	About 46 cfs (19 cfs from groundwater for areas within MVID; 27 cfs from groundwater wells for acreage no longer served by MVID).	About 46 cfs (26 cfs from river diversions for areas within MVID; 20 cfs from groundwater wells for acreage no longer served by MVID).	About 46 cfs (all from groundwater wells).	About 67 cfs from river diversions (plus some unknown amount of existing groundwater use from existing private wells).
12. COSTS (as estimated by CH_2M HILL; see Appendix B)	$4.6 million	$11.9 million	$2.7 million	$275,000 for fish screen upgrades, plus $2.4 million for immediate system repairs.
13. MVID O&M (Operations & Maintenance) ESTIMATED TOTAL ANNUAL COSTS	$104,000, or, on average, $112 per ac., based on 930 ac. irrigated.*	$127,000; or, on average, $100 per ac., based on 1,277 ac. irrigated. *	$0 (Any O&M costs for water supply to be absorbed by landowners or LIDs.)	$103,000 (1996 actual costs per B. Morgan~~J.~~); per-ac. Current assessment $50/ac. (MVID WSFP, Vol. 1, p~~.~~. 63). **

* Average O&M cost per-acre may not reflect actual per-acre assessment, established in MVID rate schedule (currently there is a minimum charge of $200 for a 2-ac. minimum).

** This figure is the assessment amount cited for 1993 in the MVID Water Supply Facility Plan (1994). Those currently not receiving water contribute additional funds. These costs may need to be increased due to the backlog of deferred maintenance.

- MVID members who leave the District would keep their benefits under MVID water rights and claims, by having MVID rights transferred to independent wells, with the same priority date. The remaining 376 hectares (ha) (930 acres (ac.)) would be irrigated by the piped groundwater system. The MVID and former MVID members would receive authorization to transfer the existing MVID **surface water** points-of-diversion to **points-of-withdrawal** for existing or new groundwater wells. Surface Water Certificate 945 and Water Right Claim 3935 would need to be changed to reflect the portion of the MVID that would be excluded. (For more information on water rights in the State of Washington, please see **Appendix A**).

- BPA, WDOE, and Washington Department of Fish and Wildlife (WDFW) would fund new system construction. BPA would provide compensation funds for MVID members leaving the district, based on an acreage formula (Table 2-2, below). The total estimated cost for this alternative is $4.6 million (see **Appendix B** for estimated construction cost details for each alternative).

- Alternative A is currently the only alternative approved by the MVID Directors.

Table 2-2: Compensation Formula

Parcel Size (acres)	Formula (acres = size of parcel)	Payment Range
0-2	$2,000 (minimum payment)	$2,000
2-5	$2,000 + [(acres - 2) x $1,000]	$2,000-$5,000
5-10	$5,000 + [(acres - 5) x $900]	$5,000-$9,500
10-15	$9,500 + [(acres - 10) x $800]	$9,500-$13,500
15-20	$13,500 + [(acres - 15) x $700]	$13,500-$17,000
20-25	$17,000 + [(acres - 20) x $600]	$17,000-$20,000
25-30	$20,000 + [(acres - 25) x $500]	$20,000-$22,500
30-35	$22,500 + [(acres - 30) x $400]	$22,500-$24,500
35-40	$24,500 + [(acres - 35) x $300]	$24,500-$26,000
40-45	$26,000 +[(acres - 40) x $200]	$26,000-$27,000
45+	$27,000 [(+ acres - 45) x $100]	$27,000-$29,514*

* Based on 70.14-acre maximum parcel size in MVID

Assumptions for Alternative A are as follows:

- The annual allowable water use would be 4 **acre-feet**/acre; the maximum **instantaneous** diversion rate would be 0.02 cubic feet per second (**cfs**) per ac. for each acre of land within the MVID. This rate would be applied to the total area within the MVID as it is now (J. Monahan, WDOE, pers. comm., 1997). With about 921 ha (2,276 ac.) of land within the MVID (MWG, 1996), the total maximum instantaneous diversion rate for this alternative would be about 45.5 cfs.

- The transfer from MVID points-of-diversion to individual points-of-withdrawal would be handled by WDOE on a case-by-case basis. MVID surface water right points-of-diversion could be transferred only to wells withdrawing water from the same water source. This would mean that transfers could be made only from the existing diversion points to wells that would withdraw water from the **alluvial aquifer** that is in direct **hydraulic continuity** with the river. Those unable to access the alluvial aquifer on their own land would need to seek arrangements with neighbors who might have access (which WDOE could then authorize), or would need to join with others to form a Local Improvement District (LID) as described in RCW 87.03.480 - 87.03.527, which would allow WDOE to provide funding for water access.

- Where the canal system is replaced by irrigation pipe, that pipe would be located in the canal alignment; the canal would be **backfilled** with gravel and native soil. Where the canal system is abandoned, the canal alignment would be (1) modified to allow water to drain out the existing **spillways**, or (2) otherwise modified to control stormwater. The unused portions of the canal alignment would revert to the land ownership underlying the MVID's easement.

- As part of the MVID's continuing maintenance program, trees would be removed along the piped irrigation system to reduce hazards and potential damage to the pipe, but the need would be less frequent than under Alternative B (partial upgrade; see section 2.1.2). Without vegetation maintenance, the MVID (the irrigation system owner) would be exposed to liability for potential damages to life and property from a failed pipe.

- Weed control and revegetation activities within MVID easements would conform to the weed control programs and policies of the Okanogan County Noxious Weed Control Board (NWCB). Where new construction or facility removal activities disturbed soils, those areas would be treated for weed control and revegetated consistent with the Board's weed control programs and policies.

- Wherever possible, construction in wetlands or riparian areas would be avoided, and MVID groundwater pumping would be designed to avoid affecting surface wetlands through groundwater withdrawal. New MVID facilities would be designed to avoid or minimize impacts on jurisdictional (open) waters of the United States, which are protected by Federal, state, and county law. Facilities constructed by local landowners

would be regulated by Federal, state, and county agencies with jurisdiction over wetlands and waters protection.

- If landowners wished to retain the existing vegetation along the section of canal through their property, they would be free to use their allocated water right to irrigate this vegetation on their property at their own expense. The allocated water right (0.02 cfs instantaneous and 4 acre-feet/acre annually) would generally be adequate to irrigate crops and to maintain existing riparian areas.

- Where existing riparian trees die off and are not a safety hazard, dead snags would be left as bird perching sites.

- Compensation would be provided to those landowners with parcels that would be excluded from the reorganized MVID. This compensation would be based on an acreage formula developed by the MVID and originally reported in the MVID Water Facility Supply Plan (MWG, 1996). Table 2-2 shows how the formula would work. The rationale for the compensation is based on the MVID members' desire for all members to benefit equally from the water supply improvements. It is anticipated that former members would use the money to drill new or upgrade existing groundwater wells, pumps, and pipelines to replace the MVID water supply to which they are currently entitled. This would include the costs for any necessary testing of the wells. It would also compensate those who have been required to continue to pay assessments to the MVID over the years, while not receiving their entitled water. No restrictions would be placed on the use of the money.

2.1.2 Alternative B: Partial Upgrade

Alternative B would include the following elements:

- The existing system would be upgraded: about 42 km (26 mi.) of the existing canal would be lined with concrete, in-stream diversions would be upgraded, and fish screens would be upgraded. (See Figure 2-2.) The concrete-lined open channels would generally follow the existing canal rights-of-way.

- The lower reaches (lower reach 5 and all of reach 6) of the east canal would be abandoned. (Reach 5 of the west canal has already been abandoned.) That portion of the MVID canal in reach 2 of the east canal presently shared under an agreement with the Barkley Ditch users would be upgraded with concrete lining as part of the overall MVID canal relining.

- MVID members remaining within the revised MVID boundary would continue to benefit from the MVID's existing water rights and claims, with no change in priority date. Surface Water Certificate 945 and Water Right Claim 3935 would need to be changed to reflect the portion of the MVID that would be excluded. . Those leaving the MVID would apply to WDOE for transfers from the existing points-of-diversion to new points-of-withdrawal. These transfers would be for a portion of the above-mentioned water

rights and claims, and would retain the same priority date. About 514 ha (1,277 ac.) would be irrigated within the MVID; the rest would be irrigated by existing or new groundwater wells using the transferred water rights.

- Some funding for new system upgrades and compensation might be available from BPA and WDFW, depending upon increases in in-stream flow benefits, operational efficiencies, and agreement with YIN and WDFW fish managers. WDOE would probably not fund a project that does not remove the obstacles to fish passage imposed by the Twisp and Methow River diversions. Two options have been proposed for compensation for those leaving the MVID: basing the compensation on 1) an acreage-based formula, or 2) on an as-needed basis to drill new wells or upgrade existing wells. The total estimated cost for this alternative is $11.9 million (see **Appendix B** for estimated construction cost details for each alternative).

- This alternative would need approval of the MVID Directors.

Table 2-1, pages 8 - 11, presents and compares the details of Alternatives A - D.

Alternative B is similar to Alternative 1 in the MVID Water Supply Facility Plan (MWG, 1996). The major difference is that, instead of using pipe materials (Alternative 1), the canal would be lined with concrete (Alternative B). Concrete lining was chosen as the most cost-effective method to preserve the gravity-fed, open-channel system while reducing leakage. (Other lining methods were considered for this alternative, but found less effective and reliable; see **Appendix C** for details.) Concrete lining is a proven method to conserve and transport irrigation water. Although initial capital costs may seem excessive, the reduced labor costs for maintenance over the life of the lining make this the best option for a lined open-channel system.

Assumptions for Alternative B appear below:

- Assumptions regarding the amount of water diverted for irrigation are the same as those for Alternative A (0.02 cfs, 4.0 acre-feet per acre, section 2.1.1). No allowance for additional diversion from the rivers would be made for conveyance and operational losses. Therefore, the quantity of water delivered to each farm would be lower for Alternative B by the amount of water lost through evaporation, seepage, and operational spills.

- As under Alternative A, the transfer from MVID points-of-diversion to individual points-of-withdrawal would be handled by WDOE on a case-by-case basis. Such transfer would be carried out only to wells withdrawing water from the same water source: that is, to wells that would withdraw water from the alluvial aquifer that is in direct hydraulic continuity with the river. As under Alternative A, those unable to access the alluvial aquifer directly would need to seek arrangements with neighbors or would need to join with others to form a LID, which would allow WDOE to provide funding for water access. See discussion under Alternative A.

- Concrete lining installation would consist of the following tasks: clearing and grubbing of the canal alignment, bulldozing the existing canal full with native embankment material, compacting that material to form a suitable construction platform, regrading the alignment to a level surface to provide for the new channel and a 3.7-m-wide (12-ft.-wide) access road along one side of the new channel (wherever space exists to site a road), excavating the canal prism in preparation for lining activities, installing crushed aggregate lining base, and placing the concrete lining using slip-forming techniques. The gravel base is required for drainage beneath the lining to keep the lining from floating during high water and to protect against frost-heaving over the winter months.

- The new, concrete-lined canal system would be located within the existing canal alignment. The channel would be constructed as detailed above. Where the canal system was abandoned, provisions would be made so that the local drainage that now flows into the open canals would continue to flow and exit the canals at the existing spillways. The unused portions of the canal alignment would revert to the land ownership underlying the MVID's **easement**.

- As part of maintenance, trees and other vegetation would be removed from the active canal alignment. Regular removal would be needed to ensure canal safety and maintenance of canal embankment integrity (preventing leakage and breakage caused by tree roots and windthrow). Without vegetation maintenance, the MVID (the irrigation system owner) would be exposed to liability for potential damages to life and property from a failed canal section.

- Weed control and revegetation activities within MVID easements would conform to the weed control programs and policies of the Okanogan County NWCB. Where new construction or maintenance activities disturbed soils, those areas would be treated for weed control and revegetated consistent with the Board's weed control programs and policies.

- Wherever possible, construction in wetlands or riparian areas would be avoided, and any new individual groundwater wells would be located to avoid affecting surface wetlands through groundwater withdrawal. See Alternative A for details.

- Landowners would be free to use their allocated water right to irrigate vegetation, as under Alternative A.

- Where existing riparian trees die off and are not a safety hazard, dead snags would be left as bird perching sites.

- As under Alternative A, it was assumed that compensation would be provided to landowners whose parcels were excluded from the reorganized MVID (see the formula in Table 2-2). This assumption, however, would require further review of the project by the Council to determine whether the in-stream flow benefits were significant enough to warrant inclusion of this project in the Fish and Wildlife Plan. Also, a group of MVID members has proposed the option of BPA paying *only* for the costs of upgrades to

existing or installing new groundwater well systems (see section 2.2). This option would be considered; however, since its costs were not available, we used the compensation formula costs. In any case, the costs could not exceed $2.2 million, the amount of money approved by the Council and budgeted by BPA for this project. If the costs for compensation were less than this, the remainder would be used toward construction costs.

2.1.3 Alternative C: Dissolution of MVID

Alternative C would include the following elements:

- The existing canal system would be abandoned, and the MVID dissolved (cease to exist entirely). The portion of the MVID canal in reach 2 of the east canal presently shared under an agreement with the Barkley Ditch users would be replaced with a pipeline to provide the Barkley users with the same amount of water they are currently using.

- Individual members would (1) use existing wells, (2) drill their own new wells, or (3) join together to form LIDs before dissolution. Some existing wells might need to be repaired or upgraded. Up to 921 ha (2,276 ac.) no longer in the MVID would be irrigated by existing or new, privately developed groundwater wells.

- In-stream diversions and fish screens would be removed.

- All former MVID members would retain benefits under MVID water rights and claims. All 921 ha (2,276 ac.) within the former MVID would be irrigated by existing or new, privately developed groundwater wells.

- BPA would compensate former MVID members to drill or upgrade wells, based on the acreage formula in Table 2-2. WDOE would provide funding for removal of in-stream diversions and fish screens, and for newly formed LIDs if money were applied for *before* the MVID dissolved. WDFW would provide no funds. The total estimated cost for this alternative is $2.7 million (see **Appendix B** for estimated construction cost details for each alternative).

- This alternative would require an MVID petition and vote.

Assumptions for Alternative C appear below:

- Assumptions regarding the amount of water available for irrigation are the same as those for Alternative A (section 2.1.1).

- As under Alternative A, the transfer from MVID existing points-of-diversion to new individual points-of-withdrawal would be handled by WDOE on a case-by-case basis. Such transfer would be carried out only to wells withdrawing water from the same water source: that is, to wells that would withdraw water from the alluvial aquifer that is in direct hydraulic continuity with the river. As under Alternative A, those unable to access the alluvial aquifer directly would need to seek arrangements with neighbors or would

need to join with others to form an LID, which would allow WDOE to provide funding for water access. See discussion under Alternative A.

- Where the canal system was abandoned, provisions would be made so that the local drainage that now flows into the open canals would drain from the canals at the existing spillways. The canal would revert to the land ownership underlying the MVID's easement.

- Local landowners and/or newly formed LIDs would be responsible for vegetation maintenance along any new irrigation systems.

- Weed control and all related activities would be the responsibility of the landowners and/or the LIDs.

- Federal and county agencies with jurisdiction over wetlands and waters protection would regulate facilities constructed by local landowners or LIDs.

- Landowners would be free to use their allocated water right to irrigate vegetation on their property at their own expense; see Alternative A.

- Where existing riparian trees die off and are not a safety hazard, dead snags would be left as bird perching sites.

- Compensation would be the same as under Alternative A, although review by the Council of changes to the original proposal might be needed. Because Alternative C's in-stream flow benefits are similar to or slightly better than Alternative A's, the Council would likely approve funding.

2.1.4 Alternative D: No Action

Alternative D would include the following elements:

- The MVID would continue to use the existing system; no changes would be made to the section of canal serving Barkley Ditch users.

- Repairs would be needed to several miles of "high risk" canal sections. Fish screens would still need to be upgraded; the availability of WDFW funding for this is uncertain.

- MVID would retain current water rights and claims, pending outcome of potential litigation. Acres served would continue as at present.

- BPA and WDOE would provide no funding for repairs, for any rehabilitation of possible future failures of the system, or for landowner compensation. However, WDFW might fund upgrade of the fish screens. Costs of the immediately needed repairs are estimated to be $2.4 million.

The following assumptions are made for Alternative D:

- Although vegetation maintenance was not performed regularly in the past, it is assumed that trees and other vegetation would be removed from the canal alignment. Regular removal is needed to ensure canal safety and maintenance of canal embankment integrity (preventing leakage and breakage caused by tree roots and windthrow). Without vegetation maintenance, the MVID (the irrigation system owner) is exposed to liability for potential damages to life and property from a failed canal section.

- Weed control and revegetation activities within MVID easements would conform to the policies of the Okanogan County NWCB.

2.2 Alternatives Not Examined in Detail

Alternatives to the proposed action (Alternative A) have been proposed by the Canal Associates, an MVID member subgroup, during the environmental process. Several ideas were proposed to WDOE and BPA during the workshops in December 1996; a preliminary proposal was presented to BPA in a letter from Mr. Jim Gerlach (April 23, 1997); and additional refinements and ideas were proposed in a May 14, 1997, letter from Mr. Vaughn Jolley.

2.2.1 December 1996 Options

The ideas proposed in **December 1996** included the following:

- Provisions for allowing MVID members who leave the district to obtain water rights and to obtain alternative sources of water through direct payment to well drillers (no direct landowner compensation);

- Improvements to the fish screens at the diversions to be paid for by WDFW;

- Lining of the canals, where needed, with mats or half-pipe;

- Upgrading spillways and improving diversion dams;

- Inspecting and, if necessary, upgrading or installing of **weirs** at district **laterals**;

- Employment of a ditch walker to monitor wasteful practices;

- Provisions for reorganizing the MVID Board of Directors;

- Use of funding from WDOE, if available, to help non-MVID junior-water-right holders upgrade their efficiencies; and

- Provisions for how to pay for the upgrade, including selling a portion of the water saved by the proposal; a flat $50 per-acre assessment plus administrative fee;

establishing a renovation and improvement fund; looking for additional low-interest loans; and/or allowing new and contract water users to join the district.

2.2.2 April 1997 Options

The **April 1997** letter included a proposal to maintain a gravity-flow irrigation system through low-cost lining of the canal, including:

- Repair of the critical areas of the ditch with a half-pipe galvanized steel, fiberglass, or poly-type culvert; and
- Repair and lining of the existing earthen-lined sections of the ditch with a **semi-permeable** polyethylene liner (or similar inexpensive liner) to significantly reduce the amount of water seepage from the ditch, but still allow some seepage to occur to irrigate riparian areas and recharge groundwater.

The December 1996 ideas for reorganizing the district, help for non-MVID junior-water-right holders, and provisions for alternative funding of the upgrade are outside of the scope of this EA. WDOE has expressed concerns about the alternative funding ideas to the Canal Associates in a letter to Mr. Jim Gerlach (WDOE, March 14, 1997; see **Appendix D**).

However, BPA did include Alternative B in this EA to address as many of the other ideas as possible. Alternative B preserves a gravity-flow, open-channel system. The main difference between Alternative B and the April 1997 proposal is in the material to be used to line the canals. Alternative B would essentially rebuild the canals in place, using concrete as a liner. The April 1997 letter proposed a combination of half-pipe sections and lining with a polyethylene or similar lining that allowed a controlled amount of seepage.

Based on information from our consultant, CH_2M HILL, BPA does not believe that the half-pipe or the flexible semi-permeable liners are viable alternatives for the MVID. While the initial costs for the liners themselves might be much lower than those for a new concrete ditch lining, the overall costs, when longevity and maintenance concerns are factored in, raise these costs substantially. The reasons are summarized below:

1. Exposed polyethylene or other flexible liners would need to be replaced quite frequently. Some require replacement each year. For example, the 3-M Ditch in the Teanaway River Basin uses a low-cost liner, but it requires yearly replacement. The life of the liner can be extended by several years through the addition of a protective layer of soil. However, in order to get the soil to stay on the sloped sides of the canal, the sides would need to be regraded to a 3:1 slope, which would create right-of-way problems. Also, provisions would need to be made for drainage, so that groundwater or uphill surface water would not displace the lining. These provisions would entail essentially rebuilding the canal, and would add greatly to the cost of this option. The costs for a long-term lining of this type would therefore be comparable to or more than the concrete lining proposed in Alternative B.

2. A semi-permeable membrane liner that allowed a controlled amount of seepage would not be a very effective solution to watering riparian areas, since it would need either to be replaced on a yearly basis or protected with a soil layer, as discussed above. The natural sediment in the water or the soil protective layer would end up blocking or severely limiting seepage through the liner. In order to make the maximum amount of water available for in-stream uses, ditch leakage must be stopped and on-farm water application efficiencies maximized. WDOE and BPA have addressed the issue of providing water for wildlife habitat along the canals by stating that a portion of an individual's allocated irrigation water right may be used for this purpose under Alternatives A, B, and C. See section 2.1.1 for details.

3. Yearly maintenance of a soil-protected liner would be greater than that required for a concrete liner. Vegetation quickly takes hold in a soil liner and must be cleared yearly by either chemical or hand methods to prevent damage to the liner.

4. Alternative liner materials such as semi-circular galvanized steel, plastic, or fiberglass "half-pipes" have not been used successfully on projects of this scale. Factors such as the cost of labor to install them properly and to provide watertight connections to other canal structures, their shorter useful lives due to weathering and exposure to ultraviolet light, and hydraulic characteristics make these products less suitable than conventional buried pipe or concrete lining materials.

Further details are available in **Appendix C**.

2.2.3 May 14 Options

We also received a letter (dated **May 14, 1997**) from Mr. Vaughn Jolley, with some recommendations for other options. This information was received too late to include in the preliminary EA, but is addressed here. Mr. Jolley recommended the following:

1. That no members be excluded from the MVID and all members should be provided an improved water delivery system with sufficient and dependable service; that members should be assessed according to irrigation law.

2. Starting at the reaches furthest south, MVID members should vote on a choice of two alternatives: 1) an improved gravity flow system, or 2) a closed pressurized pipe system. However, the closed system could not extend north of the first reach to opt for gravity flow.

3. The amount of water right needed under this new scenario to adequately service the existing and anticipated future uses should be determined.

4. A value should be negotiated for the water rights the District is being asked to give up; it should be determined whether that amount is sufficient to implement the proposed plan and provide for sufficient reserves for future needs of the MVID (50-100 years).

In a letter dated June 18, 1997, BPA responded to Mr. Jolley's recommendations as follows:

1. This is an MVID Board of Directors issue. Neither BPA nor WDOE would be involved in determining who or how many people are in or out of the district, nor how they would be assessed. BPA and WDOE have offered to assist the MVID in obtaining a sufficient and dependable level of irrigation service for all of its members (whether they remain in or leave the District). Whether or not members are allowed to leave, how many might leave, and which members might leave are issues that must be addressed by the MVID Board of Directors, as stated above.

2. The idea of a vote is an issue/process that is the responsibility of the MVID Board of Directors. The National Environmental Policy Act (NEPA) process that BPA is currently conducting is not set up for a "vote." The EA does include a range of alternatives to fulfill the stated need for action: to increase in-stream flow and improve fish passage in the Methow and Twisp rivers. We hope that you will consider whether these meet your needs, or whether you would wish to propose a combined pipe/open canal alternative as part of the comment process on the Preliminary EA. In proposing any new alternatives, please keep in mind that they should meet the water conservation goals of the project identified above.

3. As stated above in the response to the second question, regardless of the alternative, the amount of water needed to supply the MVID with an efficient system has been agreed to between the MVID and WDOE. The amount agreed to has been identified as 0.02 cfs/acre (maximum instantaneous rate) or 4 acre-feet/acre annually (or a total of about 46 cfs or 9100 acre/feet of water if all 921 ha (2,276 ac.) remain in the District).

4. Neither BPA nor WDOE can negotiate the value for the MVID's water right as suggested. We recommend that you submit this suggestion to your elected MVID representatives and attorney for consideration.

Mr. Jolley expanded further on this alternative in his second comment letter on the preliminary EA. He stated,

> Our engineer has submitted a plan which would cost less and achieve many of the benefits you desire of your plan. This plan would improve the diversion points in the Twisp and Methow Rivers, for the most part retain the gravity flow canal system, and, where needed, a permeable liner would be installed. In the reaches furthest south, if it is determined that the gravity flow system is not practical, a pressurized pipe and well field could be installed. Importantly, the District would not be down sized. All members would be serviced and all members would pay an appropriate assessment. This plan could be designed and evaluated as to increased efficiency. The amount of saved diversions would be appraised and it could then be determined if that value is sufficient to warrant the cost of the plan. If- the value is greater than the cost, that surplus could be placed in a trust account for future repairs of the new system.

The physical aspects of this proposal, providing it could meet the water requirements stated in number 3 above, are within the range of alternatives considered in this EA. The impacts of both an improved gravity flow system with improved diversions and fish screens, and a closed pressurized pipe system have been addressed in this EA (Alternatives B and A, respectively). Permeable liners, however, were not considered feasible for the reasons discussed in section 2.2.2 above. Not allowing the MVID to be downsized and determining a value for the amount of saved diversion water are addressed in responses 1 and 4 above.

2.2.4 Partial Lining Option under Alternative B

Several people who commented on the preliminary EA raised the question of why the entire canal would need to be lined (irrespective of the type of lining) under Alternative B. They suggest that just the sections that have been identified as being at high risk for failure should be relined. This would reduce the costs of Alternative B, and possibly bring them more in line with the costs for Alternative A.

Surveys of the canal system in 1994 showed that 5.3 km (3.3 mi.) of the 25-km (15.5-mi.) east canal and 5.6 km (3.5 mi.) of the 20-km (12.5-mi.) west canal have a high operational risk. However, it was noted that the overall condition of the canal and related structures is fair to poor, with most areas of the canal system requiring replacement to allow the MVID to operate a safe and efficient system (MWG, 1996). Of the 45 total km (28 total mi.) of canal, 38 km (23.6 mi.) are unlined. Therefore, lining or relining the 11 km (6.8 mi.) of canal at high operational risk would only minimally help meet the need and purposes for the project, which are to increase in-stream flows and passage conditions for fish in the Methow and Twisp rivers, and to increase the efficiency of the MVID irrigation system. It is the opinion of WDOE and BPA that a partial rehabilitation of the system would not result in the increase in efficiency needed to meet the needs and purposes of the project. Therefore, this alternative was not examined in detail in this EA.

2.3 Comparison of Alternatives

Table 2-3, pages 24-25, presents a comparison of the alternatives. Each is evaluated as it meets the objectives for the project, which were listed in section 1.3.

Table 2-3: Predicted Performance Summary (2 pages)

	Alternative A	Alternative B	Alternative C	Alternative D
Increase Fish Habitat	Would result in increased habitat area for ana-dromous and resident fish in the Methow and Twisp rivers above their confluence	Same as Alternative A, except increase would be less	Same as Alternative A	No significant change in fish habitat area
Remove Obstacles to Fish Passage	Would remove diversions on Twisp and Methow rivers that are obstacles to fish passage	Some improvements to fish passage expected from upgraded diversions, but not total removal	Same as A	Diversions would remain as fish passage obstacles
Environmental Protection:				
water conservation	Would result in net average savings of about 21 cfs; would return average of about 67 cfs to both rivers above their confluence	Same net savings as Alternative A, but would return an average of only about 26 cfs to both rivers above their confluence	Same as Alternative A	Would not result in water conservation
access to adequate water supply	Would provide access to adequate water supply for all MVID members	Same as A	Same as A	Does not provide access to adequate water supplies for all MVID members

	Alternative A	Alternative B	Alternative C	Alternative D
preserve landscape and aesthetics	**Would result in some impacts on riparian vegetation developed along canal, mitigated in part by providing in-stream flows for natural riparian areas along rivers**	**Same as A**	**Same as A**	**Preserves existing riparian vegetation along canal, although some tree removal likely to result from prudent maintenance practices**
Cost and Administrative Efficiency	**Estimated implementation cost of $4.7 million within range of available funds** **Estimated total annual MVID O&M cost of $104,000 (plus individual well or LID costs shifted to members leaving the district)**	**Estimated implementation cost of $11.9 million far exceeds available funds** **Estimated total annual MVID O&M cost of $123~~3~~7,000 (plus individual well or LID costs shifted to members leaving the district)**	**Estimated implementation cost of $2.7 million well within range of available funds** **Estimated total annual MVID O&M cost of $0 (all costs shift to individuals or LIDs)**	**Cost of repairs to 7 miles of high-risk areas estimated to be $2.4 million** **1996 total annual O&M cost of $103,000, but likely to increase due to need to fund repairs and reinstate deferred maintenance**
Compliance with Laws, Regulations, and Executive Orders	**Would be in compliance**	**Would be in compliance**	**Would be in compliance**	**Diversions and canal operations could be called into question for inefficient water practices by WDOE, as well as under the Endangered Species Act, due to impacts on bull trout and steelhead.**

This page intentionally left blank.

CHAPTER 3: ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

The discussions in Chapter 3 below are divided into sections for each environmental resource potentially affected by the proposed project. Each section describes the existing environment, then identifies specific impacts of each of the four alternatives.

Table 3-1, pages 27 - 32, presents a summary of the impacts discussed in Chapter 3 for each resource, by alternative.

3.1 Water Quantity and Quality

3.1.1 Existing Environment

The Methow Valley, located in the north-central portion of Washington, drains approximately 4590 square km (1,772 square mi.) of the eastern slopes of the Cascade Range. The valley's primary river system, the Methow River, joins with the Columbia River at Pateros, Washington. The Twisp River is a primary tributary to the Methow River; their **confluence** is at the town of Twisp. (See Figure 3-1.)

Ice Age glaciation greatly influenced the water resources of the Methow Valley. The glaciers originally carved U-shaped valleys into the mountains' basalt core. As the continental ice sheet that once covered the area receded, however, deposits of **glacial till** and outwash filled the valleys, providing a broad, shallow alluvial aquifer: a geological formation that receives, holds, and releases water. This aquifer is very permeable, allowing water to flow down the valley both underground as groundwater and in the rivers and streams as surface water. The water flows relatively freely between the underground aquifer and the Methow River and its tributaries because the glacial till and outwash are so porous. Under these conditions, the groundwater in the shallow alluvial aquifer and the surface water in the rivers and streams are described as being *in hydraulic continuity* with each other. This hydrologic connection is central to the discussion below.

3.1.1.1 Water Quantity

For this analysis, we describe water quantity in the study area in terms of three factors: surface water, groundwater, and irrigation demand.

Surface Water

Surface waters from the Methow and Twisp rivers are diverted to supply the MVID (see Figure 3-2). The MVID Water Supply Facility Plan (MWG, 1996) indicates that, at the MVID diversion points, enough water exists in these rivers to supply the MVID with its historic **mean** diversion rate of approximately 66.8 cfs.

Table 3-1: Environmental Analysis Summary

	ALTERNATIVE A (Proposed action)	ALTERNATIVE B (Partial Upgrade)	ALTERNATIVE C (Dissolution of MVID)	ALTERNATIVE D (No action)
Water quantity	Water use reduced from 67+ to about 46 cfs, providing more water to be left in-stream, especially on the Methow and Twisp rivers above their confluence. Potential impacts on most groundwater and existing wells would be mitigated through WDOE regulation of well locations.	Water use reduced from 67+ to about 46 cfs, providing more water to be left in-stream, although not as much as under Alternative A, due to continuing diversions on the Methow and Twisp rivers above their confluence. Potential impacts on groundwater and existing wells would be less than under Alt. A, and would be mostly mitigated through WDOE regulation of well locations.	Water use, benefits and impacts similar to Alt. A.	67 cfs diverted from Twisp and Methow Rivers upstream of their confluence. Irrigation water not available to some areas of existing MVID. No potential impacts on groundwater or existing wells, as no changes are proposed.
Water quality	Construction - Potential impact in and around rivers and streams, mitigated through conditions in permits. O&M - improved water temperatures due to more water being left in rivers; decrease in suspended solids in irrigation water.	Construction - Potential impact in/around rivers and streams, mitigated through conditions in permits. O&M - improvements in water temperature, but not as much as under Alt. A. Some potential decrease in suspended solids in irrigation water due to canal concrete lining.	Construction - same as Alt. A. O&M - same as Alt. A.	Construction- none. O&M - impacts on water quality due to sedimentation and turbidity from yearly maintenance of Twisp River diversion. Potential for major sedimentation problems if decayed sections of canal were to fail. Diversions may be contributing to high in-stream water temperatures.

Table 3-1: Environmental Analysis Summary

	ALTERNATIVE A (Proposed action)	ALTERNATIVE B (Partial Upgrade)	ALTERNATIVE C (Dissolution of MVID)	ALTERNATIVE D (No action)
Fish	Construction - Potential impacts from sedimentation mitigated through conditions in permits. Improvement in fish passage through removal of diversions. O&M - Increases in habitat area for anadromous fish and Bull trout life stages in the Twisp and Methow rivers above their confluence.	Construction - Potential impacts from sedimentation mitigated through conditions in permits. Some improvement in fish passage through renovation of diversions, although not as much as under Alt. A. O&M - Some increases in habitat area for most anadromous fish and Bull trout life stages in the Twisp and Methow rivers above their confluence, although less than under Alt. A.	Construction and O&M - Impacts would be very similar to Alt. A.	Construction - none. O&M - fish habitat for anadromous fish and Bull trout life stages would continue to be affected due to diversions in the Twisp and Methow rivers above their confluence, and to fish passage problems at the diversions. In-stream habitat area would continue to be diminished by amount of water diverted. Annual reconstruction of diversion structure in Twisp River would continue to displace fish and affect fish habitat area and passage conditions.
Soils	Potential erosion impacts from construction mitigated through use of erosion prevention measures. Potential for erosion impacts from canal washouts greatly reduced.	Potential erosion impacts from construction mitigated through use of erosion prevention measures. Potential for erosion impacts from canal washouts greatly reduced from existing situation.	Impacts similar to Alt. A.	Continued risk of major erosion due to potential for canal failure.
Vegetation	Visual impacts resulting from changes in vegetation	Visual impacts similar to Alt. A.	Visual impacts similar to Alt. A.	Visual and vegetation impacts would not occur except where

Table 3-1: Environmental Analysis Summary

	ALTERNATIVE A (Proposed action)	ALTERNATIVE B (Partial Upgrade)	ALTERNATIVE C (Dissolution of MVID)	ALTERNATIVE D (No action)
	along canal. Minor potential for impacts on -wetlands mitigated through careful facility siting and conditions in permits. Impacts on about 33 ac. of riparian vegetation from elimination of water from canal seepage; potentially mitigated through landowners providing irrigation and through improvements to natural riparian areas along the Twisp and Methow rivers above their confluence. Potential for weed problems resulting from construction controlled through weed control program.	Potential for impacts on -wetlands less than Alt. A, because fewer new facilities would be needed. Impacts on about 30 ac. of riparian vegetation from major reduction in water from canal seepage; potentially mitigated through landowners providing irrigation and through some improvements to natural riparian areas along the Twisp and Methow rivers above their confluence. Potential for weed problems similar to those for Alt. A. Open-canal operation could disperse weeds through water.	Potential for impacts on -wetlands less than Alt. A, because fewer new facilities would be needed. Impacts on riparian vegetation similar to Alt. A. Potential for weed problems similar to those for Alt. A.	prudent maintenance practices would require removal of trees and larger shrubs that could threaten the canal integrity. Little or no impacts on -wetlands. Open-canal operation could disperse weeds through water. Little or no potential weed problems resulting from construction, however.
Wildlife	Impacts from construction, loss of access to open water	Impacts from construction and loss of riparian habitat	Impacts similar to those of Alt. A.	Prudent maintenance practices would require removal of trees

Table 3-1: Environmental Analysis Summary

	ALTERNATIVE A (Proposed action)	ALTERNATIVE B (Partial Upgrade)	ALTERNATIVE C (Dissolution of MVID)	ALTERNATIVE D (No action)
	in canal and reduction in riparian habitat now supported by canal seepage; partially offset by increased in-stream flows benefiting natural riparian habitat along both rivers above their confluence, and maintenance of vegetation by landowners electing to do so. Negligible impact on endangered or threatened species, ex. possible dis-placement of bald eagle perching.	currently supported by canal seepage; would be slightly less than under Alt. A, partially offset by increased in-stream flows benefiting natural riparian vegetation along the two rivers above their confluence. Access to open water preserved. Endangered or threatened species impacts similar to Alt. A.		and larger shrubs that could threaten the canal integrity, resulting in very minor impacts.
Socio-economics/ Land Use	Construction - Minor land use changes for new wells or well fields and associated facilities. WDOE and BPA cover all costs; no local economic impacts.	Construction - No land use changes due to new facilities. Only a portion of costs covered by BPA; questionable funding from WDOE; no identified source of additional funding.	Construction - No land use changes due to new facilities. Costs covered by WDOE and BPA, so no local impacts.	Construction - No land use changes due to new facilities. Costs of any necessary repairs would not be covered by WDOE or BPA; MVID members would likely need to cover. *[continued]*
Socio-economics/ Land use	O&M - Smaller MVID, resulting in potential loss of some irrigation district benefits.	O&M - Smaller MVID (but larger than Alt. A), resulting in potential loss of some irrigation district	O&M - MVID dissolved, resulting in potential loss of irrigation district benefits. Annual MVID O&M costs	O&M - MVID assumed to remain the same size, but not all members currently being served. Economic impacts on those who

Table 3-1: Environmental Analysis Summary

	ALTERNATIVE A (Proposed action)	ALTERNATIVE B (Partial Upgrade)	ALTERNATIVE C (Dissolution of MVID)	ALTERNATIVE D (No action)
(con't)	Annual MVID O&M costs estimated to be $104,000 (some costs would be shifted to individuals who leave or new LIDs). Compensation would benefit on a per-acre basis those who elect to leave the district. Benefit to property values for those who would obtain more reliable source of irrigation water. Detriment for those who value aesthetic benefit of canal. Some benefit to future growth and development through deposit of saved water into State Water Rights Trust. Could result in future growth-induced impacts.	benefits. Annual MVID O&M costs estimated to be $127,000 (some costs would be shifted to individuals/new LIDs). Compensation option would benefit on a per-acre basis all who elect to leave the district; direct payment option would benefit only those who needed new wells or equipment. Benefit to property values for those who would obtain more reliable source of irrigation water. Benefit for those who value aesthetic benefit of canal. Growth and development benefits and impacts similar to Alt. A.	estimated to be $0 (all costs would be shifted to individuals/new LIDs). Compensation would benefit on a per-acre basis all former MVID members. Benefit to property values for those who would obtain more reliable source of irrigation water. Detriment for those who value aesthetic benefit of canal. Growth and development benefits and impacts similar to Alt. A.	pay assessments but don't currently receive water. Annual MVID O&M costs $103,000 for 1996, but may need to be increased due to deferred maintenance. No compensation to individuals leaving MVID. Potential system-failure economic impacts. Potential property value impact due to uncertainties regarding water availability and possible liabilities from system failure. Benefit to those who value aesthetic benefit of canal. No benefits to or impacts on future growth and development.
Cultural Resources	Potential construction impacts on historic canal, archaeological sites, and/or traditional use sites,	Similar to Alt. A.	Similar to Alt. A, although potential for impacts on archaeological and/or traditional use sites would	Some potential for impacts due to canal repair and maintenance activities, with less potential for possible mitigation.

Table 3-1: Environmental Analysis Summary

	ALTERNATIVE A (Proposed action)	ALTERNATIVE B (Partial Upgrade)	ALTERNATIVE C (Dissolution of MVID)	ALTERNATIVE D (No action)
	mitigated through pre-construction surveys, careful siting of new facilities, and consultation with SHPO and Tribes. Potential benefit to Tribal and other anglers if fish numbers were to increase as a result of the project.		be lower due to lack of construction impacts for new facilities except individual wells.	No potential benefit to Tribal and other anglers.
Safety and Liability	Greatly reduces liability from potential for canal failure and drowning safety issue.	Greatly reduces liability from potential for canal failure. Does not eliminate drowning safety issue.	Same as Alt. A	Continues existing liabilities and safety issues.

The MVID delivers water via two main canals on the east and west sides of the valley. (See Figure 3-3.)

- The **east canal** diverts, on average, about 41 cfs from the Methow River about 3 km (5 mi.) north of Twisp, at river mile (RM) 44.8 (MWG, 1996, page 15); it rejoins the river at RM 26.6 (MWG, 1996, page 15).

  RM 44.8 is at about the midpoint between two US Geological Survey (USGS) gauging stations located at RM 40.0 and RM 49.8. September irrigation diversions are the highest, compared to river flows. If the mean September flows at these two gauging stations are used, and the change in flow prorated over the distance between the stations, a river flow of about 301 cfs is calculated at the diversion to the east canal (calculated from MWG, 1996, page 3-2). The average September east canal diversion of 39.3 cfs is about 13 percent of the mean September flow in the Methow River at that point.

- The **west canal** diverts, on average, about 26 cfs of water (MWG, 1966, page 15) from the Twisp River at RM 3.9, or 3.9 miles above its confluence with the Methow River near the town of Twisp (MWG, 1996). The west canal rejoins the Methow River at RM 28.9, upstream of Carlton.

  The point at which the west canal diverts water is about 3.7 km (2.3 mi.) upstream of the USGS gauging station located at RM 1.6 on the Twisp River. The mean river flow at the gauging station during the month of September is 54 cfs. The average September diversion amount of 24.6 cfs is approximately 46 percent of the mean September flow in the Twisp River at that point.

Although surface water diversions provide enough water, substantial portions of the MVID do not receive dependable water supplies because the MVID conveyance and distribution facilities are inefficient and not sufficiently maintained.

Groundwater

Most of the groundwater available for irrigation is from the shallow alluvial aquifer that underlies the valley, with much smaller amounts available from the underlying basalt. The depth of the alluvial aquifer varies throughout the valley. Geological cross-sections of the valley from the Water Facility Supply Plan, drawings 11-17 (MWG, 1996), show that the aquifer is generally deepest toward the middle of the valley and under the river, but this is not always true. Some cross-sections show a U-shaped aquifer with steep sides, while at other points the valley is wider and the sides of the aquifer taper off gradually.

Although the MVID delivers surface water for irrigation, individual landowners use groundwater from privately owned wells for domestic use and/or irrigation to supplement or to replace water deliveries from the MVID. The amount of such groundwater use is unknown (MWG, 1996). Groundwater levels may also be affected as surface water is applied to fields and **percolates** back into the aquifer, and as the existing canal system leaks water back into the aquifer. These

factors make it difficult to estimate the amounts of groundwater available at any one point in the valley.

Questions were raised during scoping for this project about the contribution of canal seepage to river flows, especially during the winter. Some people believe that the canal seepage contributes substantially to winter flows in the Methow. To address this question, we used a simplified model to approximate the amount of water that seeps from the canals after diversion from the two rivers (see **Appendix E, part 1** for details). Without a complex study beyond the scope of this document, it is not possible to determine exactly where and how much of this water enters the groundwater table. However, the approximate amount of the total diversion of 67 cfs that seeps from the canals is about 51 cfs during the peak irrigation period.

That water returns to the rivers gradually, during and beyond the end of irrigation season (normally, the beginning of October). Because soils in the area are permeable, and the canals are close to the rivers, it is assumed that almost all return flows reach the river by the end of December. It is also assumed, based on historic diversion rates, that return flows are greatest in August, September, and October; and that they taper off thereafter. Because water generally follows local grades, it can be assumed that all such flows return to the Methow River *below* the confluence of the Methow and Twisp rivers.

Irrigation Demand

Currently approximately 314 ha (776 ac., or about one-third of the MVID acreage) receives irrigation water, either through canal deliveries supplied by the MVID or through private groundwater wells.

Data are available that document the amount of the river diversions that serve the MVID canal system; however, there are no accurate data about the amount of irrigation water actually delivered to MVID farms and residential properties.

The irrigation water demand in the existing MVID system as it is currently operated can be estimated several ways:

- The MVID Water Supply Facility Plan (MWG, 1996) indicates that the current actual MVID on-farm demand is about 0.017 cfs/acre, the average amount delivered at each turnout from the MVID canal system. This means that 0.017 cfs/acre reaches farmers' fields. For the 314 MVID ha (776 ac.) that are currently irrigated, this would amount to approximately 13.5 cfs. Note that this irrigation rate does not include losses from the canal system (i.e., the difference between the 13.5 cfs and the actual 66.8 cfs combined average diversions from the Twisp and Methow rivers).

- The *Washington Irrigation Guide*, the standard reference for irrigation water requirements in Washington State, indicates that, for the MVID crop mix documented in the MVID Water Supply Facility Plan (MWG, 1996), a peak flow of 0.01 cfs/acre is required (Washington Irrigation Guide, 1990). For the 314 ha (776 ac.) currently irrigated, this would amount to 7.62 cfs. This irrigation rate does not include losses from the canal or other delivery systems or from on-farm inefficiencies.

With the information above in mind, WDOE and the MVID have agreed upon an appropriate per-acre water allowance of 0.02 cfs/acre maximum instantaneous (and 4 acre-feet/acre annually) (MWG, 1996, page 26). For the 314 ha (776 ac.) in the MVID that are currently irrigated, this allowance would amount to 15.5 cfs. This rate would include irrigation system conveyance losses and on-farm inefficiencies (i.e., the 0.02 cfs/acre allowance would be measured at the diversion point or groundwater well). This flow rate would provide sufficient amounts of water to meet present crop demands, but would not allow for the present inefficiencies caused by the excessive canal system losses, or inefficient on-farm practices.

Individual landowners use groundwater from wells they have drilled to irrigate some of the MVID areas *not* currently delivered water by the MVID or not supplied water on a reliable basis, due to canal inefficiency. The total number of such wells, and the amount of irrigation water they supply, is unknown. However, it appears that more than 200 recorded domestic and irrigation wells exist in the MVID service area. The irrigation wells (about 23 of the 200 documented wells) are concentrated near the lower reaches of the east and west canals (MWG,~~omery,~~ 1996).

3.1.1.2 Water Quality

Surface Water

The *Draft Methow River Basin Plan* states that water quality in the Methow basin is affected by the discharge of municipal wastewater treatment systems, logging, grazing, land-clearing, and road-building (Methow Valley Water Pilot Planning Project Planning Committee, 1994). Both rivers are found on the 303(d) list, which identifies streams that are priorities for development of Total Maximum Daily Load [TMDL] standards. That list has been submitted for approval in the Washington 1996 State Water Quality Assessment Section 305(b) Report, prepared as a reporting requirement under the Clean Water Act. Both rivers are listed as in-stream flow- and temperature-limited, which means they do not meet the water quality standards under the Clean Water Act. Nonetheless, within the MVID area, the Methow River is classified by the State as Class A water quality (excellent); the Twisp River above Twisp is classified as AA (extraordinary).

Table 3-2 shows maximum and minimum values for three water quality measures at two monitoring sites (RM 39.4, near Twisp; RM 5, near Pateros) along the Methow River, between 1989 and 1995. Class A in-stream water quality standards, as stated in Chapter 173-201A of the Washington Administrative Code (WAC), were exceeded at the site at Twisp for pH and dissolved oxygen. Standards were exceeded for temperature and pH at the site near Pateros. Data on additional water quality measures is found in **Appendix E, part 3.**

Table 3-2: Minimum and Maximum Values for Standard Water Quality Measures

	Methow River at Twisp		Methow River near Pateros		WAC[1] Standards
Variable	**Max**	**Min**	**Max**	**Min**	
Temp(C)	15.5	0	19.8[a]	0	< 18
Oxygen (mg/L)	14.1	7.9[a]	14.7	9	> 8
pH (units)	8.8[a]	7.3[a]	9.5[a]	7.5	7.5 to 8.5

1 = Washington Administrative Code a = Value is above or below WAC standards

Source: *River and Stream Ambient Monitoring Report for Water Year 1995* (Washington Department of Ecology, December, 1996) Data on additional water quality measures is found in **Appendix E, part 3.**

Groundwater

No groundwater quality studies have been completed that address the study area. Groundwater in the Methow Valley is recharged principally from rain, snowmelt, and stream run-off into the shallow alluvial aquifer that underlies the valley. Local inflow from fracture and joint zones in the adjacent bedrock may contribute a minor amount of water. Because the majority of the groundwater is heavily influenced by surface sources and is in continuity with the river, the chemical character of the groundwater in the Methow basin can be estimated by the surface water quality in the Methow River at the site near Pateros (Table 3-2 and **Appendix E, part 3**).

The groundwater in the Methow Valley has been used for drinking and irrigation for many years. We know of no contaminants in these waters that would preclude continued uses. Some of the groundwater used for irrigation in the area returns to the river systems, with no known adverse impacts. Typically, groundwater is less turbid (stirred up, muddy) than river water. Shallow groundwater is typically cooler than the summer river-water temperature, and warmer than the winter river-water temperature. Groundwater flows to the Methow River during the coldest winter months are probably minimal, because the permeable soils drain water back to the river by December, or perhaps earlier. Although no studies of the effect of groundwater returns on river-water temperature or flow have been completed in the MVID area, it is likely that any such effects are too small to be reliably measured.

3.1.2 Potential Impacts

3.1.2.1 Potential Impacts of Alternative A

Water Quantity

Construction Impacts. Under Alternative A, the existing diversion structures, intakes, and fish-screen structures would be removed and new groundwater wells drilled near the Twisp and Methow rivers to serve a new groundwater piped irrigation system. In addition, current MVID members no longer served by the MVID system could leave the MVID and either use existing (upgraded) wells or drill their own new groundwater irrigation wells, or form LIDs to provide piped groundwater to serve their irrigation needs.

Although the demolition of the diversion, intake, and fish-screen structures would occur in and next to the two rivers, and new wells would be drilled into the groundwater, there would be no direct impact on either surface or groundwater quantity. Impacts resulting from the *use* of the groundwater are discussed below.

Operation and Maintenance Impacts. About 376 ha (930 ac.) of agricultural land would remain in the district; these lands would be irrigated from wells and piped distribution systems (for irrigated acreage and water use by alternative, see **Table E-2, in part 3** of **Appendix E**). The remaining 545 ha (1,346 ac.) would be irrigated from private or community wells not controlled by MVID. All new wells would need to be located so as to withdraw water from the shallow alluvial aquifer, and therefore would be in direct hydraulic continuity with the river water.

The maximum allowable instantaneous groundwater withdrawal rate authorized for the system would be 0.02 cfs/ac., with an allowance of 4 acre-feet/acre per year (MWG, 1996). Thus, a total of about 45.5 cfs would be withdrawn from the shallow groundwater aquifer to irrigate the full 921 ha (2,276 ac.) within the current MVID service area. No allowance for conveyance is included (it is assumed that the piped groundwater systems would be without leaks). With proper management, the maximum instantaneous water allowance of 0.02 cfs per ac. would be sufficient to meet the crop needs, any on-farm application inefficiencies, and any landowners' irrigation of vegetation previously fed by canal leakage.

This alternative would be expected to have overall positive effects on surface water quantity and on the groundwater aquifer, because overall river diversions and groundwater extraction would be reduced by at least 32 percent, from more than 66.8 cfs (known river diversions plus some additional unknown amount of groundwater use), to 45.5 cfs.

Surface Water Impacts. In-stream flow increases would occur on the Methow and Twisp rivers, generally above their confluence.

- For the **Methow River**, the reach between the present east canal diversion and a point about 1.6 km (1 mi.) below the confluence with the Twisp River (a total of 8 km

(5 mi.)), where a groundwater well field would be constructed, mean peak river diversions would drop from 40.8 cfs (current peak diversion) to 0 cfs.

- On the **Twisp River**, the reach between the present west canal diversion and a point just above the confluence near Alder Creek Road (about 6.5 km (4 mi.)), where a groundwater well field would be constructed, mean peak river diversions would drop from 26.1 cfs to 0 cfs.

These respective reductions would return water to those reaches of the two rivers, making it available for fish and other in-stream values.

Downstream of the confluence, there would also be an in-stream flow benefit; however, it would not be as great as that above the confluence.

- Pumping from the well fields located near the confluence (a peak amount of 3.1 cfs for the well field serving the upper west side piped groundwater system, and 8.8 cfs for the piped groundwater system on the east side) would reduce river flows in the well fields' immediate vicinity. These reductions in river flow would be much less than those currently occurring at the diversions because the overall amount of water required would be much less, and because the withdrawals would be spread over the two well fields separated by approximately 1.6 km (1 mi.). Figure 2-1 shows the well field locations.

- A third well field serving the lower west side would withdraw a peak amount of 6.7 cfs from the Methow River about 1.6 km (1 mi.) below Alder Creek.

Mean peak diversions below the confluence would be reduced as follows:

- from a total of 66.8 cfs to 11.9 cfs for the reach of the Methow River from the east side well field (just below the confluence) to the lower west side well field below Alder Creek.; and

- and from a total of 66.8 cfs to 18.6 cfs for the reach of the Methow River from the lower west side well field to the end of the MVID system.

However, other factors also influence the amount of flow that would be returned to the Methow River below the confluence. These include leakage from the canal, and the extent and destination of groundwater return flows from irrigated fields. Currently, under existing (No Action) conditions, canal leakage and surface and groundwater return flows from irrigated lands located below the confluence return water to the Methow River below the confluence. The return flows currently return some amount of the 66.8 cfs diverted from the Twisp and Methow rivers to the Methow River below the confluence. However, the *location* of these return flows, and the *proportion* that returns as surface water leaks and seeps versus groundwater, cannot be determined without extensive analysis of existing canal leakage, aquifer characteristics, and irrigation patterns. Because we cannot quantify the amount and location of return flows to the Methow River below the confluence in the No Action alternative, we have quantified the benefits of Alternative A only for the Twisp and Methow rivers above their confluence.

Impacts from Development of Groundwater Supplies. Hong West (Hong West, 1997) reports that groundwater sources could probably be developed to meet the irrigation needs of the entire MVID service area (921 ha or 2,276 ac.). Hong West's Table 4 shows that the minimum "Estimated Reasonable Potential Yield" for the entire area would be 49.1 cfs. This is enough to meet the entire service area peak demand of 45.5 cfs, as calculated above (@ 0.02 cfs/ac.).

However, the Hong West's well logs and the hydrogeologic cross-sections clearly indicate certain conclusions regarding well development and impacts:

- The only locations able to produce the sustained high yields necessary to supply the three groundwater well fields for the reorganized MVID are those right next to the rivers, where direct hydraulic continuity is likely to exist.
- Withdrawal of substantial quantities of water (on the order of 10 cfs) would have local impacts on the groundwater levels in existing wells, and/or on river flows.
- In addition, the groundwater levels would be depressed during the peak demand periods (summer irrigation months) and would be recharged over the non-irrigation season.
- Any nearby wells (new or existing) would probably be influenced by high rates of groundwater pumping.
- In general, any new wells of comparable size, located farther from the river, would experience greater drawdowns and would have more significant negative influences on adjacent wells than would wells drilled nearer the river.

Therefore, the three major well fields to support the MVID pumped groundwater system are proposed for location near the rivers. Note that even if the wells were drilled in areas in hydraulic continuity with the river, groundwater levels would be drawn down, and existing wells could, in theory, be affected in some cases.

However, WDOE would *not* authorize water rights for new wells if they would impair authorized uses of existing wells. The agency might require pumping tests and/or additional test and monitoring wells to assure that new wells were not located where they could impair existing wells. WDOE's regulatory role would limit impacts on existing wells both from wells drilled by the MVID to serve the MVID pumped groundwater system or from wells drilled by individuals and LIDs to serve areas no longer in the MVID.

Under this alternative, some new groundwater wells would also be drilled (by individuals or LIDs) to serve parcels no longer served by the MVID. These wells could potentially affect existing nearby wells, especially if they were drilled into the upslope margins of the aquifer instead of closer to the rivers. In general, the farther the wells are from the river, the longer it could take for recharge to occur and the greater the drawdown of groundwater levels that could affect nearby wells. However, as stated above, WDOE would not authorize new wells that would impair existing authorized uses.

Impacts of Canal Dewatering on Wells. The Hong West hydrogeologic cross-sections (Hong West, 1996) show that water levels in wells located in the upslope margins of the alluvial aquifer are significantly higher than the river level. These wells are replenished primarily from groundwater in upslope watersheds (winter precipitation), *not* from the rivers. Very shallow wells (less than 15 m or 50 ft. deep) that are improperly surface-sealed and located in the immediate vicinity of the canals would most likely be affected if the source of local recharge water (canal seepage) were eliminated. Loss of canal seepage would likely have very little impact on *properly constructed* existing wells in these upslope areas, because such wells are deep enough to tap the alluvial aquifer.

Transfer of Water Right Points-of-Diversion. WDOE could authorize the transfer of the existing MVID surface water right points-of-diversion to groundwater points-of-withdrawal under this alternative under the following conditions: *if* it can be demonstrated that

- the groundwater well was tapping the alluvial aquifer in hydraulic continuity with the rivers,
- it would not impair existing rights, and
- it would meet the conservation/in-stream flow goals of the project.

It is anticipated that most wells within the MVID could meet these requirements without any difficulty. The permit process would involve a WDOE review of each well on a case-by-case basis to insure that the conditions would be met. Hydrogeologic investigations might be needed in some cases to size and locate the new wells so that there would be no impairment of existing permitted wells. If a landowner were not able to access the alluvial aquifer with an adequate well on his or her own property, WDOE could authorize the use of water from a new or existing well on another landowner's property, or through a common source developed by a LID. WDOE would not authorize water rights for new wells if they would impair authorized uses of existing wells. WDOE's regulatory role would therefore limit impacts on existing authorized wells from wells drilled by individuals or LIDs.

Canal Seepage Contribution to Groundwater. The issue of the effects of eliminating canal-seepage contributions on groundwater levels was raised during scoping. If one compares historic MVID diversions from the Methow and Twisp rivers to the amount of water needed for crop irrigation (see **Appendix E, part 2**, for detailed information on the comparison) it becomes evident that the losses are distributed over a relatively large area (45 km or 28 mi. of canal), with an average loss of between 0.8 and 2.4 cfs per mile. The loss of any canal contribution to the total groundwater supply at any one location along the canal would be *very* small in relation to the amount of groundwater returns from irrigation under Alternative A, and even less significant when compared to the naturally occurring subsurface flows through the aquifer.

Water Quality

Construction Impacts. In-stream construction work associated with the diversion and intake structures and fish-screen removal, as well as construction of the water storage tanks and pipeline, could in the short term increase sedimentation and the potential for diesel-fuel and oil spills from construction equipment. River-bottom sediments would be disturbed and become

suspended while equipment is operating in the river or streams at the existing points of diversion or at stream crossings.

However, the potential for major adverse impacts is minimal, because all construction would have to comply with the requirements of a Hydraulic Project Approval (HPA) permit, issued by WDFW, and a water quality permit, issued by WDOE. The conditions specified by these permits, which would likely include an erosion control plan and a Spill Prevention Containment and Countermeasures (SPCC) plan, would minimize the potential for impacts on surface and ground water quality. This construction would occur only once, and would eliminate in-stream activities that affect the stream on an annual basis, such as the berm construction at the Twisp River diversion.

Operation and Maintenance Impacts. This alternative is expected to enhance the water quality of both the rivers and the irrigation water. Eliminating diversions into the canal system would leave more water in the Twisp and Methow rivers, would lower river water temperature during summer months (as noted above in Table 3-2, water temperature standards have been exceeded on occasion on the Methow River at Pateros, below the MVID area), and would eliminate annual in-stream construction activities. With irrigation water flowing through a pipe instead of an earthen channel, no suspended solids would be scoured from the channel bottom to affect irrigation water quality. Although it is unlikely, water pumped from shallow wells could suffer turbidity problems that might occur during periods of high surface-water runoff.

3.1.2.2 Potential Impacts of Alternative B

Water Quantity

Construction Impacts. Under Alternative B, the existing diversion and intake structures and fish screens would be rehabilitated and upgraded to help correct fish passage problems. Selected sections of the existing canal system would be reconstructed and lined with concrete to reduce conveyance losses. (For a discussion of alternative lining methods, see **Appendix C**.) Landowners not served by the canal would drill new groundwater wells near the Twisp and Methow rivers to provide their own irrigation water, or would form LIDs to drill groundwater wells and pipe irrigation water to parcels more distant from the rivers. Although construction would occur in and next to the two rivers, and the new wells would be drilled into the groundwater, there would be no negative impact on either surface or groundwater quantity.

Operation and Maintenance Impacts. This alternative is expected to have positive effects on the surface waters and groundwater aquifer, although not to the same extent as under Alternative A (for irrigated acreage and water use by alternative, see **part 3 of Appendix E**). Overall river diversions and groundwater extraction would be reduced about 32 percent, from more than 66.8 cfs to 45.5 cfs, the same as Alternative A. However, 26 cfs would still be directly diverted from the original diversion points on the Methow and Twisp rivers.

Surface Water Impacts. Diversions would be reduced as follows:

- on the Methow River above the confluence of the Twisp and Methow rivers: from 40.8 cfs to 13.7 cfs; and
- from the Twisp River above the confluence: from 26.1 cfs to 11.8 cfs.

As under Alternative A, there would also be increased flows in the Methow River below the confluence of the Twisp and Methow rivers. These benefits would be less than those under Alternative A (because more water would be diverted higher up in the Methow River system). In-stream flow benefits below the confluence have not been quantified, for the same reasons described for Alternative A.

Impacts from Development of Groundwater Supplies. Concerns described under Alternative A about the potential impact of new groundwater wells on existing wells would also be true for this alternative. However, a smaller proportion of the total MVID area would be served by groundwater wells under this alternative. To avoid impacts, WDOE would authorize the transfer of surface water right points-of-diversion to groundwater points-of-withdrawal *only* if new wells would not impair authorized uses and would be in hydraulic continuity with the river aquifer.

Impacts of Canal Dewatering on Wells. Canal seepage would be curtailed under Alternative B by lining the canal with concrete. Alternative B would likely have very little impact on properly constructed existing wells in the vicinity of the canal. It would have the potential to dewater shallow, improperly surface-sealed wells located immediately downslope of the canal, as under Alternative A.

Transfer of Water Right Points-of-Diversion. WDOE could authorize the transfer of the existing MVID surface water right points-of-diversion to new groundwater points-of-withdrawal for individuals no longer within the MVID under this alternative *if* several conditions were met. The groundwater wells must tap the alluvial aquifer in hydraulic continuity with the rivers. As under Alternative A, the water right transfers would be handled on a case-by-case basis, and would be authorized only if there were a valid right to change, and the use of adjacent permitted wells would not be impaired. In addition, sufficient in-stream flow benefits, operational efficiencies, and fish passage improvements would need to be gained, and agreement must be reached between WDFW and YIN fisheries managers regarding their adequacy.

Canal Seepage Contribution to Groundwater. As under Alternative A, the loss of any canal contribution to the total groundwater supply would be very small at any one point along the canal in relation to the amount of groundwater returns from irrigation and the natural flows through the aquifer under Alternative B.

Water Quality

Construction Impacts. Impacts from Alternative B would be similar to those under Alternative A.

Operation and Maintenance Impacts. Under this alternative, water quality is expected to be enhanced, although not as much as under Alternative A. The water quality (particularly temperature) of the Methow and Twisp rivers should improve because less water would be diverted from the rivers; however, because some water (26 cfs) would still be diverted, and from higher up on the two rivers than under Alternative A, water quality improvements would not be as great as those under Alternative A.

3.1.2.3 Potential Impacts of Alternative C

Water Quantity

Construction Impacts. Under this alternative, there would be no construction of new MVID facilities. Landowners would drill new groundwater wells to provide themselves irrigation water; would use existing or upgraded wells; or, in situations where the alluvial aquifer cannot be accessed directly, they would create LIDs to drill wells and pipe the irrigation water to these parcels. The construction of new wells is not expected to negatively affect surface or groundwater.

Operation and Maintenance Impacts. Impacts would be similar in nature to those described for Alternative A. The entire MVID area would be served by groundwater pumping from individual wells or LIDs. As with Alternative A, all wells would need to be located so as to withdraw water from the shallow alluvial aquifer, and would therefore be in direct hydraulic continuity with the river water.

Overall water use would be reduced by at least 32 percent, the same as for Alternatives A and B. (For irrigated acreage and water use by alternative, see **part 3 of Appendix E.**) However, as with Alternative A, there would be no direct diversions of water from the rivers. Diversions would be reduced as follows:

- on the Methow River above the confluence of the Twisp and Methow rivers: from 40.8 cfs to zero; and
- from the Twisp River above the confluence: from 26.1 cfs to zero.

As under Alternative A, there would also be increased flows in the Methow River below the confluence of the Twisp and Methow rivers; however, these benefits have not been quantified, for the same reasons described for Alternative A.

Impacts from the development of groundwater supplies would be similar to those of Alternative A. However, the groundwater wells would be more numerous and dispersed, and the three major well fields would not be developed. WDOE would not authorize water rights for new wells if they would impair authorized uses of existing wells, and the agency might require pumping tests and/or additional test and monitoring wells to assure that new wells were not located where they could impair existing wells. WDOE's regulatory role would limit impacts on existing wells from wells drilled by individuals or LIDs.

The potential impacts of canal dewatering on wells, transfer of water right issues, and canal seepage contribution to groundwater issues would be the same as under Alternative A.

Water Quality

Construction Impacts. The potential for construction-related water quality impacts from removal of diversions and fish screens would be essentially the same as those under Alternative A.

Operation and Maintenance Impacts. Operations and maintenance-related impacts to water quality would essentially be the same as those under Alternative A.

3.1.2.4 Potential Impacts of Alternative D

Water Quantity

Construction Impacts. There would be no new construction in the No Action alternative; however, repairs are needed as soon as possible for approximately 11.3 km (7 mi.) of canal identified as "high risk." This repair work would not directly affect surface or groundwater quantity.

Operation and Maintenance Impacts. Diversions currently average 66.8 cfs during each irrigation season. (For irrigated acreage and water use by alternative, see **Table E-2**, in **part 3 of Appendix E.**) Under this alternative, a large amount of water would continue to be diverted from the rivers to irrigate a relatively small area of land. The inefficiencies associated with the current irrigation facilities would continue, and areas of the MVID that are not currently served by the canal system would continue not to be served.

Water Quality

Construction Impacts. Repairs to the high-risk areas of the canals could cause water quality impacts if not properly conducted. If repair of the most seriously decayed or damaged sections of the existing canal system were *not* to occur, the potential for catastrophic damage or failure (with attendant impacts on water quality) would continue to exist.

Operation and Maintenance Impacts. The current practice of using a bulldozer to push up the berm on the Twisp River, with its resulting adverse impacts of sedimentation and turbidity, would continue. Also, it is likely that the diversions of water from the rivers would continue to increase summer river water temperatures in the stretches of the river below the diversion points (although water temperature data are not available to confirm this).

3.2 Fish

3.2.1 Existing Environment

Salmon populations throughout the Northwest have declined over the last century. Populations of several species have reached critical levels, and there is much concern over the dwindling

numbers of naturally produced fish. The number of anadromous fish (those that spend adult life in marine or estuarine water and migrate to **spawn** in fresh water) returning to the Columbia River system from the Pacific Ocean has declined dramatically in the last 150 years.

Pacific salmon have disappeared from about 40 percent of their historical breeding ranges in the Pacific Northwest, and many remaining populations are severely **depressed** (that is, their reproduction is substantially lower than would be expected based on natural variation and available habitat, but above the level where permanent damage is likely). The decline in range can be attributed to human impacts on the environment, such as dams, forestry, agriculture, hatcheries, and overfishing, while the decline in population can be attributed both to human influences and to shifting climactic and ocean conditions.

The Methow River basin is fairly high upstream in the Columbia River system. Because of its location, the anadromous fish that use the basin are subjected to many of the above-mentioned impacts throughout the Columbia River. They are particularly affected at the dams, as they make their way up the system to spawn and as the juveniles return to the ocean.

3.2.1.1 River Habitat and Fish Species Presence in the Methow Basin

Methow and Twisp river channel characteristics and fish habitat are described in the In-stream Flow Incremental Methodology (IFIM) study conducted by WDOE (1992). (For more information on the purpose, suitability, and limitations of the IFIM study, see **Appendix E, part 4.)** The Methow River between Carlton and Twisp is about 50 m (160 ft.) wide, and has an average gradient of less than 0.5 percent. Its substrate is dominated by **cobble** and some large boulders. Habitat types mostly include **glides** and **riffles**, interspersed with some deep pools. Within the project area, the Twisp River is about 18 m (60 ft.) wide, and has an average gradient of 1.7 percent. It is mostly **cascade** and riffle habitat with no pools. Substrate is primarily cobble and boulder.

The Methow Basin provides 294 km (182 mi.) of streams used by several anadromous fish species, including chinook, sockeye, and coho salmon and steelhead trout (see Figure 3-4) (Mullan et al., 1992). Little is known about sockeye and coho salmon use of the MVID project area; however, such use appears to be minimal because of the basin's location and characteristics (such as limited rearing habitat for those species). Resident species (fish that do not migrate to the ocean) include rainbow, cutthroat/rainbow hybrid, brown, brook, and Bull trout; and mountain whitefish (Table 3-3). The species of primary concern in this portion of the basin are chinook salmon (summer and spring), summer steelhead trout, and Bull trout (USFWS, 1997; WDFW, 1996a).

Table 3-3: Anadromous and Resident Fish Species Using the MVID Project Area

Anadromous Species		Resident Species	
Common Name	**Scientific Name**	**Common Name**	**Scientific name**
Summer chinook salmon	*Oncorhynchus tshawytscha*	Rainbow trout	*O. mykiss*
Spring chinook salmon	*O. tshawytscha*	Cutthroat trout	*O. clarki*
Fall chinook salmon	*O. tshawytscha*	Eastern brook trout	*Salvelinus fontinalis*
Coho salmon	*O. kisutch*	Bull trout	*S. malma*
Summer steelhead trout	*O. mykiss*	Brown trout	*Salmo trutta*
		Mountain whitefish	*Prosopium williamsoni*
		Largescale sucker	*Catostomus macrocheilus*
		Longnose dace	*Rhinichthys cataractae*
		Redside shiner	*Richardsonius balteatus*
		Sculpin	*Cottus* sp.

3.2.1.2 Special Status Fish Species

On August 11, 1997, steelhead in the Methow and other areas were added to the Endangered Species list by the National Marine Fisheries Service (NMFS). The US Fish and Wildlife Service (USFWS) recently announced that bull trout will be listed under the Endangered Species Act, and is currently finalizing the ruling. BPA has submitted a biological assessment to NMFS regarding the impacts of the project on steelhead, and will consult with USFWS regarding impacts on bull trout when the species is listed.

The WDFW considers several of the anadromous and resident species in the Methow basin as Priority Species (Table 3-4). Because of this, the Methow and Twisp rivers within the MVID project area are designated as used by Priority Species. This means that the area requires special protective measures and management guidelines to ensure the continued existence of each species (WDFW, 1996b).

Table 3-4: WDFW-Identified Priority Species in the MVID Project Area

Common Name	Scientific Name	Washington Species Criteria*
Chinook salmon	*Oncorhynchus tshawytscha*	Vulnerable/Species of Importance
Coho salmon	*O. kisutch*	Vulnerable/Species of Importance
Sockeye salmon	*O. nerka*	Vulnerable/Species of Importance
Steelhead trout	*O. mykiss*	Species of Importance
Rainbow trout	*O. mykiss*	Species of Importance
Bull trout	*Salvelinus malma*	Vulnerable/Species of Importance

*WDFW species criteria (WDFW, 1996b) include:

Vulnerable - Species or groups of animals susceptible to significant population declines within a specific area by virtue of their inclination to aggregate, e.g., in fish spawning and rearing areas.

Species of Importance - Native and non-native fish species of recreational, commercial, or Tribal ceremonial and subsistence importance that are vulnerable to habitat loss or degradation.

3.2.1.3 Anadromous Fish

Major factors affect Methow Basin anadromous salmonids, including passage and associated mortality at nine mainstem Columbia River dams and overharvest in downstream fisheries (WDW et al., 1990; Caldwell and Catterson, 1992; Mullan et al., 1992). Once anadromous salmonids are in the basin, the factors affecting them are specific to both the species and the **life stage** of each species. The discussion below provides a brief overview of anadromous species found within the MVID project area. Figure 3-5 illustrates the life history timing of Methow and Twisp River salmonids in the project area.

Spring Chinook Salmon

Spring chinook spawn in the upper mainstem reaches of the Methow and Twisp rivers. The WDFW considers the Twisp River spring chinook stock to be depressed, based on short-term declines in spawning **escapement** (USFS, 1995). The fish use both rivers in the MVID project area, mainly for passage. However, spawning surveys conducted in the basin have identified **redds** near the diversions on both rivers, including both above and below the Twisp diversion. Spring chinook juveniles spend about one year rearing in freshwater before they **out-migrate** to

the ocean. Natural spawning escapement (returning adults produced from natural reproduction) averaged 2,024 fish between 1977 and 1985 (WDW et al., 1990).

Based on the Council's habitat-carrying-capacity model, the Methow Basin is capable of producing 826,359 smolts (WDW et al., 1990). Currently, the Winthrop National Fish Hatchery produces spring chinook annually and summer chinook as available, with an average releases of 986,187 spring chinook yearling smolts into the Methow River from 1977 to 1987 (WDW et al., 1990).

The goal in the basin is to obtain a sustainable harvest of 2,000 fish, to be shared between sport and Tribal fisheries, while maintaining genetic integrity and a balance of spawners in tributaries of the subbasin (WDW et al., 1990; Caldwell and Catterson, 1992). In-basin limiting factors for spring chinook include the following:

- intermittent flow in some reaches,
- low flows because of irrigation diversions,
- substandard diversion screens,
- winter icing, and
- habitat losses from development in riparian areas (WDW et al., 1990; Caldwell and Catterson, 1992).

Summer Chinook Salmon

Summer chinook spawn in the lower- and mid-mainstem Methow River reaches up to the Chewuck River confluence (RM 50.1); this area includes the MVID project area on the Methow River. Summer chinook are not known to spawn or rear in the Twisp River at the present time, although they have in the past. The river basin is being managed to encourage the natural production of summer chinook under current conditions (i.e., hatchery summer chinook are not released into the Twisp River). The average run size for the years of 1977 to 1985 was 1,018 fish per year (WDW et al., 1990).

Adult summer chinook migrate into the system beginning in late August, and spawn in late September through early November. Smolts emigrate in the spring, typically before diversions begin. Summer chinook juveniles spend about 3 to 4 months rearing in the Methow system before out-migrating to rear in the Columbia River impoundments (D. Bambrick, Yakama Indian Nation, pers. comm., 1997).

Winthrop National Fish Hatchery intermittently releases summer chinook into the Methow River, but hatchery fish contribution to annual run sizes is unknown. Based on the Council's habitat-carrying-capacity model, the Methow Basin is capable of producing 1,470,822 summer chinook smolts (WDW et al., 1990). Although the Methow River may be able to support this many juveniles, critical rearing areas in the Columbia River may not. This number may therefore be misleading.

The goal in the basin is to obtain a sustainable harvest of 3,000 fish, to be shared between sport and Tribal anglers while maintaining the unique characteristics of the stock (WDW et al., 1990; Caldwell and Catterson, 1992). In-basin factors limiting summer chinook production include the following:

- low stream flows because of irrigation diversions, and
- in-stream and riparian habitat losses (WDW et al., 1990; Caldwell and Catterson, 1992).

Fall Chinook Salmon

Fall chinook use a small part of the mainstem Methow River. They are not known to use any tributary streams (including the Twisp River) for spawning or rearing. Little is known about the life history of fall chinook in the Methow River, except that they migrate into the system in October, and spawn in November; smolt emigration most likely occurs in June. Documented fall chinook redds have been located only in the lower reaches of the Methow River, downstream of the MVID project area. There is currently no management plan for fall chinook in the Methow Basin because of the lack of information on their basin use (Caldwell and Catterson, 1992).

Sockeye Salmon

Sockeye salmon are known to use the Methow Basin in small numbers. Sockeye that use the Methow and Twisp river systems are somewhat different from typical sockeyes, in that they do not rely on lakes or reservoirs for spawning. Redds have been recorded up to Winthrop in the mainstem Methow River and also in the Twisp River (Caldwell and Catterson, 1992). There is minimal information about escapement or life-history information specific to the Methow River basin. Sockeye enter the system in September; and peak spawning occurs in late September and early October. **Emergence**, rearing areas, and out-migration timing are uncertain. There is currently no management plan because there is so little information about basin use (WDW et al., 1990).

Summer Steelhead Trout

Summer steelhead are present in the Methow and Twisp rivers and in most accessible tributaries in the basin. Adults begin entering the Methow system in July, and continue their migration into the system through October (Figure 3-5). During the winter, many adults return to the Columbia's warmer waters. Spawning occurs in the upper mainstem Methow River upstream of the MVID project area and in tributaries, including the Twisp River, beginning in March and continuing into early June. Juveniles rear near spawning areas in tributaries. However, many smolts also emigrate from smaller tributaries to rear in the warmer waters of the mainstem Twisp and Methow rivers (USFS, 1995).

Between 1977 and 1986, an annual average Methow Basin return (catch plus escapement) of 8,164 steelhead occurred; 200 of these were considered naturally reproduced (WDW et al., 1990; Caldwell and Catterson, 1992). Annual spawning escapement in the Methow Basin was 4,050 fish, of which an estimated 93 were naturally reproduced. Of the total Methow Basin return, Twisp River escapement between 1972 and 1992 averaged 913 fish per year, of which 79 were

naturally reproduced (USFS, 1995). The naturally reproduced component of Methow Basin runs has increased since anglers were required to catch-and-release unmarked steelhead beginning in 1987 (USFS, 1995). The average sport catch and harvest between 1977 and 1986 was 3,936.

Hatchery releases in the Methow Basin, from Wells Dam broodstock, averaged 370,664 summer steelhead smolts per year from 1981 through 1987 (WDW et at., 1990). Survival of egg-to-smolt and smolt-to-adult for naturally reared summer steelhead is unknown for the Methow Basin, but the average smolt-to-adult survival of hatchery steelhead is 2.1 percent. The Council's habitat-carrying-capacity model estimates that the Methow Basin is capable of producing 169,610 summer steelhead smolts (WDW et al., 1990). The WDFW Salmon and Steelhead Stock Inventory states that the wild Methow River summer steelhead stock is depressed, based on chronically low spawning-escapement counts (USFS, 1995).

The basin's steelhead management goal is to rebuild natural runs and maintain genetic integrity, while allowing a harvest of 10,000 hatchery steelhead for sport and Tribal anglers (WDW et al., 1990; Caldwell and Catterson, 1992). The after-harvest target escapement is 3,200 natural fish (Caldwell and Catterson, 1992). In-basin factors limiting summer steelhead production include the following:

- mortalities from winter icing,
- spring runoff flooding,
- lack of in-stream winter cover, and
- inefficient screen systems at diversion points.

3.2.1.4 Resident Fish

The Methow and Twisp rivers support a significant recreational fishery for rainbow, brown, and brook trout. The Twisp River drainage is the most extensively used area for recreation in the MVID project area (USFS, 1995). Rainbow trout are stocked in the Methow Basin to help support the recreational fishery. Brook trout were introduced into the Methow Basin in the early 1900s. Brook trout is a **char** similar to Bull trout, and can interbreed and hybridize extensively.

Cutthroat, Bull, and brook trout appear to have similar temperature preferences; are found primarily in the cooler upper reaches of the Twisp River; and are probably not found in the MVID portion of the lower Twisp River (USFS, 1995). These trout species are also found primarily in the upper Methow River and tributaries; however, some Bull trout and brook trout have been documented in the MVID portion of the Methow River (D. Bambrick, Yakama Indian Nation, pers. comm., 1997). Rainbow trout are found throughout the MVID project area in the Methow and Twisp rivers. Cutthroat and rainbow trout are spring spawners (April through early May), but cutthroat trout emergence is typically later than that for rainbow trout because cutthroat prefer cooler water temperatures. Bull trout and whitefish typically spawn in the fall months, and develop over the winter months. Ice kills many developing Bull trout and other salmonid species (USFS, 1995).

Two areas of the Methow River have been identified as critical spawning areas for resident fish species: near the confluence with Beaver Creek and near the confluence with the Twisp River (WDFW, 1996a). The MVID portion of the Twisp River has also been identified as a critical spawning area for resident species (WDFW, 1996a). Critical spawning areas are designated as Priority Habitat, and are priority areas for management and preservation because of their significant value and contribution to the continued existence of fish species (including Priority Species).

Non-salmonid species are present in the MVID project area and include whitefish, dace, shiners, suckers, and sculpins. However, the distribution and status of these species have not been documented, except incidentally.

3.2.2 Potential Impacts

3.2.2.1 Potential Impacts of Alternative A

Alternative A proposes to provide water to the users in the MVID through a low-pressure pipe system and groundwater wells. The in-stream diversions and fish screens for both canals would be removed, and the canals would no longer be used to convey water. The following sections address the potential resulting impacts on the fish in the Methow and Twisp rivers.

Construction Impacts

Removal of Fish Screen and Diversion Facilities. Alternative A calls for the removal of the diversion and fish-screening facilities at the east canal and west canal diversion points**.** Removal would require in-stream construction work that could potentially increase sedimentation to the project rivers in the short term, and create the potential for spilling hazardous materials (e.g., gasoline and oil) from construction equipment. A Hydraulic Project Approval (HPA) permit, issued by WDFW, and a water quality permit, issued by WDOE, would be required to carry out the in-stream work. These permits would specify conditions needed to minimize potential impacts on water quality and aquatic resources. Such measures would likely include identifying timing windows for in-stream work, an erosion control plan, and an SPCC plan.

Removing the in-stream diversion would improve upstream fish passage past both canals' intakes. The diversions currently span most of the river widths, and most likely cause some delay in upstream migration. This delay is particular a problem for spring chinook, because the adults need to have access to deeper holes in the upper watersheds, where they hold before spawning. Temperatures and habitat features *below* the diversions are probably not suitable for spring chinook holding areas, given the number of spring chinook that need to access the upper Twisp and Methow rivers.

Groundwater Wells. Under this alternative, the MVID would construct three groundwater well fields in locations very close to the rivers. In addition, MVID members who do not receive irrigation water through the pipe system could leave the MVID and use groundwater wells for irrigation. Locations of any new wells would be subject to review and approval by the WDOE

and Okanogan County (under the Shorelines and Critical Areas Ordinance) to assure compliance with applicable environmental laws and regulations. Therefore, it is unlikely that construction of these wells would affect fisheries habitat.

Operation Impacts

In-stream Fish Habitat Analysis Methodology. The IFIM study conducted by Caldwell and Catterson (1992) in the Methow River Basin was reviewed by CH_2M HILL and used in this EA to evaluate changes in in-stream fish habitat under the alternatives. (For more information on the purpose, suitability, and limitations of the IFIM study, see **Appendix E, part 4.)** In-stream fish habitat is defined in terms of physical habitat as a function of streamflow. IFIM is typically applied only for the spawning and rearing portions of the life cycles of salmon, because the criteria used to define a fish's preference for certain hydraulic conditions and physical habitat, including cover and substrate, are mostly developed when fish are active and easily observed. A basic IFIM premise is that fish populations respond to changes in the environmental conditions of their habitat**.** IFIM data can help make decisions about water management. Other factors—water temperatures, harvest, downstream fish passage, and management objectives, for instance—must also be considered when assessing the overall impacts of a project flow change.

For all project alternatives, changes in in-stream fish habitat were evaluated as they relate to changes in flow for one section of the Methow River and one section of the Twisp River: the upper Methow River from the diversion point at the west canal to the confluence with the Twisp, and the Twisp River diversion point of west canal to the confluence with the Methow River. Evaluation of the effects of the project alternatives below the confluence of the Methow and Twisp rivers suggests that for Alternatives A, B, and C there would also be benefits to in-stream flow, and consequently to physical habitat. However, relationships between diversion rates, canal seepage, return flows, groundwater recharge, and groundwater-surface water continuity could not be modeled adequately to predict river flows for this section of the Methow River.

The factors evaluated for project reaches above the confluence included adult holding (areas in which adults reside before spawning occurs), spawning habitat, and juvenile rearing habitat for spring chinook salmon; spawning habitat for summer chinook; juvenile rearing for summer steelhead; and juvenile rearing for Bull trout. These were used, as applicable, for each river section. September flows were selected for evaluation because September irrigation diversions are highest in comparison to in-stream flows, presenting the greatest challenge to the fish. See **Appendix E, part 4**, for more detail, and **Table E-3** presenting September flows for the reaches used in the habitat analysis.

The results of the analysis are presented for two conditions—50-percent "**exceedance flows**" (which means normal conditions) and 90-percent exceedance flows (dry conditions). Using exceedance flows (rather than average flows) is a more meaningful way to assess impacts on aquatic resources. This is because averages often tend to mask true impacts. For example, fish survival in a particular stream may be more affected by the amount of water present during dry conditions than by the average flows. Exceedance values are computed by compiling the daily flow records for a given stream, or section of stream, over the period of record of interest. These daily flows are then ranked from highest to lowest. The 50-percent exceedance flow, or the

normal condition, is the normal flow for the entire period of record. The 90-percent exceedance flow, or the dry condition, is the flow level at which 90 percent of all the recorded daily flows are greater than (or exceed) that flow.

In-stream Fish Habitat. This section evaluates the expected fish habitat changes associated with changes in flow under Alternative A for the Methow River above the confluence and the Twisp River. As stated above, flows in the Methow River below Twisp are not expected to change substantially from No Action conditions; therefore there would not be substantial changes in fish habitat. However, the upper portion of this section of the Methow River would probably see some flow increase and therefore some benefits to fish habitat under this alternative, because groundwater return flows probably increase downstream of the confluence.

The habitat-versus-flow relationships (Weighted Usable Area or **WUA** curves) for the species/life stages were evaluated in the Methow River above Twisp and the Twisp River to provide an evaluation of habitat quality. All show habitat generally increasing with increasing flow, over the range of flows evaluated. Therefore, the percentage of habitat increase for any species/life stage is related to the increased flow resulting from the implementation of Alternative A, as well as the pre-existing flow.

Here are the results of the evaluation:

- Maximum habitat for most of these species/life stages occurs at flows above 650 cfs. The most substantial gains in habitat occur between 90 cfs and 500 cfs.

- Under normal (50-percent exceedance) flows in the Methow River above Twisp, habitat area (WUA) would increase by 10 to 13 percent for almost all of the species/life stages evaluated (Table 3-5). The exception is for spring chinook juvenile rearing, which would essentially not change. The habitat-vs-flow relationship is relatively flat at flows between 200 and 300 cfs for this species/life stage.

- Habitat in the Twisp River for four of the five species/life stages evaluated would increase by 45 to 57 percent under normal (50-percent exceedance) conditions (Table 3-5); rearing habitat for juvenile spring chinook would only increase by 10%.

- Under dry conditions (90-percent exceedance flows), habitat increases in both the Methow River above Twisp and in the Twisp River would be greater than those under 50-percent exceedance flows (Table 3-6). This difference is due primarily to the relatively large percentage increase in flows under Alternative A, as well as the relatively low flows in both rivers under No Action. Dry-condition flows for September under No Action conditions are only about 150 cfs in the Methow above Twisp and 24 cfs in the Twisp.

Table 3-5: Comparison of In-stream Habitat (WUA) between No Action Conditions and Alternative A Using the 50-Percent Exceedance (Normal) Flows for September

Exceedance Flow by River Reach and WUA[1] by Species/Life Stage	No Action	Alternative A	Net Change
Methow River Above Twisp			
50-percent exceedance (normal) flow (cfs)	233	272	+39
Spring Chinook			
Adult Holding	3,890	4,332	+11%
Spawning	28,624	32,446	+13%
Juvenile Rearing	20,907	20,865	0%
Summer Chinook Spawning	28,624	32446	+13%
Summer Steelhead Juvenile Rearing	20,206	22,719	+12%
Bull Trout Juvenile Rearing	48,86	53,588	+10%
Twisp River at Twisp			
50-percent exceedance (normal) flow (cfs)	55	80	+25
Spring Chinook			
Spawning	3,058	4,429	+45%
Rearing	10,369	11,417	+10%
Summer Chinook Spawning	3,058	4,429	+45%
Summer Steelhead Juvenile Rearing	4,522	6,631	+47%
Bull Trout Juvenile Rearing	16,578	26,070	+57%

Note: Habitat was not evaluated in the Methow River below Twisp because flows are estimated to be similar to No Action conditions. Please refer to the text for this discussion.

[1] WUA is defined as the amount (square feet) of habitat per 1,000 feet of stream.

- Under dry conditions in the Methow River above Twisp, habitat would increase by 16 to 25 percent for four of the five species/life stages evaluated; only spring chinook rearing habitat shows a smaller increase of 2% (Table 3-6).

- In the Twisp River, habitat increases for all species/life stages during dry conditions would be substantial, ranging between 57 and 224 percent (Table 3-6). (Again, spring chinook rearing would have the lowest increase.) These potentially substantial habitat increases can be attributed to the fact that, under dry conditions, flows in the Twisp River are very low. Even a slight absolute increase in flows would result in a substantial percentage increase in habitat.

Special Status Species. All of the species evaluated above are either under review for listing under the Endangered Species Act or listed by WDFW as priority species.

Temperature. One of the concerns about carrying out any of the project alternatives is that changes in streamflows and irrigation diversions might change the groundwater return flows to the Methow and Twisp rivers, particularly during the winter. Groundwater return might affect water temperature, and water temperature is an important factor in fish development and survival. In the Methow Basin, summer and spring chinook salmon; and brook, brown, and Bull trout all have eggs in the gravel through the winter. The rate at which fish eggs develop during that time is greatly influenced by temperature, among other variables. If changes in groundwater return flows (which in winter are usually warmer than stream water) were to occur, such changes could perhaps affect egg-development timing and **fry** emergence from the gravel. For example, if groundwater return flows were reduced, fry emergence might be delayed because river water is colder. Salmon fry might not have enough time to grow big enough to migrate downstream and **smoltify**, thus reducing their chance for survival.

Presently, much of the canal system leakage and irrigation water applied to fields seeps into the ground and recharges the alluvial aquifer that also feeds the river. This groundwater therefore returns to the river over some period of time. About 80 percent of the water currently diverted to the MVID canals is estimated to return to the Methow River as surface or groundwater. How fast it returns to the river is unknown, but return undoubtedly occurs for some time after the irrigation season and probably ends by December. The temperature of the groundwater return flow is about 50ºF, while Methow River midwinter temperatures approach 32ºF. Alternative A would eliminate much of the groundwater return flow during the summer and late fall. By the time the river has cooled significantly (December), the groundwater return flows have diminished (see section 3.1.1.1). Thus the implementation of Alternative A should have few or no effects on winter river temperatures, and therefore on salmon egg development.

Table 3-6: Comparison of In-stream Habitat (WUA) between No Action Conditions and Alternative A Using the 90-Percent Exceedance (dry conditions) Flows for September

Exceedance Flow by River Reach and WUA by Species/Life Stage	No Action	Alternative A	Net Change
Methow River Above Twisp			
90-percent exceedance (dry condition) flow (cfs)	157	196	+39
Spring Chinook			
Adult Holding	2,972	3,459	+16%
Spawning	19,681	24,548	+25%
Juvenile Rearing	20,466	20,887	+2%
Summer Chinook Spawning	19,681	24,548	+25%
Summer Steelhead Juvenile Rearing	14,078	17,321	+23%
Bull Trout Juvenile Rearing	27,452	43,616	+16%
Twisp River at Twisp			
90-percent exceedance (dry condition) flow (cfs)	24	49	+25
Spring Chinook			
Spawning	820	2,659	+224%
Rearing	6,277	9,828	+57%
Summer Chinook Spawning	820	2,659	+224%
Summer Steelhead Juvenile Rearing	1,610	3,993	+148%
Bull Trout Juvenile Rearing	4,770	14,310	+200%

Note: Habitat was not evacuated in the Methow River below Twisp as the Alternative flows were estimated to be about the same as No Action conditions. Please refer to the text for this discussion.

[1] WUA is defined as the amount (square feet) of habitat per 1,000 feet of stream.

Fish Habitat in the Project Irrigation Canals. Presently, the project canals dry up after irrigation season because water is no longer diverted to them. Therefore, there is no effective year-round fish habitat in the project canals. For this reason, canals are screened to keep fish out. However, because screening is inefficient, some resident and anadromous fish may occasionally get into the canals during periods of high flow. This occasional use of canal habitat by fish is considered to be detrimental because the canals are essentially isolated from the project rivers; any fish in them cannot return to the river and would be considered "lost" to the river populations. Therefore, the elimination of the canal system under Alternative A would not reduce fish populations in the project rivers.

Power Usage. Some scoping commenters have noted that Alternative A would require electricity to pump water from the groundwater wells and pressurize the pipe system. Most of the region's power production is from hydroelectric generation on the Columbia River, which has contributed to the decline of the anadromous fish populations of the Columbia Basin. Therefore, it has been argued that any increase in power use within the basin would incrementally contribute to the decline of the fishery.

However, the amount of electricity that would be used to pump groundwater in this alternative would be immeasurably small compared to the region's total electricity consumption, and would lead to a correspondingly small change in generation at the Columbia River system dams. The resulting impact on anadromous fisheries at the mainstem dams would likewise be immeasurably small. In contrast, the improvements in flows in the Methow and Twisp rivers would have direct benefits for fisheries in the project area.

3.2.2.2 Potential Impacts of Alternative B

Under Alternative B, all of the west canal and the upper reaches of the east canal would be lined with concrete to reduce seepage loss. The lower portions of the east canal would be abandoned. The fish screening facilities and diversion structures at the diversion points would be upgraded. The sections below discuss the potential related impacts on fish resources.

Construction Impacts

Improvements to Fish Screen and Diversion Structures. Improvements to the diversion structures and fish-screening facilities would require in-stream work. This work could potentially increase river sedimentation in the short term, and create the potential for spilling hazardous materials (e.g., gasoline and oil) from construction equipment. These impacts would be minimized by the requirements for an HPA issued by WDFW and a water quality permit, issued by WDOE. These permits would specify conditions needed to minimize potential impacts on water quality and aquatic resources. Such measures would likely include identifying timing windows for in-stream work, an erosion control plan, and an SPCC plan.

Potential designs for these facilities are at present unknown. However, any designs that could receive regulatory approvals would be expected to improve upstream fish passage past both the east canal and west canal diversions, and to reduce fish injury and death at fish screens.

Groundwater Wells. Under Alternative B, MVID members who do not receive irrigation water through the canal system could leave the MVID and use groundwater wells for irrigation**.** The groundwater wells would be located near but not in the Methow River, at locations to be decided by the individual landowners or LIDs**.** Locations would be subject to review and approval by the WDOE and Okanogan County to assure compliance with applicable laws and regulations. Therefore, it is unlikely that the construction of these wells would affect fisheries habitat.

Operation Impacts

In-stream Fish Habitat. As with Alternative A, information from the IFIM study was used to identify the expected changes in **in-stream habitat** that would result from September streamflow changes in the Methow and Twisp rivers under Alternative B. Please see section 3.2.2.1 (Alternative A) and **Appendix E, part 4,** for a discussion of the basic methodology and applicability of the IFIM study, and **Table E-4** showing the September flows for the reaches used in the habitat analysis.

As with Alternative A, the discussion below evaluates habitat changes *only* in the Methow River above Twisp and the Twisp River between the diversion and the confluence. Changes in fish habitat below the confluence were not evaluated because the assumed effect of increases in in-stream flows in this section of the Methow River would not result in substantial increases in fish habitat.

Alternative B would continue to divert water from the present points-of-diversion. The habitat increases in the Methow River above Twisp and the Twisp River in the project area above the confluence are therefore much less than under Alternative A, because flows would change relatively little in these reaches. Results would be as follows:

- Under normal (50-percent exceedance) flows, habitat in the Methow River above Twisp would increase only slightly (2 to 4 percent) compared to No-Action conditions, for four of the five species/ life stages evaluated; spring chinook rearing habitat would remain unchanged (Table 3-7).

- The relatively small habitat increase would be a function of the relatively small-percentage flow increase and of the fact that, under normal conditions, habitat for most of the fish increases only gradually as flows increase above the No Action flow of 233 cfs.

Table 3-7: Comparison of In-stream Habitat (WUA) between No Action Conditions and Alternative B Using the 50-Percent Exceedance (Normal) Flows for September

Exceedance Flow by River Reach and WUA by Species/Life Stage	No Action	Alternative B	Net Change
Methow River Above Twisp			
50-percent exceedance (normal) flow (cfs)	233	240	+7
Spring Chinook			
Adult Holding	2,890	3,971	+4%
Spawning	28,624	29,383	+3%
Juvenile Rearing	20,907	20,902	0%
Summer Chinook Spawning	28,624	29,383	+3%
Summer Steelhead Juvenile Rearing	20,206	20,748	+3%
Bull Trout Juvenile Rearing	48,686	49,627	+2%
Twisp River at Twisp			
50-percent exceedance (normal) flow (cfs)	55	66	+11
Spring Chinook			
Spawning	3,058	3,716	+22%
Rearing	10,369	11,005	+6%
Summer Chinook Spawning	3,058	3,716	+22%
Summer Steelhead Juvenile Rearing	4,522	5,470	+21%
Bull Trout Juvenile Rearing	16,578	20,866	+26%

Note: Habitat was not evaluated in the Methow River below Twisp because flows were estimated to be similar to No Action conditions. Please refer to the text for this discussion.

[1] WUA is defined as the amount (square feet) of habitat per 1,000 feet of stream.

- Habitat increases in the Twisp River under normal conditions are more pronounced than in the Methow River above Twisp because flow would increase relatively more compared to No Action conditions. Habitat would increase by 22 to 26 percent for four of the five species/life stages evaluated; spring chinook rearing habitat would increase by 6 percent (Table 3-7).

- Under dry flow conditions in the Methow River above Twisp, only modest increases in fish habitat would occur (net flow increase of only 4 cfs; Table 3-8). Habitat would increase by only 3 to 4 percent for all species/life stages evaluated (Table 3-8).

- In the Twisp River under dry flow conditions, habitat gains would be much more substantial than those in the Methow River (between 29 and 96 percent), because, under dry conditions, the proposed flow increase would be proportionately higher than in the Methow above Twisp.

Special Status Species. As under Alternative A, all of the species evaluated above are either under review for listing under the Endangered Species Act or listed by WDFW as priority species.

Temperature. As under Alternative A, no significant changes in winter river water temperatures are anticipated, and there should be no impact on salmon egg development.

Fish Habitat in the Project Irrigation Canals. Under Alternative B, the fish screens would be upgraded to prevent fish from entering the canals. As discussed under Alternative A (section 3.2.2.1), the canals are not suitable habitat for fish, because they cannot leave the canal and are killed when the canal is dewatered at the end of the irrigation season.

Power Usage. Under Alternative B, portions of the present gravity-fed canal system would remain in place. Therefore, there would be no expected increase in power usage over what presently exists within the MVID for that aspect of Alternative B. However, some members of MVID would be expected to leave the district and pump groundwater for their irrigation supply, thereby increasing power usage. As described above for Alternative A, the amount of electricity involved would be very small compared to the generation at Columbia River system dams, and any impacts of increased power generation on fish survival likely to be immeasurable.

3.2.2.3 Potential Impacts of Alternative C

Under Alternative C, the existing canal systems would be abandoned, and the individual MVID members would use either new or existing, privately owned groundwater wells or form LIDs for irrigation water supply. The discussion below covers potential impacts on fish for this alternative.

Table 3-8: Comparison of In-stream Habitat (WUA) between No Action Conditions and Alternative B Using the 90-Percent Exceedance (Dry Condition) Flows for September

Exceedance Flow by River Reach and WUA by Species/Life Stage	No Action	Alternative B	Net Change
Methow River Above Twisp			
90-percent exceedance (dry condition) flow (cfs)	157	164	+4
Spring Chinook			
Adult Holding	2,972	3,059	+3
Spawning	19,681	20,554	+4
Juvenile Rearing	20,466	20,552	+4
Summer Chinook Spawning	19,681	20,554	+4
Summer Steelhead Juvenile Rearing	14,078	14,660	+4
Bull Trout Juvenile Rearing	37,452	38,559	+3%
Twisp River at Twisp			
90-percent exceedance (dry condition) flow (cfs)	24	35	+11
Spring Chinook			
Spawning	820	1,606	+96%
Rearing	6,277	8,119	+29%
Summer Chinook Spawning	820	1,606	+96%
Summer Steelhead Juvenile Rearing	1,610	2,604	+65%
Bull Trout Juvenile Rearing	4,770	9,282	+95%

Note: Habitat was not evaluated in the Methow River below Twisp because the flows were estimated to be similar to No Action conditions. Please refer to the text for this discussion.

[1] WUA is defined as the amount (square feet) of habitat per 1,000 feet of stream.

Construction Impacts

Removal of Fish Screen and Diversion Facilities. Because the canal system would be abandoned under Alternative C, the diversions and fish-screening facilities would be removed. Please see Alternative A (section 3.2.2.1) for a discussion of the potential impacts on fish resources.

Groundwater Wells. The groundwater wells that would provide irrigation water in this alternative would be located throughout the former MVID service area, at locations to be identified by the individual landowners or LIDs. Locations would be subject to review and approval by the WDOE and Okanogan County, to assure compliance with applicable laws and regulations. Therefore, it is unlikely that constructing any needed new wells would affect fisheries habitat.

Operation Impacts

In-stream Fish Habitat. As above, the IFIM study was used to evaluate expected changes in in-stream habitat that might result from streamflows changes in the Methow and Twisp rivers through the implementation of Alternative C. Please see Alternative A (section 3.2.2.1) and **Appendix E, part 4**, for a discussion of the methodology and applicability of the IFIM study.

Habitat. Estimated irrigation water use from groundwater wells under Alternative C would be the same as that under Alternative A. The location of these wells would be more dispersed than under Alternative A, but would still be concentrated along the Methow River below the confluence with the Twisp River. Therefore, changes in flow and fish habitat under Alternative C would be very similar to those discussed for Alternative A.

Special Status Species. The changes in flow in the Methow and Twisp rivers under Alternative C are expected to be the same as those described for Alternative A. Therefore, changes in in-stream habitat for the special status species would be the same.

Temperature. As under Alternative A, no significant changes in winter river water temperatures are anticipated, and there should be no impact on salmon egg or fry development.

Fish Habitat in the Project Irrigation Canals. Alternative C would result in a loss of aquatic habitat in the canals. Please see Alternative A for a discussion on the potential impacts on fisheries.

Power Usage. Alternative C might increase power usage for delivering pumped groundwater to the water users in the MVID. As described under Alternative A, the amount of electricity involved would be very small compared to the generation at Columbia River hydroelectric system facilities, and any impacts of increased power generation on fish survival are likely to be immeasurable.

3.2.2.4 Potential Impacts of Alternative D

Alternative D (No Action) would not change existing facilities and operation of the canal system, with the exception of upgraded fish screening facilities and resumption of regular maintenance. Therefore, flows in the Methow and Twisp rivers would remain unchanged from present conditions. The habitat conditions that result from these flows (both in-stream physical habitat and temperature-related conditions) would continue to persist.

Although some improvements to fisheries would result from the improved fish-screen facilities, the project's fisheries objectives would not be met. High diversion rates would persist, to the detriment of in-stream flows downstream of the diversion point. The resulting low flows along the downstream reaches of the Methow and Twisp rivers during the irrigation months would continue to limit the value of the two rivers as fish habitat. The annual re-construction of the Twisp diversion would continue the sedimentation impacts on the Twisp River habitat downstream. Passage conditions would not improve at either diversion. At any time, "high risk" sections of the conveyance system could wash out, to the detriment of water quality, and therefore fish habitat.

3.3 Soils

3.3.1 Existing Environment

Ice Age glaciation left its mark on most of the Methow Basin. As the continental ice sheet that once covered the area receded, deposits of glacial till and outwash were left behind. These sediments have since been reworked extensively along major streams and tributaries. Resulting soils are coarse-textured and very permeable. Most soils are gravelly sandy loams or stony fine sandy loams.

The effect of glaciation is also reflected in the area's topography. Along the Methow River, the terrain is flat to gently rolling. Slopes become steeper where the glaciated valley is bound by bedrock uplands rising steeply from the valley floor.

3.3.2 Potential Impacts

3.3.2.1 Potential Impacts of Alternative A

Construction and Operation Impacts

The proposed pipeline route follows the existing canal right-of-way. Sections of the existing canals are located on steep slopes subject to erosion (such as along the east canal at and above Twisp, and the west canal between the intake and Twisp). Canal sections would be abandoned in these areas with unstable slopes, and canal washouts due to excessive seepage and unstable soils would be eliminated. Grading and/or filling would be required in converting sections of open canals and laterals to enclosed pipe. Since most areas subject to construction disturbance

are flat and would require limited backfilling within the existing canal depression, the erosion risk is low.

Removal of the existing in-stream fish screens and diversions would cause short-term disturbance to soils; minor amounts of sediment could be dispersed downstream. Construction of new wells and three small concrete reservoirs (each approximately 6 m (20 ft.) in diameter) would result in surface disturbance at drilling and reservoir construction sites. Impacts would be slight and limited to the well and reservoir sites. Best management practices would be used to minimize erosion. These would include the use of sediment barriers (silt fences, straw bales, erosion control blankets) and similar measures, as needed, during and after construction (MWG, Inc., 1996, Vol. II).

3.3.2.2 Potential Impacts of Alternative B

Construction and Operation Impacts

Alternative B, the partial upgrade, would cause slight short-term impacts on soils. Relining the canal and rebuilding the access road would cause some ground disturbance, increasing the soils' susceptibility to erosion. Upgrading the existing in-stream diversions and fish screens would disturb soils, with temporary minor increases in erosion and sediment dispersal during construction. Drilling of new wells would result in minor surface disruption, a slight impact. As with Alternative A, best management practices would be used to minimize erosion.

3.3.2.3 Potential Impacts of Alternative C

Construction and Operation Impacts

Alternative C, dissolution of the MVID, would abandon the canal system. There would be minor short-term impacts as fish screens and in-stream diversions were removed. Equipment and spoil deposition associated with new well drilling would disrupt surface soils locally; minor local increases in off-site movement of sediment would occur. Best management practices would be used to minimize erosion.

3.3.2.4 Potential Impacts of Alternative D

Construction and Operation Impacts

The No Action alternative would continue the risk of washouts if repairs were not made to unstable sections of the canal. Areas could erode locally and sediment could move off-site. Repairing the canal would cause minor ground disturbance, increasing the soils' susceptibility to erosion. This change could flush minor amounts of sediment through the canal system. Removing the existing fish screens would cause minor short-term disturbance, and could disperse small amounts of sediment into streams. Best management practices would be used to minimize erosion.

3.4 Vegetation

3.4.1 Existing Environment

3.4.1.1 Project Landscape

Physiography

The project lies in the Okanogan Highlands physiographic province, a region east of the Northern Cascades and north of the Columbia Basin Provinces, in Okanogan County, Washington. Elevations range from about 420 to 515 m (1,380 to 1,690 ft.).

The Okanogan Highlands Province is characterized by moderate slopes, broad rounded summits, and broad river valleys (Franklin and Dyrness, 1988). The predominant natural plant community consists of high desert **steppe**, primarily the *Artemesia tripartita/Festuca idahoensis* association. This association is characterized by bunchgrasses and sagebrushes. A dense turf of grasses and grass-like plants and a discontinuous layer of threetip sagebrush (*Artemesia tripartita*) characterize the association (Franklin and Dyrness, 1988). Climatically, the steppe is arid to semiarid, with low precipitation, warm-to-hot summers, and relatively cold winters.

Landscape Analysis

An understanding of the project landscape provides the context for determining potential environmental consequences of project alternatives that may extend beyond the project construction "footprint." The project landscape is confined to the valley bottoms, and roughly parallels parts of the Methow and Twisp rivers. It is predominantly agricultural bottomland and upland steppe. The rivers and associated floodplains are prominent features, and share a common hydrology with the canals. They provide wildlife migration routes and pathways for aquatic resources to move. The canals also function as wildfire breaks, limiting the extent of wildfire spread, and as dispersal routes for weeds. Other prominent features include roads such as Highways 20 and 153, Eastside Winthrop-Twisp Road, Poorman Creek Road, Twisp-Carlton Road, and local roads. The roads cross the canals and, to a lesser extent, the rivers, reducing habitat values by fragmenting these linear corridors.

3.4.1.2 Upland Vegetation

Most of the valley bottom vegetation communities are croplands—including hay, alfalfa, wheat, peas, orchards, lawns—or steppe communities. Steppe communities particularly are present upslope of the existing canals where native vegetation is relatively undisturbed. The steppe community upland vegetation is described in **Appendix F, part 1.** Dominant drought-tolerant vegetation along the canals consists of both species that are drought-tolerant and those that tolerate both moist and dry conditions (**facultative** species); these are listed in **Table F-2 in part 3** of **Appendix F**.

3.4.1.3 Wetlands

Wetlands are lands transitional between **terrestrial** and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water. Many natural wetlands occur in the project area: these are associated with stream margins, floodplains, and natural seeps.

Some residents of the area also consider as wetlands the areas along the canal where leaking canal water supports water-dependent vegetation. However, these areas were examined by Parametrix and by wetland experts from the U.S. Army Corps of Engineers (Corps) and were found not to meet one of the three criteria for defining a wetland.

The Federal government defines wetlands by looking at three factors: soils, hydrology, and vegetation. To be classified as a wetland, an area must meet the following criteria:

1. The soils must be classified as hydric soils or show characteristics of being developed under hydric conditions;

2. The area must be either permanently or periodically covered with water, or the soil saturated to the surface at some time during the growing season of the prevalent vegetation; and

3. The prevalent vegetation must consist of plants that are typically adapted for life in water-saturated soil conditions.

Except for a short portion of the west canal next to the Twisp River diversion and at the Hotchkiss spill, the areas supporting water-dependent vegetation along the east and west canals are not wetlands because they were excavated from uplands and do not meet the soils criteria; therefore, they are not protected by Federal, state, or county laws or regulations. In the lower elevational floodplains of the Methow and Twisp rivers, it is difficult to distinguish between natural and artificially created wetlands along the canal; however, careful examination of the canal in these areas showed that, except for the area near the diversion on the Twisp River, the canal is situated in uplands, above any natural wetlands. (See **Appendix J** for letter from the Corps.)

County jurisdiction is invoked under the Shoreline Master Program for projects within 61 m (200 ft.) of the ordinary high water mark of Shorelines of Statewide Significance (or within the 100-year floodplain) or for projects requiring a floodplain development permit (Okanogan County, 1997). County jurisdiction is limited to the natural wetlands, and excludes any artificially created wetlands created by irrigation.

The water in the irrigation canals is considered "Waters of the United States," and is subject to Federal jurisdiction under the Clean Water Act.

National Wetlands Inventory Wetlands

The National Wetlands Inventory is maintained by the USFWS; it documents areas believed to be natural or artificially created wetlands through air photo interpretation. **Appendix F, part 2**, **Table F-1**, lists natural and artificially created wetlands systems within 91 m (300 ft.) of the MVID canals, as shown on the National Wetlands Inventory (USFWS, undated). Wetlands associated with the main channel of the canals are classified as manmade, artificially flooded, and excavated **riverine** wetlands (R4SBKCx); however, these National Wetland Inventory classifications are always subject to interpretation through field review. Our field review revealed that these areas do not meet the wetlands criteria for soils, as discussed above. Other wetlands in the canal vicinity include riverine wetlands~~,~~; and **palustrine** wetlands with forest, shrub/scrub, or emergent vegetation. Dominant vegetation of the wetlands includes **hydrophytic** and facultative riparian vegetation (described below).

3.4.1.4 Riparian Vegetation

Riparian zones are areas that are located next to aquatic systems with flowing water and that contain elements of both aquatic and terrestrial ecosystems that mutually influence each other. National Wetland Inventory maps provide a good indication of the distribution of riparian areas in the study area (Figure 3-6). A survey of riparian vegetation conducted for the *Methow Valley Irrigation District Water Supply Facility Plan* identified all hydrophytic (water-dependent) vegetation within 1.5 m (5 ft.) of either side of the canal. The survey also identified all canal-dependent hydrophytic vegetation that extended or appeared downslope of the canals (whether or not such vegetation was contiguous with the canal). This survey identified a total of 13.3 ha (32.9 ac.) of canal-dependent tree, shrub, and **herbaceous** riparian vegetation (Parametrix, 1995, in MWG, 1996). These riparian areas extend along approximately 43,155 m (141,550 ft.) of the east and west canals.

Jurisdictional Status

Riparian vegetation in the project area includes naturally and artificially occurring communities. Some riparian areas are jurisdictional wetlands, particularly those historically associated with the floodplains of the Methow and Twisp rivers. The only existing MVID irrigation system facilities located in potentially jurisdictional riparian areas are those near the west canal diversion on the Twisp River, and on a short portion of the canal at the Hotchkiss Creek crossing. Most riparian areas along the canals are not jurisdictional because they do not meet the soils criteria to be designated as wetlands, and therefore are not regulated by local, state, or Federal agencies (Parametrix, 1995; Okanogan County, 1997).

Dominant Vegetation Along the Canals

Riparian vegetation along the canals and spillways is dominated by hydrophytic, facultative, and drought-tolerant species. Most of the riparian areas within or next to the canals contain relatively low species richness and a predictable list of species (see **Appendix F, part 3, and Table F-2** for a description and listing of species).

3.4.1.5 Threatened and Endangered Plant Species

A search of the Washington Department of Fish and Wildlife Priority Habitats and Species, and Wildlife Heritage Databases, and informal consultation with the USFWS did not identify the presence of known threatened or endangered plant species in the project area (WDFW, 1997a). It is not likely that these species would exist along the canal, since the soil was extensively disturbed during canal construction. The USFWS has concurred with BPA's determination that the project alternatives would have no effect on threatened or endangered plant species (K.R. Campbell, USFWS, letter, October 22, 1997 in Appendix J).

3.4.1.6 Weeds and Weed Control

Several weed species of concern occur in the project area. They include noxious weeds such as whitetop, dalmatian toadflax, musk thistle, knapweeds, tansy ragwort (*Senecio jacobaea*), houndstongue (*Cynoglossum officinale*), St. Johnswort (*Hypericum perforatum*), and purple loosestrife (*Lythrum salicaria*) (Peterson, 1997). All are highly invasive and aggressive. Where they become established, alien weeds dominate the vegetation; change is possible only through human intervention. The policy of the Okanogan County NWCB sets forth measures for eradication, reduction, and suppression. The policy establishes weed control practices and policies, and identifies a Coordinated Weed Management Area, which is located south of Carlton, downstream of the project area (Noxious Weed Control Board of Okanogan County, 1997).

3.4.1.7 Aesthetic/Scenic Values

Riparian vegetation along the canal possesses positive aesthetic and scenic values (MWG, 1996). Some larger stands of black cottonwood and trembling aspen trees are highly valued (MWG, 1996). These values arise from the contrast in color, structure, and species composition between the riparian vegetation and the surrounding steppe communities. Also, the presence of riparian vegetation along the canals for over 90 years has created a social sense of place.

3.4.2 Potential Impacts

3.4.2.1 Potential Impacts of Alternative A

Construction Impacts

Landscape. Under Alternative A, the primary landscape change would be the gradual dying off of water-dependent vegetation in the linear aquatic/riparian corridors associated with the east and west canals. The wildlife and aquatic corridor functions of the canal , are expected to shift

to the Methow and Twisp river floodplains. Although some vegetation along the canals may become stressed or die in the short term, the functions the corridors provide would be maintained to some extent, and would gradually be replaced, by the river systems. Reliance on the river systems for these functions has many advantages: (1) the movement corridors would require less maintenance, (2) they would be more fully functional, and (3) they would receive better long-term resource protection under Federal and county jurisdiction.

Uplands. No impacts are expected to occur on upland zones.

Wetlands. Construction, removal, or maintenance of some of the facilities under Alternative A could possibly affect wetlands. At this point in the environmental process, BPA does not know the exact locations of the new facilities because the Agency does not want to prejudice the selection of alternatives by committing funds to final designs for Alternative A. The facilities in question include groundwater wells, pump stations, reservoirs, and new sections of pipeline to connect the well fields to the existing canal rights-of-way. In addition, work on the water intake, fish screen, and Hotchkiss Creek crossing on the west canal, would take place in wetlands The project proponents are committed to completing required wetland surveys in the vicinities of these facilities if Alternative A were selected as the preferred alternative (see Sections 4.6.2 and 4.8.2 of this EA). They would avoid wetlands wherever possible through the final design and siting of these facilities. If all wetlands cannot be avoided, they would apply for aquatic resource permits and commit to any mitigation required under that permitting process.

MVID groundwater pumping would be designed not to affect surface jurisdictional waters or wetlands through groundwater withdrawal. Facilities built by local landowners would be regulated by Federal and county agencies with jurisdiction over waters and wetlands protection. Any impacts on wetlands that could not be avoided through careful planning and siting would most likely be offset by partially restoring historical conditions of hydrology to the Methow and Twisp river systems by eliminating or reducing water diversions. Therefore, impacts on jurisdictional waters and wetlands are expected to be minor, if any, and mitigated.

Riparian Areas. Water withdrawal would change up to about 43,155 m (141,550 ft.) of hydrophytic riparian tree, shrub, and herbaceous vegetation along the east and west canals and crossed by the existing canal alignments (Parametrix, 1995). This represents up to about 13.3 ha (32.9 ac.) of changed hydrophytic riparian tree, shrub, and herbaceous vegetation, including all hydrophytic vegetation within 1.5 m (5 ft.) of the canal and additional riparian vegetation supported by the canal seepage, but extending various distances away from the canals (Parametrix, 1995; **part 3, Table F-3 in Appendix F**). Changes would include plant mortality, species composition shifts, and/or conversion to non-riparian conditions. This anticipated loss of artificially created riparian areas would not be regulated under Okanogan County's Growth Management Critical Areas regulations.

Many of the highly valued existing riparian communities along the canal could be maintained on-site, if landowners choose to use part of their water right to irrigate riparian areas on their properties. The long-term persistence of such areas would depend on functional, well-maintained irrigation systems, but there would be no assurance that such irrigation systems would be constructed by landowners, or, if constructed, would continue to operate as designed.

The abandoned west canal, reach 5, serves as an example showing how dewatering might affect riparian vegetation. Generally, after the old wooden aqueduct was abandoned, the adjacent black cottonwood and trembling aspen died after several years. Drought-tolerant species persisting along the abandoned canal include sagebrush, bitterbush, wild rose, bluebunch wheatgrass, and arrowleaf balsamroot. Other upland species—bittercherry, serviceberry, and ponderosa pine—survived, but show signs of drought stress.

However, most of the existing riparian conditions along the canals are not by design, and do not represent historical conditions. Artificially created riparian areas do not function as fully natural systems (they are in poor health, fragmented, and/or too narrow for full habitat function).

The negative environmental effects from the loss of artificially created riparian areas would be mitigated, in part, through **passive restoration** along the Methow and Twisp rivers, as their riparian areas would benefit from increased flows and restoration of a more natural hydrological **regime** (though the benefits might not be easily measurable). The benefits of flow increases from May through October would include the restoration of soil nutrient cycling rates and water quality improvement functions, increased plant productivity, and the restoration of plant community structure within the re-wetted margins of the floodplains. Also, it is likely that the more natural water regime would help to deter weed infestation and improve habitat quality for a range of moisture-dependent wildlife and aquatic species. In addition, most drought-tolerant riparian communities would persist, and some hydrophytic riparian vegetation would remain where natural seeps occur or where irrigation is continued.

Threatened and Endangered Plant Species. No threatened or endangered plant species are known to occur in the project area; no impacts on such special status species are expected to occur.

Weeds and Weed Control. Grading and pipeline construction would expose new areas to potential weed infestation. Canal abandonment and associated plant community shifts could also predispose some areas to weed infestation. However, weed control and revegetation activities within MVID easements would conform with the weed control programs and policies of the Okanogan County NWCB. Therefore, **successional development** of new plant communities would be controlled, and negative impacts from the spread of weeds are expected to be minor and controllable.

Aesthetic/Scenic Values. Replacing the canal system with pipelines would change or reduce the scenic/aesthetic values provided by canal-dependent vegetation. However, passive restoration of natural riparian areas through increases in in-stream flows would partially offset these losses by improving riparian and vegetation conditions along the natural river corridors, although not necessarily in the same locations or viewsheds. Also, facultative and drought-tolerant riparian vegetation would be expected to persist, and some landowners might choose to use a portion of their water right allocation for riparian-area irrigation.

Operation and Maintenance Impacts

Weeds and Weed Control. Alternative A would eliminate the weed dispersal that currently occurs through the active canals. The MVID would be responsible for conforming to the weed control programs and policies of the Okanogan County NWCB (unless a LID were established and assumed that responsibility). Therefore, no negative impacts regarding weeds and weed control issues are expected to occur.

Aesthetic/Scenic Values. Periodic vegetation maintenance would eliminate or control trees and other vegetation regrowth from the active pipeline alignment where it interfered with operations or posed irrigation system performance or safety hazards. However, the vegetation maintenance activities would be considered ongoing operations, and impacts on aesthetic/scenic values probably would occur even if the project were not constructed (i.e., even under the No Action alternative).

3.4.2.2 Potential Impacts of Alternative B

Construction Impacts

Landscape. Under Alternative B, the primary landscape change would be the removal of most of the linear riparian corridors associated with the east and west canals. The change would result from the canal lining and access road construction, and the subsequent reduction in canal seepage. Temporary ecological adjustments would occur; for example, the wildlife and aquatic systems of the canal riparian corridors are expected to shift to riparian areas along the Methow and Twisp river floodplains. The remaining riparian areas along the canals would become increasingly fragmented.

Uplands. The construction of an access road along sections of the lined canal could affect small amounts of upland vegetation, but these impacts are expected to be minor.

Wetlands. Impacts on wetlands under Alternative B could result from the reconstruction of the canals, diversion structures, and fish screens, primarily near the west canal diversion on the Twisp River and at the Hotchkiss Creek crossing. As described under Alternative A, the project proponents are committed to completing required wetland surveys in the vicinities of these facilities if Alternative B were selected as the preferred alternative (see Sections 4.6.2 and 4.8.2 of this EA). They would avoid wetlands wherever possible through the final design and siting of these facilities. If all wetlands cannot be avoided, they would apply for aquatic resource permits and commit to any mitigation required under that permitting process.

Any impacts on wetlands that could not be avoided through careful planning and siting would be offset by partially restoring historical conditions of hydrology to the Methow and Twisp river systems by eliminating or reducing water diversions. Therefore, impacts on wetlands are expected to be minor, if any, and mitigated.

Riparian Areas. Water withdrawal and access road construction would change up to about 40,360 m (132,384 ft.) of hydrophytic riparian tree, shrub, and herbaceous vegetation along the east and west canals (Parametrix, 1995). This change represents up to about 12.2 ha (30.1 ac.) of

hydrophytic riparian tree, shrub, and herbaceous vegetation, including all hydrophytic vegetation within 1.5 m (5 ft.) of the canal and additional riparian vegetation supported by the canal seepage, but extending various distances away from the canals (Parametrix, 1995; **Table F-3 in Appendix F**). Changes would include plant mortality, species composition shifts, and/or conversion to non-riparian conditions. Riparian losses would be up to about 91 percent of those described for Alternative A, assuming approximately 15-percent canal seepage and spill from the open, lined canal system in this alternative. However, most existing riparian conditions are not by design, and do not represent historical conditions. Artificially created riparian areas do not function as fully natural systems (they are unhealthy, fragmented, and/or too narrow for full habitat function). This anticipated loss of artificially created riparian area would not be regulated under Okanogan County's Growth Management Critical Areas regulations.

Negative environmental impacts from the loss of artificially created riparian areas are expected to be temporary. Many of the highly valued existing riparian communities along the canal could be maintained on-site if landowners were to choose to use part of their water right to irrigate riparian areas on their properties. The long-term persistence of such areas would depend on a functional, well-maintained irrigation system, but there would be no assurance that such irrigation systems would be constructed by landowners, or, if constructed, would continue to operate as designed.

This project would passively restore historical riparian areas along the Methow and Twisp rivers, which are expected to benefit from increased flows and restoration of a more natural hydrological regime. However, the amount of restoration may not be as great as that under Alternative A.

Threatened and Endangered Plant Species. No threatened or endangered plant species are known to occur in the project area, and no impacts on such special status species are expected to occur.

Weeds and Weed Control. Although construction activities would differ somewhat, impacts are expected to be similar to those described under Alternative A (see section 3.4.2.1). No impacts regarding weeds and weed control issues are expected to occur.

Aesthetic/Scenic Values. The repair and upgrade of the canal system under this alternative would remove some of the canal-dependent vegetation along the sections of the east and west canals that would be lined, with attendant impacts on scenic/aesthetic values. However, landowners could use a portion of their water right to irrigate riparian areas if they wanted to maintain those areas.

Operation and Maintenance Impacts

Weeds and Weed Control. The active canals would continue to disperse weeds. Additional weed dispersal could also occur via access roads. However, weed control and revegetation activities within MVID easements would conform to the weed control programs and policies of the Okanogan County NWCB. No impacts regarding weeds and weed control issues are expected to occur.

Aesthetic/Scenic Values. Periodic vegetation maintenance would remove or reduce many trees and other vegetation from the active canal alignment where they interfere with operations or pose canal performance or safety hazards. Maintenance activities would probably be more frequent than under Alternative A. However, the vegetation maintenance activities would be considered ongoing operations, and impacts on aesthetic/scenic values probably would occur even if the project were not constructed. Because the corridor would be wider than the corridor under A, the width of the cleared area would be greater.

3.4.2.3 Potential Impacts of Alternative C

Construction Impacts

Landscape. As under Alternative A, the primary landscape change under Alternative C would be the gradual dying off of water-dependent vegetation in the linear aquatic/riparian corridors associated with the east and west canals. The wildlife and aquatic corridor functions of the canals are expected to shift to the Methow and Twisp river floodplains. Although some vegetation may become stressed or die in the short term, the functions the corridors provide would be maintained to some extent, and would gradually be replaced, by the river systems. Reliance on the river systems for these functions would have many advantages: (1) the movement corridors would require less maintenance, (2) they would be more fully functional, and (3) they would receive better long-term resource protection under Federal and county jurisdiction.

Uplands. No impacts on upland steppe or drought-tolerant riparian zones are expected to occur (same as Alternative A).

Wetlands. Overall, potential wetlands impacts would be fewer for Alternative C than for Alternatives A or B, because there would be less construction, removal, or maintenance of facilities. These impacts would be offset as described for Alternatives A and B. Facilities built by local landowners would be regulated by Federal and county agencies with jurisdiction over waters and wetlands protection. Therefore, impacts on jurisdictional waters and wetlands are expected to be minor, if any, and mitigated.

Riparian Areas. Impacts would be the same as those described for Alternative A (section 3.4.2.1).

Threatened and Endangered Plant Species. No threatened or endangered plant species are known to occur in the project area, and no impacts on such special status species are expected to occur.

Weeds and Weed Control. Although construction activities might differ, impacts for weed and weed control would be the same as those reported for Alternative A (section 3.4.2.1).

Aesthetic/Scenic Values. Impacts would be similar to those reported for Alternative A (section 3.4.2.1).

Operation and Maintenance Impacts

No adverse operation- or maintenance-related environmental impacts are expected.

Weeds and Weed Control. This alternative would eliminate the active canal as a source of weed dispersal**.** Nevertheless, the newly constructed individual irrigation systems may *not* be required to conform to the weed control programs and policies of the Okanogan County NWCB (unless an LID is established and assumes that responsibility)**.** Although the MVID would relinquish responsibility for long-term weed control, local landowners may elect to adopt these programs and policies**.** Therefore, minor impacts regarding weeds and weed control issues are expected to occur.

3.4.2.4 Potential Impacts of Alternative D

Construction Impacts

No construction-related environmental impacts are expected, except for those resulting from canal repairs. These canal repair impacts are addressed below, under Operation and Maintenance Impacts.

Operation and Maintenance Impacts

Landscape. The landscape would remain essentially the same under Alternative D, the No Action alternative. Impacts associated with canal repairs and operations and maintenance (O&M), as described below, would not be major enough to affect the wildlife and aquatic corridor functions of the canals.

Uplands. No measurable changes to steppe or riparian areas are expected to occur.

Wetlands. This alternative would not affect wetlands, except for relatively minor and mostly temporary impacts associated with maintaining canals, water intakes, pump stations, diversions, fish screens, and groundwater wells. Any wetlands impacts would be regulated under Federal, state, and county wetlands protection regulations.

Riparian Areas. No measurable changes in riparian length or area are expected to occur (Parametrix, 1995; **Table F-4 in Appendix F**). However, periodic vegetation maintenance would temporarily remove or reduce trees and other riparian vegetation from the active canal alignment where they interfere with operations or pose canal safety hazards.

Threatened and Endangered Plant Species. No threatened or endangered plant species are known to occur in the project area, and no impacts on such special status species are expected to occur.

Weeds and Weed Control. The active canals would continue to disperse weeds. Weed control and revegetation activities within MVID easements would conform to the weed control programs and policies of the Okanogan County NWCB. No impacts regarding weeds and weed control issues are expected to occur.

Aesthetic/Scenic Values. Periodic vegetation maintenance would remove or reduce trees and other vegetation from the active canal alignment where they interfere with operations or pose canal safety hazards. However, the vegetation maintenance activities would be considered ongoing operations under the No Action alternative.

3.5 Wildlife

3.5.1 Existing Environment

3.5.1.1 Wildlife Overview

Project area wildlife is characteristic of the lower elevation fauna of the Okanogan Highlands. General wildlife habitats in this area fall into three major types: (1) agriculturally modified desert steppe and croplands, (2) black cottonwood-dominated riparian areas along drainages and water bodies, and (3) upland Ponderosa-pine grasslands at higher elevations, commonly above the canals. The vegetation comprising the wildlife habitats, the relationships between the physiography and vegetation, and the landscape patterns associated with habitat distributions are discussed in section 3.4.1.

A list of the terrestrial wildlife that potentially may occur in the project area was prepared for two general **physiographic areas** from an unpublished U.S. Forest Service (USFS) species list (John Rohrer, USFS, pers. comm., 1997; USFS, 1997). These biophysical environments or general habitats are (1) the hot-dry, lowest elevation Ponderosa forest/grassland associations, and (2) all relatively open non-forested areas including steppe, croplands, and riparian areas. The terrestrial wildlife include about 309 species of amphibians, reptiles, birds, or mammals. Over 77 percent (238 species) of the total are birds; 16 percent (48 species) are mammals; and the remaining 7 percent (23 species) the combined amphibian and reptilian species.

Mammals

The 48 species of mammals that potentially occur in the project vicinity include opossums, shrews, bats rabbits and hares, rodents, furbearers, carnivores, and big game. Furbearers include otters, skunks and the wolverine. The coyote (*Canis latrans*), gray wolf (*Canis lupus*), red fox (*Vulpes vulpes*), mountain lion (*Felis concolor*), and bobcat (*Felis rufus*) are the primary carnivores. The primary big game species in the project area are Rocky Mountain elk (*Cervus elaphus nelsoni*), mule deer (*Odocoileus hemionus*), and white-tailed deer (*Odocoileus viginianus*).

Most mammals are permanent residents, occurring in both the upland coniferous forest/grassland and non-forested physiographic environments. About 75 percent of the total species use riparian areas as a special habitat component.

Birds

The 238 species of birds that may potentially occur in the project area represent all the major groups of birds found in temperate North America. These include waterfowl, shorebirds and

other waterbirds, raptors, grouse and quail, swifts, hummingbirds, woodpeckers, and perching songbirds. The birds are highly seasonal, and favor non-forested habitats and riparian areas. Over 175 species (75 percent) are either migrants or migrating summer breeders. About 60 percent of the total number of species occur exclusively in non-forested habitats; over 90 percent use riparian habitats.

Amphibians and Reptiles

The amphibians (9 species) and the reptiles (14 species) that potentially occur in the project area are all permanent residents. All are found in non-forested environments; over 80 percent of these species use riparian habitats.

3.5.1.1 Wildlife Species of Concern

Threatened and Endangered Species

The USFWS prepared a list of Federally listed threatened and endangered species that may be present in the general project area in Okanogan County (Philip Laumeyer, USFWS, letter; February 28, 1997). The USFWS considered potential species occurrence in the 373 km^2 (144 mi^2) within T34N R22E, T33N R21E, T33N R22E, and T32N R22E. Federally listed species include the endangered gray wolf, the threatened bald eagle (*Haliaeetus leucocephalus*), and the endangered northern spotted owl (*Strix occidentalis caurina*). The USFWS also identified 13 terrestrial species of concern that are to be considered for planning purposes. These species are listed in Table 3-9.

Gray Wolf. One sighting and track observations of a gray wolf were documented in 1991 about 1.2 km (0.75 mi.) south of the Twisp River in the project area (J. Almack et al., 1993a). Recent wolf sightings throughout sparsely populated areas of Washington indicate that wolves have remained relatively rare and widely dispersed, favoring remote areas. It is highly unlikely that any actions of this project would affect wolves or their favored prey species.

Bald Eagle. WDFW Wildlife Heritage database records indicate that the Methow Valley is a bald eagle winter concentration area (WDFW, 1997a). Bald eagles gather primarily in the lowland areas in late fall or early winter. Eagles are regularly observed in riparian areas near the Methow and Twisp rivers, where roost trees are available. A documented communal roost site with over 20 eagles has been recorded in a stand of black cottonwoods and Ponderosa pines about 0.8 km (0.5 mi.) east of the Methow River between Winthrop and Twisp.

Table 3-9 Federal Species of Concern[1]

Species			
Common Name	**Scientific Name**	**Status[2]**	**Habitat Available[3]**
Gray wolf	*Canis lupus*	**FE,** SE	yes
Bald Eagle	*Haliaeetus leucocephalus*	**FT,** ST	yes
Northern spotted owl	*Strix occidentalis caurina*	**FT**, SE	no
Long-eared myotis	*Myotis evotis*	**FSC**, SM	?
Long-legged myotis	*Myotis volans*	**FSC,** SM	?
Yuma myotis	*Myotis yumaensis*	**FSC**	?
Small-footed myotis	*Myotis ciliolabrum*	**FSC,** SM	?
Pale Townsend's big-eared bat	*Plecotus townsendii pallescens*	**FSC**, SC	?
Pacific fisher	*Martes pennanti pacifica*	FSC, SC	no
California wolverine	*Gulo gulo leuteus*	**FSC,** SM	no
North American lynx	*Felis lynx canadensis*	**FSC**, ST	no
Harlequin duck	*Histrionicus histrionicus*	**FSC**	yes
Northern goshawk	*Accipiter gentilis*	**FSC,** SC	no
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	**FSC,** SC	no
Olive-sided flycatcher	*Contopus borealis*	**FSC**	no
Spotted frog	*Rana pretiosa*	**FSC**, SC	yes

Notes:

[1] Source: Letter from Philip Laumeyer, USFWS, to Lauri J. Croff, BPA, February 28, 1997.

[2] Federal Status: **FE** = Federal endangered; **FT** = Federal threatened;
FSC = Federal species of concern. (Laumeyer 1997)
State Status: SE = State endangered; ST = State threatened;
SC = State candidate for listing; SM = State monitor species.
Source for State Status: 1996. Species of Special Concern List. Washington Department of Fish and Wildlife, Wildlife Management Program, Olympia, WA.

[3] Preferred wildlife habitat for the species is available within the actual project area.

Northern Spotted Owl. In the general vicinity of the project area, northern spotted owls have been documented in the Okanogan National Forest at the higher elevations a few kilometers southwest of the MVID canals and in the non-forested cropland areas (WDFW, 1997b). The large expanses of mature forest stands that comprise spotted owl habitat do not exist in the immediate area of the proposed project. Therefore, it is highly unlikely that spotted owls would occur there or be affected by project activities.

Grizzly Bear. Although not listed by the USFWS as likely to occur in the vicinity of the project, the grizzly bear (*Ursus arctos)*, a Federally listed threatened species, has been mentioned as a species of concern by state wildlife biologists (S. Fitkin, WDFW, pers. comm., 1997). The project is located within the North Cascades Grizzly Bear Ecosystem management area, one of the six ecosystem areas identified within the present distribution of the grizzly bear (J. Almack et al., 1993b). Past sightings of grizzly bears have been recorded from the Twisp Ranger District and the Winthrop Ranger District, but none near the project area.

Federal Species of Concern

Thirteen species of concern are listed by the USFWS as potentially occurring in the general vicinity of the project. Four of these species—the Pacific fisher (*Martes pennanti pacifica*), wolverine (*Gulo gulo*), North American lynx (*Felis lynx canadensis*), and northern goshawk (*Accipiter gentilis*)—are typically found in large tracts of mature forests with habitat characteristics similar to those of the northern spotted owl's. All are wide-ranging species, especially the wolverine and fisher. In the project area, it is highly unlikely that these species occur regularly outside the Okanogan National Forest. Therefore, the proposed project would not affect them directly or indirectly.

Another forest-dwelling species of concern, the olive-sided flycatcher (*Nuttallornis borealis*), is a typical summer resident in coniferous forests. Because its preferred habitat is in the coniferous forests at elevations above the influence of the MVID canals and project activities, this species is unlikely to be affected by project habitat modifications.

Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus)* is an uncommon resident of grasslands, hayfields, and open areas broken by canyons and rocky outcrops. In the Methow Valley area, land conversion and residential development have made several historic **lek** wintering areas no longer suitable habitat. Historic areas are located a few miles from the Methow River east of Winthrop and east of Twisp. In 1992, a small concentration of birds was documented in the Balky Hills area east of the Methow River outside the project area (WDFW, 1997b). It is unlikely that the proposed project would affect Columbian sharp-tailed grouse because their known historic and current habitat is beyond the area that would be influenced by habitat changes.

Five species of bats with a range that includes the Methow Valley area are Federal species of concern. All five are **nocturnal** and insectivorous, catching and eating insect prey while flying. All are summer residents; the four myotis species typically migrate to warmer areas during winter. Townsend's big-eared bat (*Plecotus townsendii*) may hibernate in local caves or cave-like features. Although exact roosting habitats and nursery conditions for these species are not

well-known, the project's minor habitat modifications are unlikely to influence habitat conditions for roosting or breeding bats. Loss of surface water in canals may eliminate potential locations for drinking and for attracting insect prey; however, bats can easily travel to other nearby areas (such as the Methow and Twisp rivers) where water will be available.

In the project area, harlequin ducks (*Histrionicus histrionicus*) are observed during the summer season along the Methow River from Winthrop to Carlton, and on the Twisp River at its confluence with the Methow River. These bottom-feeding ducks breed in fast-moving streams and nest on fallen logs and on ledges. In the fall they migrate to the coast where they winter, feeding in the breaking surf. The project is unlikely to influence harlequin duck habitat, directly or indirectly.

The spotted frog (*Rana pretiosa*) is most likely to be found in slow-moving backwater pools and ponds associated with watercourses in the project area. This species appears unable to survive where bullfrogs become well established. The Wildlife Heritage database has documented the occurrence of spotted frog adults in a pond next to the south shore of the Twisp River in the project area (WDFW, 1997a). The project canals do not simulate prime habitat conditions for the spotted frog. Because the canals do not flow all year and because they flow fairly rapidly, spotted frogs would probably not occur regularly or consistently in the project canals.

State Species of Concern

WDFW maintains two databases on wildlife resources and occurrences, based on research and field surveys over the last 20 years (WDFW, 1997a). The Priority Habitats and Species (PHS) database and the Wildlife Heritage database were searched to identify documented wildlife occurrences and habitats of concern to the state in the general project area. Data concerning Federal species of concern are discussed above; additional information for state species of concern is summarized below.

The wildlife observations within 1.6 km (1 mi.) on either side of the Methow and Twisp rivers in the project area indicate numerous occurrences of wintering mule deer; and year-round use by white-tailed deer, wintering bald eagles, breeding harlequin ducks, and (based on nest box surveys) cavity-nesting wood ducks (*Aix sponsa*) and goldeneye (either *Bucephala clangula* or *B. islandica*). A few records document spotted frogs in the general vicinity of the rivers. Other wildlife observations from uplands outside the influence of the project include breeding golden eagles (*Aquila chrysaetos*, a State Candidate for listing), sharp-tailed grouse, one record of overwintering Townsend's big-eared bats, and one record of tiger salamanders (*Ambystoma tigrinum*, a State Monitor species).

Wildlife priority habitats identified within 1.6 km (1 mi.) on either side of the Methow and Twisp rivers in the project area include well-developed riparian areas used by resident white-tailed deer; by mule deer for fawning; and by forest grouse, California quail (*Lophortyx californica*), tree swallows (*Iridoprocne bicolor*), kingfishers, and various woodpeckers. The Methow Valley ponds and lakes and associated emergent wetlands are used by nesting mallards, American wigeon (*Anas americana*), teal species, pied-billed grebes (*Podilymbus podiceps*), sora rails (*Porzana carolina*), and common snipe (*Capella gallinago*). The PHS database notes

that various furbearers use riparian habitats and wetlands next to lakes and ponds (WDFW, 1997b). These include muskrat, mink, beaver, and raccoons. Although not mentioned specifically in the database notes, California quail have been observed in areas of dense cover along project canals (L. Hoffman, WDFW, pers. comm., 1997).

Okanogan County Wildlife Conservation Areas

Habitat Levels. As part of the Growth Management Act of 1990, Okanogan County has designated Resource Critical Areas, including wildlife habitat conservation areas, to protect wildlife from human activities (Okanogan County, Office of Planning and Development, 1994). Wildlife occurrence and habitat have been grouped into three categories:

- Level I - Habitat of threatened and endangered species, which corresponds to the WDFW Priority Habitats and Species Database Priority 1 Habitat;
- Level II - Habitat of local concern essential to sustaining fish and wildlife populations, which corresponds to WDFW Priority Habitats and Species Database Priority 2 Habitat; and
- Level III - Habitat of local concern considered important to sustaining fish and wildlife populations.

These three levels of wildlife conservation areas have been mapped by the county for planning purposes. Within the project area, Level I includes bald eagle habitat, and Level II contains essential habitat for golden eagles and mule deer (see Figure 3-7). Mule deer habitat is divided into critical winter range, migration corridors, and spring range. Important habitat (Level III) from the general area of the project is mapped on Figure 3-8, and includes additional corridors and priority winter range for mule deer and habitat for white-tailed deer.

Mule Deer. The Okanogan County mule-deer herd is the largest migratory herd in the state of Washington (Myers et al., 1990). The mule deer summer in high mountain forests and alpine areas within the Okanogan National Forest. Winter range is found at lower elevations in grass-shrub and Ponderosa pine/grassland associations generally below 915 m (3,000 ft.) in elevation (Zeigler, 1978). Mule deer are faithful to traditional summer and winter ranges and to the use of well-documented migration corridors in western Okanogan County (Myers et al., 1989). WDFW is concerned over the loss of mule-deer habitat, particularly winter range in the Methow Valley area (Fitkin, 1996). Urban encroachment and intensive grazing by livestock, and the accompanying spread of exotic weeds, have limited the quantity and quality of forage on winter range. Current mule-deer population numbers are still depressed, but recovering from the severe winters of 1992-1993 and 1994-1995.

The project area generally occurs within Okanogan mule-deer winter range, although critical areas are traditionally at higher elevations above the MVID canals and the Methow and Twisp rivers between Winthrop and Carlton. During severe winters with heavy snow, mule deer have been observed concentrated in riparian cover along the canals (L. Hoffman, WDFW, pers. comm., 1997). Some hypothesize that vegetation along the ditches provide winter browse and early spring green forage (J. Rohrer, USFS/Twisp, pers. comm., 1997). Mule-deer fawning areas normally occur on intermediate habitats between summer and winter ranges that are located at

areas along the Twisp River and tributaries of the Methow River above the project area (Zeigler, 1978). Migration corridors also tend to occur along the higher slopes above irrigated croplands and the riparian river bottoms in the project area. Residential and agricultural development, fencing, and presence of domestic dogs may limit mule-deer access to riparian areas adjacent to the Methow and Twisp rivers (L. Hoffman, WDFW, pers. comm., 1997).

3.5.2 Potential Impacts

3.5.2.1 Potential Impacts of Alternative A

Construction Impacts

Converting existing canals to a piped delivery system would diminish open-water habitat, displace some adjacent riparian habitat to the Methow and Twisp river floodplains, and expand upland habitats for wildlife. The total area of potentially affected riparian habitat for Alternative A is estimated at 13.3 ha (32.9 ac.) (see **part 3, Table F-5 in Appendix F**). Habitat modifications would result in the direct loss or displacement of wildlife that depend on canal habitats for food, water, and shelter. Individuals of more mobile species (e.g., most birds and some mammals) would adjust most readily to construction-related habitat losses, as many would be displaced to the natural river systems. Some individuals of less mobile species (e. g., amphibians, reptiles, etc.) would not survive habitat modifications along the canals.

The noise and other human activities associated with construction are temporary; these activities would not significantly disturb or disperse wildlife. Construction is normally completed during the summer months, and would have little direct impact on wintering species such as the bald eagle or mule deer.

Operation and Maintenance Impacts

Patterns of wildlife use would be altered as open water and some riparian habitat would be permanently replaced with maintained upland areas. Wildlife that rely on open water for cover (e.g., frogs), for foraging (e.g., mink, raccoons), or for drinking (e.g., bats) would be permanently displaced. Wildlife that use riparian vegetation along existing canals for food and cover would also be displaced, although some patches of riparian vegetation are likely to remain outside the canal maintenance area.

Threatened and Endangered Species. Operational impacts on threatened or endangered species are expected to be negligible. Gray wolves and grizzly bears are relatively rare and wide-ranging; in the project area, they occur sporadically. Alternative A would change habitat, but would not appreciably influence normal activities for these species. The northern spotted owl also would not be affected, because suitable habitat for spotted owls does not exist along the canals.

In winter, bald eagles may perch in the tallest trees along the canals. No communal winter roosting areas have been documented along the canals. The dense tree stands preferred for communal winter roosts do not occur there, and probably could not be supported by the normal canal leakage that currently maintains canal riparian areas. Existing perching trees not *directly*

in the canal right-of-way would not be cleared as part of this project. Because bald eagles use both live and dead trees for perching, they could still use existing perch trees that die back as water is withdrawn. Eventually, these perch trees would fall (as would any perch trees). In the meantime, perching trees and communal roosting trees would be available in the areas of the Methow River floodplain along natural riparian corridors.

The USFWS has concurred with BPA's determination that Alternative A would have no effect to the Northern spotted owl, grizzly bear, or grey wolf, and may affect, but not adversely affect the bald eagle (K.R. Campbell, USFWS, letter, October 22, 1997 in Appendix J).

Other Species of Concern. Alternative A would permanently change patterns of species use in the project canal areas, as habitat is modified. The increase in in-stream flows in the Methow and Twisp rivers above their confluence would offset some potential losses by enhancing degraded habitats along natural riparian corridors. The improved riparian conditions would provide greater habitat potential for most species because it would link to other natural habitat areas and allow for population expansion. Riparian-associated species and species groups that would benefit include white-tailed deer, bats, furbearers, cavity-nesting ducks, songbirds, California quail, frogs, and other amphibians.

Wintering mule deer that occasionally use riparian areas associated with the canals would lose a source of browse and cover. Because the use of canal riparian areas is largely incidental, and because lowland agricultural and floodplain habitats provide food and cover, habitat changes resulting from this alternative should not be important to this species.

3.5.2.2 Potential Impacts of Alternative B

Construction Impacts

Upgrading and relining the existing canals and access roads would eliminate some open-water habitat, associated substrate, and some adjacent riparian habitat, and would expand some wildlife upland habitats. The total area of potentially affected riparian habitat for Alternative B is estimated at 12.2 ha (30.1 ac.) (see **part 3, Table F-5, in Appendix F**). Habitat for species that forage in open-water habitats would be limited, as substrate and associated vegetation would be lost (even though open water would be maintained). Habitat modifications would directly remove or displace wildlife that depend on canal habitats for food, water, and shelter. Individuals of more mobile species (e.g., most birds and some mammals) would adjust most readily to construction-related habitat losses; some of these might survive displacement to other riparian habitats. Some individuals of less mobile species (e. g., amphibians, reptiles, etc.) would not survive habitat modifications along the canals.

As under Alternative A, the noise and other human activities associated with construction would not significantly disturb wildlife or cause them to avoid the area.

Operation Impacts

Although construction activities would differ somewhat, impacts are expected to be similar to those described under Alternative A.

Threatened and Endangered Species. Operational impacts on threatened or endangered species are anticipated to be negligible, as described under Alternative A. The USFWS has concurred with BPA's determination that Alternative B would have no effect on the Northern spotted owl, grizzly bear, or grey wolf, and may affect, but not adversely affect, the bald eagle (K.R. Campbell, USFWS, letter, October 22, 1997 in Appendix J).

Other Species of Concern. Impacts on other species of concern would essentially be as those described for Alternative A.

3.5.2.3 Potential Impacts of Alternative C

Construction Impacts

Abandoning existing canals would eliminate some open-water habitat, displace some adjacent riparian habitat to the Methow and Twisp river floodplains, and expand upland habitats for wildlife. Impacts associated with construction activities would be as described under Alternative A, and would not result in significant impacts on wildlife.

Operation Impacts

The operational impacts of Alternative C would be essentially similar to those described for Alternative A.

Threatened and Endangered Species. Impacts on threatened and endangered species would essentially be as described for Alternative A, and are expected to be negligible. The USFWS has concurred with BPA's determination that Alternative C would have no effect to the Northern spotted owl, grizzly bear, or grey wolf, and may affect, but not adversely affect, the bald eagle (K.R. Campbell, USFWS, letter, October 22, 1997 in Appendix J).

Other Species of Concern. Impacts on other species of concern would essentially be as those described for Alternative A.

3.5.2.4 Potential Impacts of Alternative D

Construction Impacts

No construction-related impacts are anticipated.

Operation Impacts

No major changes in habitat are expected if Alternative D were implemented. However, it should be noted that periodic removal of trees and other vegetation would be required for maintenance of the canals.

Threatened and Endangered Species and Other Species of Concern. Under Alternative D, no measurable changes in habitat for threatened or endangered species or other species of concern would occur. Current activities along the existing canal system would continue into the foreseeable future.

3.6 Socioeconomics/Land Use

3.6.1 Existing Environment

3.6.1.1 Land Use

The MVID is located in Okanogan County in north-central Washington, on the east slope of the Cascades. The area is characterized as rural. Land uses in the area include intensive agricultural, urban, recreational residential, tourist, commercial, and unclassified areas including forest, grazing and dryland farming (Comprehensive Plan for Okanogan County, 1964; and field review). Mining and timber-related activities occur mainly in the upper subbasin. The lower valley activities are dominated by agriculture, including hay fields, pastures, cattle ranching, and fruit orchards. The valley is surrounded by expanses of public lands, including the Mount Baker-Snoqualmie National Forest and the Okanogan National Forest (see Figure 3-9).

Three zoning districts exist outside the communities of Twisp, Winthrop, and Carlton. These are:

- Methow Valley Review District "Uplands" (8-ha or 20-ac. minimum lot size),
- Methow Valley Review District 5 (2-ha or 5-ac. minimum lot size), and
- Methow Valley Review District 1 (0.4-ha or 1-ac. minimum lot size).

The MVRD 1 Zoning District is located around the Twisp Airport. The remaining two zoning districts comprise most of the district. The MVID canals are commonly used to separate these two zoning districts, with the Uplands zoning generally upslope of the canals and the District 5 zoning generally downslope (Okanogan Office of Planning and Development, pers. comm., 1997).

The MVID is one of about 50 irrigation districts in Washington State. Irrigation districts operate under State law. Their primary purpose is to distribute available water efficiently, equitably and fairly to all users within those districts (WDOE and Washington State University, 1995).

The district serves parts of the Twisp and Methow river valleys and portions of the low terraces next to them. About 10 percent of Okanogan County is in agricultural use; only about 1.5 percent (20,900 ha or 51,600 ac.) is irrigated, most often by hand/wheel lines and solid set (93 percent). Other irrigation methods less commonly used are drip (3 percent), furrow/open corrugated pipe (2 percent), and center pivots (2 percent) (Natural Resources Conservation Service, 1995). Statewide, about two-thirds of irrigation water is taken from surface water, and about one-third from groundwater (Wandschneider and Barron, 1993).

A total of about 314 ha (776 ac.) in the district is currently under irrigation by the MVID canal system. The MVID delivers water to 239 parcels, with an average-sized parcel of 1.3 ha (3.2 ac.). Another 316 MVID parcels, representing 607 ha (1,500 ac.), are also a part of the MVID but currently do not receive any irrigation water from the MVID; some have already

converted to groundwater use from individual wells. Total MVID service area is 920 ha (2,276 ac.), and consists of 555 parcels (tax lots) owned by 344 MVID members.

3.6.1.2 Economy

The Methow Valley local economy has historically been based on mining and logging, supplemented by agriculture. However, mining has largely been replaced by lumber and wood products production, and tourism. Agriculture, still part of the local economy, focuses primarily on grass hay and orchards. Cattle production is also part of the local economy.

3.6.1.3 Property Values

Property values in the Methow Valley are on the increase, particularly in the northern portion of the valley (M. Archer, Okanogan County Assessor's Office, pers. comm., 1997). The northern portion of the valley has undergone a transformation from an economy based on natural resources to an economy based on recreation and tourism. Property values throughout the Methow Valley were last assessed by the county in 1993, and will be re-assessed later in 1997. Assessments are based on 100 percent of market value in Okanogan County, and remain stable between assessments. Values are normally based on the highest and best use, as well as on various market factors. Important factors include the size of a parcel; its location; improvements, if any; the supply of land currently on the market; and the availability and cost of essential public services, including water.

3.6.1.4 Growth and Development

Residential development has been relatively strong in the Methow Valley. From 1990 through 1996, 400 residential building permit applications were submitted to the Okanogan County Planning and Development office: about 44 percent of these were located above Winthrop and 54 percent below (Okanogan Office of Planning and Development, pers. comm., 1997). Absentee owners predominate in the area, owning perhaps as much as 60 percent of the land (M. Archer, Okanogan County Assessor's Office, pers. comm., 1997). Land ownership is shown in Figure 3-9.

Okanogan County recently adopted critical area regulations under the state's Growth Management Act of 1990 (as amended) in order to protect wetlands, areas with critical recharging effects on potable water, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservation areas. All development proposals must comply with regulation requirements. Any new development in the Methow Valley must also meet a number of other state and local development regulations before receiving government approval to develop property in the valley.

3.6.2 Potential Impacts

3.6.2.1 Potential Impacts of Alternative A

Construction Impacts

Land Use. Less than 400m^2 (4,500 ft^2) of land would be converted from open space to pump houses and above-ground reservoir tanks. About 3 km (2 mi.) of new pipeline easement would be needed to connect the well fields to the existing canal locations. The new easement would be located in the existing rights-of-way governed by the Town of Twisp or the county. No new rights-of-way would be required, while about 30 km (19 mi.) of existing canal rights-of-way would be abandoned.

Economics. Construction would likely be undertaken by a non-local construction company. A number of in-state construction companies (e.g., from Yakima, Wenatchee, Seattle, or Spokane) would qualify. Project construction would typically involve a crew of from 5-10 workers, and would take place over one or two construction seasons, depending on what time of year the work would begin, and the size of the construction crew that would work on the project. Construction would likely be curtailed during late fall and winter due to adverse weather conditions (Montgomery, Montgomery Water Group, pers. comm., 1997).

Construction personnel would typically seek temporary lodging in either local area motels or RV (recreation vehicle) parks in the valley. There are enough area accommodations to handle this demand. This impact would be considered slightly beneficial for the local economy. After construction, all construction personnel would be expected to leave the local area. Construction impacts are, therefore, expected to be temporary.

Costs for Alternative A would amount to about $4.6 million, including contingencies (CH_2M HILL, 1997). Funding sources would be public monies provided by both the region's ratepayers through BPA and the state's taxpayers through Referendum 38 funds from the WDOE and fish screen replacement funds from WDFW. About $210,000 in sales taxes would be generated by the proposed action, with effects distributed throughout the state of Washington (CH_2M HILL, 1997).

Operation Impacts

Land Use. Alternative A would result in a smaller irrigation district: about 376 ha (930 ac.) versus the present 921 ha (2,276 ac). Decreasing the size of the MVID would not likely result in major changes in land use, only in the way that land would be irrigated; however, Alternative A could lead to an increase in the rate of growth in the area, depending on the availability of land and other market factors (see Growth and Development, below). Most landowners who would leave the district have not received water from the MVID for many years and have already made any necessary adjustments in land use. Any changes in land use would be subject to existing land development regulations, including the Critical Areas regulations that are intended to protect environmentally sensitive areas within the county. Any decision either to develop or sell one's property would be a personal choice, unrelated to the proposed action. Limits on the

number, sizes, and locations of groundwater wells allowed to be put in by those leaving the district could limit future development of the valley.

Economics. MVID members electing to remain in the district would face higher O&M costs than at present; however, the water supply would be more dependable, liabilities resulting from lack of maintenance would be less, and future assessments would likely be more predictable and stable as a result (MVID Water Supply Facility Plan, Volume II, Appendix C, page 6 (Berk & Associates)). If the entire 376 ha (930 ac.) identified in the MVID Water Supply Facility Plan as remaining in the reformed district were irrigated, the annual O&M costs, including power cost, would amount to about $104,300 (1997 dollars), or about $277 per ha ($112 per ac.) (CH_2M HILL, 1997). (The reader should note that the MVID currently charges a minimum rate of $200 for irrigation water for two acres or less. Under Alternative A, the revised district could continue to charge a minimum rate for smaller-sized parcels. Also, the O&M cost estimate includes funding for future replacements, which is not included in the current MVID assessments.) The current O&M rates are assessed at approximately $124 per ha ($50 per ac.) for those members that currently receive irrigation water; however, additional funds are received from members not currently receiving irrigation water (MWG, June 1996).

Per-acre O&M costs would depend on the number of members who elect to remain in the district. If fewer members remain, the per-acre costs will go up. To avoid unacceptably high per-acre O&M costs to the remaining members, the MVID board could exercise its authority to establish district boundaries (RCW 87.03.665: Exclusion of Lands from District—Order Denying or Granting Petition). There is a potential for new members to be allowed to join the reformed MVID; however, any future growth of the district would depend on adequate supplies of water, and interest on the part of those adjacent to the reformed district boundaries. The assessment could be reduced if the MVID were to assess a minimum charge, or if it elected not to collect funds for future replacement costs.

Current MVID members whose parcels would be excluded from the reorganized MVID would be compensated. The amount of compensation would be calculated based on the acreage formula in Table 2-2, and would range between $2,000 and $29,500 per landowner, for a total of approximately $1.345 million. It is anticipated that former members would use the money to drill new or upgrade existing groundwater wells, pumps, and pipelines to replace the MVID water supply to which they are currently entitled. This would include the costs of any necessary testing of the wells. It would also compensate those who have been required to continue to pay assessments to the MVID over the years while not receiving their entitled water. No restrictions would be placed on the use of the money.

For those who would be leaving the district, and who would not be drilling new wells or improving existing wells, this would be considered a windfall, a beneficial impact. For those who would be using the funds to drill new well(s) or improve existing wells on their property, the impact would also be considered beneficial, although the degree would be variable and site-specific, benefiting some more than others, depending on the costs associated with obtaining a sufficient amount of water to irrigate one's fields. Overall, however, the impact would be considered to be beneficial in that the new wells would add value to the properties that would be provided with their own wells.

Property-value Impacts. This alternative would be a benefit to the salability of land. The project would establish the availability of water to parcels throughout the MVID service area. Those leaving the MVID could receive an authorization to convert a portion of the MVID right to a separate water right that would remain with the land. For those staying in the MVID, the water supply would be seen as a dependable resource and, with the formation of a new MVID, the O&M costs would be fixed for the near term. Although future power costs could rise over the long term, O&M costs would likely be foreseen as being relatively stable. Either way, long-standing water issues would be solved and this could be seen by potential buyers as an improvement over the existing situation.

However, the abandonment of the open canal could be perceived by some as detriment to property values. Some members of the district enjoy the canal from an aesthetic standpoint, and believe that potential purchasers would also.

Growth and Development. Alternative A might contribute to growth, in that it would result in water savings of approximately 21 cfs. This saved water must be transferred to the State of Washington's Trust Water Rights Program under RCW 90.42 - Water Resources Management (also known as the Trust Water Rights Program). WDOE has the statutory responsibility to administer this program, and has complete discretion to reallocate saved water to any use, including in-stream flows or new water allocations. Based on recent planning activities in the Methow Basin, it is most likely that the saved water placed in the Trust would be allocated in part to in-stream flow, and in part to new residential and agricultural uses.

3.6.2.2 Potential Impacts of Alternative B

Construction Impacts

Land Use. Under Alternative B, about 42 km (26 mi.) of canals would be relined, and 3.2 km (2 mi.) of new access roads would be built next to the renovated canals. No new rights-of-way would be required, but approximately 6.4 km (4 mi.) of existing canal rights-of-way would be abandoned.

Economics. Construction would occur along the entire length of the canal, so actions would be similar to those required for Alternative A. Economic impacts from construction crews would be similar to those under Alternative A. However, this alternative would cost more than 2.5 times as much to implement as Alternative A. Including contingencies, total cost is estimated at about $11.9 million. The cost of this alternative is well beyond the amount of money currently available through BPA, and WDOE has stated that the availability of Referendum 38 funds is questionable for any alternative that does not remove the diversions from the Twisp and Methow Rivers, so additional funding would need to be secured. The amount of sales tax received by the State of Washington would be the largest of any of the alternatives: about $700,000 in revenue.

Operation Impacts

Land Use. Alternative B would also result in a smaller irrigation district: about 517 ha (1,277 ac.) versus the present 921 ha (2,276 ac.). Impacts would be similar to those discussed for Alternative A.

Economics. O&M costs of Alternative B would amount to about $127,250 (vs. $104,300 for Alternative A), or about $248 per ha ($100 per ac.), assuming that all 517 ha (1,277 ac.) would be irrigated (more total hectares (acreage) irrigated means lower costs-per-hectare (per-acre) than under Alternative A). O&M costs would increase if fewer hectares (acres) were irrigated; as with Alternative A, the MVID board could exercise its authority to establish district boundaries (include or exclude members). As with Alternative A, more users could be encouraged to receive water from the MVID; however, this would depend on adequate supplies of water and interest. Also, a minimum charge could be levied, and funding for future replacements could be dropped.

Under Alternative B, there are two options for reimbursing current members who would leave the MVID—the acreage-based compensation option discussed under Alternative A, or an as-needed compensation option proposed by the Canal Associates (see section 2.2).

Acreage-based Compensation Option. This option is the same as the compensation option discussed under Alternative A. It would involve compensating those landowners who leave the MVID, based on the acreage formula in Table 2-2. The compensation would range between $2,000 and $29,500 per landowner, for a total of approximately $1 million. The results and impacts of this option would be the same as those discussed under Alternative A.

As-needed Compensation Option. This option would involve compensating those who leave the MVID for the cost only of new replacement well(s) or improvements made to existing well(s). The amount of payment would be based on the actual costs for these improvements and any necessary testing, not on acreage. A maximum of $2.2 million would be available for this purpose, as only the BPA money could be used (Referendum 38 funds from WDOE cannot be used for compensation). However, the number of people actually needing these improvements is expected to be low, so this option could result in savings over the acreage-based compensation option.

Under this option, only those who would want either to develop their own water supply or to improve an existing water supply would benefit. Those who have already developed their wells and/or who have been paying into the district and not receiving water would not be compensated. Those that chose to have replacement wells drilled on their property would experience a beneficial impact, in that they would receive a dependable source of water, and it would be essentially turbidity and weed-free.

Property-value Impacts. Alternative B would have similar benefits to property values as Alternative A. The system would be essentially new, and water deliveries would be reliable. O&M costs would be more stable than under Alternative A, since the potential for rising electricity costs would not be present with the gravity-fed system. Unlike the plan under Alternative A, the open canal would remain; however, some of its aesthetic value might be lost initially due to the reconstruction and removal of trees.

Growth and Development. Impacts would be similar to those discussed for Alternative A; however, not as much water would be saved, and therefore less would be available to the State Water Rights Trust.

3.6.2.3 Potential Impacts of Alternative C

Construction Impacts

Land Use. No additional land or rights of way would be needed for irrigation facilities under Alternative C. All 48 km (30 mi.) of existing canal rights-of-way and easements would be abandoned, and the diversion dams, intake structures, and fish screens removed from the rivers and their banks.

Economics. The construction impacts would include the presence of some construction personnel in the area for a much shorter period than under either Alternatives A or B. It is also more likely that local workers would be hired. Estimated project cost is about $2.7 million, up to $2.4 million of which would be needed for dissolution compensation. Approximately $18,000 in state sales tax would be generated by the proposed alternative.

Operation Impacts

Land Use. Dissolving the MVID would not likely result in major changes in land use, only in the way that land would be irrigated; however, the alternative could lead to an increase in the rate of growth in the area, depending on the availability of land and other market factors (see Growth and Development, below). Many landowners have not received water from the MVID for many years and have already made any necessary adjustments in land use. As under Alternatives A and B, any subsequent changes in land use would be subject to existing land development regulations. Any decision either to develop or sell one's property would be a personal choice, unrelated to the proposed action. Any limitations on the number, size, and location of groundwater wells allowed to be put in by those leaving the district could also limit future development in the valley.

Economics. With the dissolution of the MVID, O&M costs related to the present system would be zero, because the system would be abandoned. The aggregated costs to individuals for operation and maintenance of their systems might be higher than those for an intact district, however, because of the efficiencies of a centralized pumping system over individual wells.

Former MVID members would be compensated according to a formula based on size of area to be irrigated, as under Alternative A. This money could be used by the landowners to upgrade existing or drill new groundwater wells and pay for testing, where needed. It would also help compensate those of the district who have paid into the district over the years without receiving water.

It is likely that not all former MVID members would be able to drill individual wells, either because their land does not lie over the alluvial aquifer, or because WDOE would determine that their proposed well would impair an existing well. If MVID members who were precluded from drilling individual wells formed their own LIDs before dissolution of the MVID, the WDOE would fund replacement wells and associated facilities for the LID members.

Property-value Impacts. This alternative would most likely be a benefit to the salability of land: future assessment, O&M, and liability costs associated with the MVID would no longer be

an issue. However, as with Alternative A, the abandonment of the canal could be perceived to be a detriment.

Growth and Development. Impacts would be similar to those under Alternatives A and B.

3.6.2.4 Potential Impacts of Alternative D

Construction Impacts

Land uses would not change under Alternative D. The MVID would continue to use the existing system as it is. Fish screens might be upgraded, if funding for these improvements were available from WDFW. Needed repairs would cause minor construction impacts. Local crews would most likely be hired, and the construction would likely not exceed one construction season. Repair costs would amount to approximately $2.4 million. MVID members would have to fund these repairs themselves, or alternative funding sources would need to be found, as BPA and WDOE would not fund these repairs.

Operation Impacts

Land Use. Under the No Action alternative, it is assumed that the district membership would remain the same. No changes in land use are anticipated.

Economics. It is expected that O&M costs for the MVID would need to increase, because deferred maintenance is backlogged and there is no fund for needed repairs or replacements. The 1996 O&M costs were $103,450. In order to maintain the present system in its current state, annual O&M costs of $86,000 (including administrative costs), or about $272 per ha ($110 per ac.) would be required (based on the currently irrigated acreage plus a minimum charge for those not receiving water). It should be noted that the current assessments do not include funding for needed repairs and replacements, which is included in the O&M cost estimates for the other alternatives. Also, historic levels of O&M have not included vegetation maintenance; however, it is assumed that some vegetation maintenance would be necessary under this alternative. The potential economic impacts of the No Action Alternative would include the inequity of continuing an economic burden on those MVID members who pay for water but receive none, and who would like to leave the district, but are prevented from doing so at the present time. This would include both those groups who have no need for water (i.e., grow no agricultural crops), and those who have a need but are located at the end of the system, in the Carlton area, and cannot depend on a source of water during those critical times of the year when irrigation water is needed.

If the MVID were to elect to allow people to leave the district, there would be no compensation available.

Other economic impacts of the No Action Alternative include the potential catastrophic failure of the system, due to a number of potential circumstances that could cause the antiquated system to shut down, or at least require a major overhaul. Such system failures, although less likely with the repair of the most critical sections of the canal, could cause heavy property loss or loss of life.

Property-value Impacts. Some prospective property buyers would see the potential assessment and liability issues related to membership in the MVID as detriments to property values, but others might see the canal as an aesthetic asset.

Growth and Development. No growth or development impacts would result from Alternative D.

3.7 Cultural Resources

3.7.1 Existing Environment

3.7.1.1 Tribal Rights

Before European-Americans arrived, north-central Washington State was occupied by a number of different Tribal groups, including the Wenatchi (Fulkerson, 1988). Subgroups of the Wenatchi Tribal group include the Methow group (Spier, 1936; Teit 1928). A subgroup, the Methow Band, occupied the Methow River Valley, practicing traditional hunting, fishing, and gathering activities. In 1879, the Moses Reservation, which included the Methow Valley, was created by Executive Order; the Methow Band was one of the Tribes that moved to the reservation. When the Moses Reservation was canceled in 1886, most members of the Methow Band and other Tribes occupying the Moses Reservation moved to the Colville Reservation in central Washington, and were enrolled as members of the Confederated Tribes of the Colville Reservation (A. Fredin, Colville Confederated Tribes, pers. comm., 1996). Others moved to the Yakama Reservation and were enrolled as members of the Confederated Tribes and Bands of the Yakama Indian Nation (J. Menninick, Yakama Indian Nation, pers. comm., 1997). Some Native Americans obtained allotments in the Methow Valley at the time of the move to the other reservations, and retain those allotments today.

3.7.1.2 Traditional Uses

The way of life for the Methow Band centered around ceremonies, religion, traditions, and customs that depended on the continued flow of salmon. This independent lifestyle was in existence and undisturbed by any outside influence for thousands of years. Materials were gathered to make mats, bags, baskets, and medicines (Fredin, 1994). Diet consisted of fish, with supplements from roots, berries, assorted greens, river mussels, deer, elk, bear, fowl, rabbits, and other small mammals.

The local Native Americans extensively used the Chillowist Trail, which began at Chillowist Creek on the Okanogan River and ended where Benson Creek flows into the Methow River. The North Fork of the Chillowist Trail traveled along Beaver Creek (Cain, 1985; Fulkerson, 1988). The east canal crosses the location of the trail in the vicinity of the Benson and Beaver Creek **flumes**. Many groups of Native Americans came over from the Okanogan valley in the summer to fish and pick berries (Moore, 1965). It is most likely those groups traveled on the Chillowist Trail.

3.7.1.3 Cultural Resource Sites

In October 1996, staff from BPA's cultural resources contractor, Archaeological and Historical Services, conducted a field investigation of the east and west canals. The possible pipeline, reservoir, and well locations were also inspected. Two artifacts were recorded. Although five cultural resource sites have previously been identified in the vicinity of the canal, only the Chillowist Trail is within the project area. It is also known that unmarked Native American cemeteries are located in the area, and one known cemetery has been marked with a rock (Confederated Colville Tribal member, public meeting, 1996).

MVID Irrigation System

The MVID canal system has been determined to be eligible for inclusion on the National Register of Historic Places (National Register), under Criterion A (property associated with events that have made a significant contribution to the broad patterns of our history). The system has been the most significant irrigation feature in the Methow Valley. Although neglect and numerous changes in the structural materials have caused substantial deterioration, both the east and west canals are still mostly located in the original rights-of-way.

The Methow Valley Irrigation District canal system has been vital to the Methow Valley's agricultural production (especially fruit-growing) during its years of operation, from the 1900s up through the present. European-Americans first began to occupy the Methow Valley following the Moses Agreement of 1886, when most Native Americans west of the Okanogan River were moved onto the Colville Reservation. The first small-scale efforts at irrigation came in the 1880s, when many ditches were taken out from the various creeks flowing down to the Okanogan River and out of the Methow.

After 1900, irrigation attempts in the Methow Valley became larger-scale and more organized. By 1908, the High Line ditch was operational, intended to supply water to several thousand acres on either side of the Methow River. However, the sole source of the water was the Twisp River, which did not prove to be adequate for the job.

In 1919, farmers and orchardists created the MVID. They acquired the High Line ditch and built a completely new system. Instead of drawing all of its water from the Twisp River, it drew from behind a newly built low dam across the Methow River, about 6.5 km (4 mi.) north of Twisp. Water was thus diverted into a new canal that supplied the east side of the Methow Valley. Water from the Twisp River was used only to supply the west side of the valley. By 1923, the new system was completed and the east-side irrigation water had reached Carlton. Much of the old High Line ditch west of the Methow River had been rebuilt, with much of the flume replaced with lined ditches.

Maintenance work on the canals included inspections for leaks and structural damage. The lining of the flumes and ditches required continual patching and replacement. By the 1930s, wildlife officials were becoming concerned with the apparent decline in the fish population in the Twisp and Methow rivers. Much of the loss was attributed to fish being drawn out of the rivers and into the irrigation network, where they often died. Fish screens, which prevent the

entry of fish into the irrigation system, were installed at both canal intakes in 1937. These facilities were periodically remodeled and eventually completely replaced.

3.7.2 Potential Impacts

3.7.2.1 Potential Impacts of Alternative A

Construction Impacts

Potential construction impacts under Alternative A would include changes to the canal system (which appears to be eligible for the National Register), impacts on archaeological sites, and/or impacts on traditional use sites. BPA is consulting with the Washington State Historic Preservation Office (SHPO) regarding the eligibility of the canal system and any mitigation that would be required for impacts on the canal system under the proposed actions. Usually, the preferred mitigation is to compile drawings, pictures, and other information in an Historic American Engineering Record (HAER) document. BPA is currently in the process of initiating this work. See section 4.4 for further information on the process.

When definite locations of proposed wells, connecting pipelines, reservoirs, and other new facilities are determined, additional surveys would be conducted to confirm that cultural resources would not be affected by construction or operation of the rebuilt irrigation system. If sites potentially eligible for the National Register were found in the vicinity of any planned construction activity, efforts would be made to avoid affecting the sites, to the extent possible. If this were not possible, consultation with the SHPO and affected Tribes would be initiated. A Memorandum of Agreement would be drafted that would detail any additional testing that would be undertaken, and the treatment of any cultural materials that might be found, either during testing or construction.

The groundwater wells and associated facilities might require small plots of land in or near traditional use areas, such as fishing sites and gathering areas for basket-weaving materials. The Tribes would be consulted to minimize any impacts on these traditional uses.

Operation Impacts

Under Alternative A, improving flows on the Methow and Twisp rivers would not change existing Tribal fishing rights; however Native Americans would benefit from the project if it were to increase fish numbers, as would all people who fish on these rivers.

3.7.2.2 Potential Impacts of Alternative B

Construction Impacts

Impacts for the partial upgrade alternative would essentially be the same as those for Alternative A, except that, because no system wells or pumps would be constructed, those areas would not be affected.

Operation Impacts

As with Alternative A, improving flows on the Methow and Twisp rivers would not change existing Tribal fishing rights. Native Americans and other anglers would benefit from the project if it were to increase fish numbers.

3.7.2.3 Potential Impacts of Alternative C

Construction Impacts

The only potential construction impacts of Alternative C would be from the abandoning of the historic canal system, and the drilling of new wells by individuals. Impacts on the canal system would be mitigated, as discussed under Alternative A. The likelihood of affecting cultural resources through well drilling would be small, since the area of ground disturbance would be only slightly larger than the wells.

Operation Impacts

Impacts would be the same as those under Alternatives A and B.

3.7.2.4 Potential Impacts of Alternative D

Construction Impacts

Impacts on cultural resources could occur during ongoing repairs to the canal system. However, since BPA funding would not be involved, there would be no protection to these resources other than any existing state laws.

Operation Impacts

Under the No Action Alternative, flows on the Methow and Twisp rivers would not increase because in-stream diversions would not be upgraded. However, there might be some slight improvement in fish numbers as fish screens were upgraded. Existing Tribal fishing rights would not change.

3.8 Safety and Liability

3.8.1 Existing Environment

Much of the current canal system is in poor condition because past maintenance has been incomplete. Sections of the existing earth- and concrete-lined canals are on steep slopes, some undercut by erosion. Homes are built in areas below the canals, and narrow bridges and culverts cross the canals. Washouts and breaks have been an ongoing problem. In 1948, hundreds of feet of ditch were washed out when severe flooding occurred. More recent breaks have threatened and damaged property and roads, and have dumped material into the Methow River. Sometimes animals tunnel under the ditch and cause breaks. The wooden flashboards in the Methow River

diversion dam must be adjusted by hand, requiring workers to walk along the structure in the river.

The valley is also a popular recreational area, drawing those who enjoy boating and floating on the Methow River. Finally, the irrigation canals have been used as a source of water to refill tanks for fighting fires. The Carlton/Twisp/Winthrop/Mazama Fire District #6 provides fire protection services to the MVID area. The Fire District carries water to fight fires primarily in 11,356-liter (3,000-gallon) tankers. If more water is needed, it is taken from rivers and the irrigation ditches (when water is present). No public water supply exists in the area. (Reiber, pers. comm., 1997).

3.8.2 Potential Impacts

3.8.2.1 Potential Impacts of Alternative A

Construction and Operation Impacts

Converting the open canals to enclosed pipe would greatly reduce the threat of canal failures/ breaks and washouts. People and property below the canals would be safe from damage or loss of life that could be caused by breaks. Drowning risk would be eliminated. The dams (removed) would no longer present a hazard to boaters or to maintenance workers. Therefore, the MVID members' costs for liability insurance would be reduced, as would threat from the potentially high cost of lawsuits by persons injured or killed, or property damaged, by current canal failures or operations.

Enclosing the irrigation ditch in an underground pipe could eliminate one source of water for fire district use during the period from May through October. River water would still be available for fire suppression purposes in the area. Also, access to the irrigation pipe could be made available where roads or bridges cross the pipe. Pump ports (accessible only to the fire district and other fire protection providers in the area) could be added to the system that would allow fire fighters a ready source of water when it would most likely be needed, i.e., during the brush fire season (March through September (Reiber, Fire District #6, pers. comm., 1997).

Abandoned portions of the canal would not be backfilled or the land reclaimed to what it was before initial construction (early 1900s). The canals, modified to allow drainage through existing spillways, would become the responsibility of the landowner. Abandoned sections could hold stagnant water, attracting mosquitoes or other pests. Those portions could be considered an attractive nuisance; however, they would likely be less of an attractive nuisance than they are now, since they would contain much less water.

3.8.2.2 Potential Impacts of Alternative B

Construction and Operation Impacts

Some safety and liability issues would be a continuing concern, since the canal would remain an open, concrete-lined system. However, with completion of proposed repairs in areas of high operational risk, improved in-stream diversions, and regular maintenance, the risks would be

greatly reduced. Nearby people and properties would have a reduced threat from breaks and washouts. The improved diversion dam might eliminate the need for workers to walk along the structure in the river to adjust flashboards. However, risk of drowning in the canal would continue. Boaters and floaters could potentially drop over the diversion dam. Therefore, the MVID members and private citizens might become liable for persons injured or killed, or property damaged, by canal operations, incurring potentially high liability costs. The canal would remain available seasonally as a source of water to fight fires.

3.8.2.3 Potential Impacts of Alternative C

Construction and Operation Impacts

Impacts would essentially be the same as those for Alternative A, as the ditch would be abandoned and modified at the spillways, and the in-stream diversions removed. As under Alternative A, Fire District #6 and other firefighting entities would no longer have access to the water in the canal. The mitigation suggested under Alternative A would not be possible.

3.8.2.4 Potential Impacts of Alternative D

Construction and Operation Impacts

Under the No Action alternative, many safety and liability issues would continue to be of concern, even if some repairs were made. Nearby people and properties would still be threatened by breaks and washouts. Drownings could still occur. Boaters and floaters could drop over the diversion dam. The dam workers would continue to work under risky conditions. Therefore, the MVID members and private citizens would continue to be liable for persons injured or killed, or property damaged, by canal failures or operations, incurring potentially high liability costs. The canal would remain available as a source of water to refill tanks to fight fires.

3.9 Cumulative Impacts

Cumulative impacts are those that result from "individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). The following potential cumulative impacts have been identified for the Methow Valley Irrigation Project:

- the cumulative impacts of all watershed management projects implemented through the Northwest Power Planning Council's Fish and Wildlife Program;
- the cumulative impacts on the groundwater aquifer and the Methow and Twisp rivers of changing the MVID diversions from direct withdrawals from the two rivers to individual wells or a combination of individual and community wells;
- the cumulative impact of loss of water-dependent vegetation and wildlife habitat along the canal ,along with past and present losses due to other factors;
- the cumulative impact of higher assessment costs to MVID members who must deal with past, present, and future increases in costs due to other factors, which may lead to a shift from agriculture to other land uses; and
- the potential for this project to enable future growth and development through the deposit of a portion of the water "saved" through this project into a proposed water bank or State water trust.

These impacts have been addressed elsewhere in this EA, but are summarized in this section as well, so that overall cumulative impacts that involve multiple resources are addressed.

3.9.1 Watershed Management Project Cumulative Impacts

The Methow Valley Irrigation Project is one of several hundred past and present watershed management projects initiated under the Northwest Power Planning Council's Fish and Wildlife Program. As discussed in section 1.4 of this EA, the Watershed Management Program EIS addressed the programmatic environmental issues of implementing this program. This EIS was recently completed by BPA with a Record of Decision signed on August 27, 1997. The cumulative impacts of all future watershed management projects (including this project), considered together with past, present, and future human actions in the Columbia River Basin, were addressed in the EIS in section 4.10. The EIS concluded that, overall, watershed management throughout the Columbia River Basin would provide a net benefit to water quality, fish, and fish habitat, as well as to other natural resources such as soils, vegetation, and wildlife. Negative impacts of watershed management projects would be temporary, site-specific, and associated mainly with initial project implementation. These short-term negative effects would be compensated for by overall long-term improvements in watershed condition, and, ultimately, in increases in fish habitat and fish populations.

3.9.2 Cumulative Groundwater and River Flow Effects

Effects of the dewatering of the canals and use of groundwater instead of river diversion water under Alternatives A and C have been of concern to many. However, it is the opinion of BPA, WDOE, and our consultants (CH2M HILL) and of the Environmental Protection Agency (letter of October 1, 1997) that the overall changes would not adversely affect river flows or groundwater levels. As discussed in section 3.1 of this EA, in-stream flows would be increased, to the benefit of fish, riparian-dependent wildlife, and other aquatic species. Not only would the direct river diversions be eliminated, but the total amount of water withdrawn from the aquifer for irrigation purposes would be decreased from approximately 67 cfs to 46 cfs through improvements in delivery efficiency.

Overall, Alternatives A and C would benefit in-stream flows, especially in the reaches immediately downstream of the diversions, for the following reasons:

- All new wells would need to be in continuity with the aquifer that feeds the rivers;
- The withdrawals would be several miles downstream of the original diversions; and
- The new wells would be spread over a much larger area than the original diversions.

River flows might be somewhat reduced in the immediate vicinity of the larger wells planned under Alternative A (wells to provide water to the reorganized MVID through a piped irrigation system). However, as discussed above, the overall diversion amount will be significantly less than the current amount, thus reducing the effect of these withdrawals on river flows. Also, these wells would be sited and tested to insure that impacts are minimized, and that the use of existing wells in the vicinity would not be impaired. The effects of individual wells on river flows or groundwater levels are expected to be minor, again because withdrawals would overall be reduced and WDOE would require appropriate siting and testing before installation. Also, the individual wells would be spread over a large area, and they would withdraw water from points much closer to where the irrigation water would be applied and the aquifer replenished.

The effect of stopping groundwater returns from canal seepage on river water temperatures or flows is expected to be negligible under Alternatives A, B, or C. Since the canal seepage is spread linearly over a relatively large area (45 km or 28 mi. of canal), and since the aquifer is so highly transmissive, it is unlikely that it contributes much to moderating river water temperatures or flows. If aquifer storage *does* contribute to moderating flows or water temperatures in the river, the majority of that effect is most likely coming from the application of irrigation water on agricultural land. This would continue under Alternatives A, B, and C.

Another potential cumulative groundwater effect would be the combination of the proposed new MVID surface water diversion to groundwater withdrawals with any other proposed new groundwater withdrawals for other reasons. WDOE is responsible for the administration of both surface and groundwater withdrawals. The laws that govern WDOE's actions regarding new water allocations require the following: 1) that there be water available for allocations, 2) that the proposed use be beneficial (as defined by regulation), 3) that the proposed use be in the public interest, and 4) that the proposed use not impair existing rights. Any new withdrawals

would be junior to the MVID rights, and would need to meet WDOE requirements. Since WDOE would not allow any new withdrawals that would impair the rights of existing water users, nor would it authorize any water use if it did not meet the three criteria identified above, cumulative impacts (if any) would be minor.

3.9.3 Cumulative Loss of Vegetation and Wildlife Habitat

As discussed in Sections 3.4 and 3.5 of this EA, Alternatives A, B, and C would result in changes to approximately 13.3 ha (32.9 ac.) of vegetation that depend on canal seepage water. This linear band of vegetation spread along the 45 km (28 mi.) of canal would gradually be replaced with more drought-tolerant species as the canal is dewatered and seepage stops. This would, in turn, affect wildlife that use the vegetation and the water in the canal. These losses, when added to past losses of vegetation and wildlife habitat as the valley developed, could have a cumulative impact. However, WDOE, BPA, WDFW, and the MVID have agreed that the new impacts could be partially mitigated through two means:

1. The increased in-stream flows may rewater those areas of the Methow and Twisp river floodplains that were historically dewatered by the diversions. As a result, the amount of riparian habitat available to wildlife along the rivers would increase. These more natural riparian areas would require less maintenance, be more fully functional, and receive better long-term protection through state and Federal law than the canal-seepage-dependent vegetation along the canals.

2. MVID members who wished to use a portion of their water right to continue to water vegetation along the canal would be allowed to do so.

Concern has also been raised that these vegetation changes could affect the overall landscape and aesthetics of the valley. However, as discussed above, the vegetative growth along the canal may be replaced by additional growth in the floodplain, a more natural and historic situation, and may be maintained in some areas by MVID members who wish to do so. Also, if the canal were to remain and be properly maintained, many of the trees would need to be removed because they threaten the structural integrity of the canal. These trees are the dominant canal-dependent vegetation contributing to the overall landscape and aesthetics of the valley.

3.9.4 Higher Assessment Costs and Shifts in Land Use

As discussed in section 3.6, assessments for maintenance and operations of the irrigation system would be higher under Alternatives A and B than they are currently. (Alternative C would result in the dissolution of the district and the assumption of irrigation costs by the individuals who continue to irrigate.) People might therefore decide not to continue irrigating. Severe winters already make valley agriculture marginally profitable, so any increase in costs could result in changes in land use from agriculture to other uses. There are several factors already contributing to these changes. The valley is undergoing a shift from an economy based on natural resources to one based on recreation and tourism. Residential development is strong, and absentee owners predominate, owning perhaps as much as 60 percent of the land (M. Archer, Okanogan County Assessor's Office, pers. comm., 1997).

Increases in assessments similar to those anticipated under Alternatives A and B would need to occur whether the project is implemented or not. As shown in Table 4 of **Appendix B**, the total O&M costs estimated for Alternative A are only slightly higher than the 1996 actual O&M costs for the MVID. *Per-acre* costs are higher, as fewer acres are assumed to be served under Alternative A. However, the existing MVID assessments do not include money for adequate maintenance of the system, needed repairs, or replacements. The MVID has historically relied on WDOE to pay for emergency repairs to the system. WDOE has stated that it will no longer pay for such repairs if the MVID does not improve its system through this project. Therefore, the MVID assessments would need to be raised substantially if the system is to be maintained, even in its present state. Under the proposed project, the improvements would be totally funded by WDOE, BPA, and WDFW.

3.9.5 Potential for Future Growth and Development

As discussed in section 3.6 of this EA, Alternatives A, B, and C might contribute to growth and development in the Methow basin. These alternatives would result in water savings through conservation. This saved water must be transferred to the State of Washington's Trust Water Rights Program under RCW 90.42 - Water Resources Management (also known as the Trust Water Rights Program). WDOE has the statutory responsibility to administer this program, and has complete discretion to reallocate saved water to any use, including in-stream flows or new water allocations. Based on recent planning activities in the Methow Basin, it is most likely that the saved water placed in the Trust would be allocated in part to in-stream flow, and in part to new residential and agricultural uses.

CHAPTER 4: ENVIRONMENTAL CONSULTATION, REVIEW AND PERMITS

4.1 National Environmental Policy

This environmental assessment is prepared pursuant to the National Environmental Policy Act (NEPA, 42 USC 4321 *et seq*.) and implementing regulations which require Federal agencies to assess the impacts of their proposed actions on the environment. Under NEPA, BPA has the option to prepare an environmental assessment to provide evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact (FONSI). BPA prepared a determination on August 28, 1996, that the funding of the Methow Valley Irrigation District Conversion is within the class of actions normally requiring an Environmental Assessment as listed in Subpart D of 10 CFR Part 1021.

4.2 State, Areawide, and Local Plan and Program Consistency

4.2.1 State Environmental Policy Act

On February 23, 1996, the MVID Board of Directors signed a Determination of Nonsignificance (DNS) under the Washington State Environmental Policy Act, Washington Administrative Code 197-11-340(2), for the proposed adoption and implementation of the Methow Valley Irrigation District Water Supply Facility Plan. This determination was made based on an environmental checklist dated January 18, 1996. A Notice of Environmental Determination was published in the *Methow Valley News* on February 29, 1996. A number of comment letters was received. After the MVID reviewed the comments and prepared responses, the Board of Directors decided to retain the DNS for adoption and implementation of the Water Facility Supply Plan. Subsequently, the DNS was challenged by a group of MVID members who oppose the action. The parties to the appeal reached an agreement to stay further action until BPA shall have completed its environmental review.

4.2.2 State and Areawide Clearinghouses

BPA distributed the preliminary EA to the Washington State clearinghouse for state and local agency review and consultation, as required by Executive Order 12372. No comments were received through the clearinghouse review. The clearinghouse will also be informed of the availability of the final EA and decision on whether to prepare a FONSI or an environmental impact statement.

4.2.3 Local Plans

The proposed MVID actions would be located in areas covered by the Okanogan County Comprehensive Plan and the Methow Valley Plan, an addendum to the comprehensive plan. The comprehensive plan is a declaration of policies, and as such, contains no regulations or minimum standards.

Most of the canal facilities are located in either the Methow Valley Review District's Uplands zoning district (8-ha or 20-ac. minimum lot size) or the MVRD 5 zone (2-ha or 5-ac. minimum lot size). Irrigation facilities are consistent with these zonings.

Okanogan County recently adopted critical area regulations under the State's Growth Management Act of 1990, as amended, in order to protect wetlands, areas with critical recharging effects on potable water, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservation areas. The existing and proposed MVID facilities are located in some of these areas:

- **Wetlands.** The diversion dams and intakes on both rivers, the fish screen facilities at the Twisp River diversion, and a short section of canal at the Hotchkiss spill on the west canal are located in wetlands. Riparian areas created solely by seepage from the canal are not considered to be wetlands by the county. See section 4.6 for a discussion of potential wetland impacts.

- **Aquifer Recharge Areas.** Areas with critical recharging effects on potable water have not been mapped; however floodplains and associated areas are considered to be likely areas. Some of the diversion and intake facilities, short sections of the canal or proposed pipeline, and the new groundwater wells might be located in these areas. Artificially diverted or stored waters such as the irrigation canal are exempted from these areas; therefore, most of the existing canal seepage areas are exempted from this designation.

- **Frequently Flooded Areas.** Diversion dams, intakes, and fish screen facilities are located in frequently flooded areas, defined as the 100-year floodplain as designated on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate maps. See section 4.6 for a discussion of these floodplain impacts.

- **Geologically Hazardous Areas.** It is likely that sections of the existing canal cross erosion hazard and landslide hazard areas; however, maps of these areas are not available. The county will be contacted to determine applicability of the regulations pertaining to these areas.

- **Fish and Wildlife Habitat Conservation Areas.** Much of the existing canal system is located in priority Level II and III mule-deer migration, spring range, and critical winter range corridor (these overlap; maximum about 37 km or 23 mi.),and white-tailed deer priority Level III (21 km or 13 mi.) habitat, with a smaller amount bordering bald eagle priority Level I and Harlequin duck priority Level II (3.5 km or

2.2 mi.) and golden-eagle priority Level II habitat (1.1 km or 0.7 mi.). The existing diversion dams, intakes, and fish screen facilities and proposed well fields and associated facilities are or would be located in bald-eagle priority Level I and Harlequin-duck priority Level II habitat areas. Standards are delineated for Level I and II habitats, but not for Level III habitats. BPA has consulted with the USFWS regarding impacts on bald eagles under the Endangered Species Act; they have concurred with BPA's finding that the project would not adversely affect the bald eagle (see sections 3.5 and 4.3). Standards for Level II habitats applicable to the proposed actions include native revegetation and riparian vegetation protection (for facilities in natural wetlands, but not for riparian vegetation artificially maintained by the seepage from the canal).

WDOE and MVID have and would continue to coordinate the proposed actions with the county planning department to specifically address any concerns regarding zoning or conflict with critical areas.

4.3 Wildlife and Habitat

4.3.1 Endangered and Threatened Species and Habitats

The USFWS prepared a list of Federally listed, threatened, and endangered species that may be present in the general project area in Okanogan County (Philip Laumeyer, USFWS, letter; February 28, 1997). Federally listed species include the endangered gray wolf, the threatened bald eagle, and the endangered northern spotted owl. The USFWS also identified 13 terrestrial species of concern that are to be considered for planning purposes. These species are listed in Table 3-9. On

August 11, 1997, steelhead in the Methow and other areas were added to the Endangered Species list by the NMFS. The USFWS recently announced that bull trout will be listed under the Endangered Species Act, and is currently finalizing the ruling. BPA has submitted a biological assessment to NMFS regarding the impacts of the project on steelhead, and will consult with the USFWS when the bull trout is listed.

See section 3.5 for information regarding impacts on these species. Impacts are expected to be negligible for the wildlife species, and may be beneficial for steelhead and bull trout. The USFWS has concurred with BPA's determination that Alternatives A, B and C would have no effect on the Northern spotted owl, grizzly bear, or grey wolf, and may affect, but not adversely affect, the bald eagle (K.R. Campbell, USFWS, letter, October 22, 1997 in Appendix J). BPA has discussed the biological assessment on steelhead with NMFS, and they have indicated that they expect to respond with a letter concurring with our determination that the project would not adversely affect steelhead. If NMFS suggests additional measures to lessen the impact on steelhead, BPA would incorporate them into the project plans.

4.3.2 Fish and Wildlife Conservation

Alternative A is consistent with the Council's Columbia River Basin Fish and Wildlife Plan. It was recommended to the Council for inclusion in the priority projects by the YIN in 1996, and subsequently accepted by and recommended to BPA for funding by the Council. Alternatives B and C would need to be reviewed for consistency with the Council's recommendations, if they were to be accepted. Alternative D (No Action) would not be consistent with the Council's recommendation.

Alternative B would include revisions to the existing diversions and therefore would require USFWS review under the Fish and Wildlife Coordination Act (16 USC 661 et seq.). BPA will provide USFWS a copy of this EA for their review.

4.4 Heritage Preservation/Native Americans

4.4.1 Historic and Archaeological Resources

The MVID canal system has been determined to be eligible for inclusion on the National Register of Historic Places (National Register), under Criterion A (property associated with events that have made a significant contribution to the broad patterns of our history). The system has been the most significant irrigation feature in the Methow Valley. Although neglect and numerous changes in the structural materials have caused substantial deterioration, both the east and west canals are still mostly located in the original rights-of-way.

BPA is working on a Memorandum of Agreement (MOA) with the Washington SHPO regarding the mitigation that would be required for impacts on the historic canal system under Alternatives A, B, and C. Usually, Historic American Engineering Record (HAER) documentation is the preferred mitigation measure for historic properties of engineering significance. BPA is currently in the process of initiating the HAER work.

Archaeologists from Archaeological and Historic Consultants, BPA's consultant, have also completed a field investigation of the east and west canals, on foot, along the length of the canals. The possible pipeline, reservoir, and well locations were also inspected. Two artifacts were recorded within 30.5 m (100 ft.) of the east canal. Several properties currently listed on the National Register were identified in the general area, but none would be affected by the proposed actions. When definite locations of proposed wells, pipelines, and other proposed facilities are determined, those areas would be carefully inspected and shovel-tested to insure that no intact subsurface cultural remains are affected.

The MOA mentioned above would address these resources as well. It would be signed and the pertinent provisions adhered to before or during any BPA-funded work on the canal or other facilities.

4.4.2 Native Americans

Methow Band members from the Colville Confederated Tribes have indicated that unmarked Native American cemeteries are located in the Methow valley, and one known cemetery has been marked with a rock. Traditional use areas for fishing and gathering basket-making materials are also located along the river (Colville Confederated Tribe members, public meeting, 1996). When definite locations of proposed wells, pipelines, and other proposed facilities are determined, BPA will comply with the regulations implementing the National Historic Preservation Act, and consult with the Colville Confederated Tribe and Yakama Indian Nation members to determine whether the historic or cultural resources would be affected, and, if so, possible courses of action. However, no additional compliance would be necessary if these facilities were placed in areas such that there is no likelihood of the activity changing the character or use of an historic property.

4.5 Coastal Management, Shorelines and Wetlands

The Coastal Zone Management Act of 1972 requires that Federal actions directly affecting the coastal zone be undertaken in a manner consistent, to the maximum extent possible, with the State's coastal zone management program. Washington's coastal zone management program is implemented through the provisions of the State Shorelines Management Act, including shoreline management programs developed/administered by the counties. The Coastal Zone Act Reauthorization Amendments of 1990 also require that proposed Federal facilities fully comply with Federal consistency requirements, as determined by and through consultation with a designated coastal zone management agency.

County jurisdiction is invoked under the Shoreline Master Program for projects within 61 m (200 ft.) of the ordinary high-water mark of Shorelines of Statewide Significance (or within the 100-year floodplain), or for projects requiring a floodplain development permit (Okanogan County, 1997). The Twisp and Methow rivers and their associated wetlands are considered shorelines of Statewide Significance. However, most riparian areas along the canals are not wetlands because they are artificially established and do not meet the soils criteria to be classified as wetland, or they are upland riparian areas (Parametrix, 1995; Okanogan County, 1997). Potentially jurisdictional areas affected by the MVID irrigation system generally are limited to areas around water intakes, diversions, and groundwater wells that are or would be located next to the rivers.

Wherever possible, construction in wetlands or shoreline areas would be avoided, and MVID groundwater pumping would be designed to avoid affecting surface wetlands through groundwater withdrawal. Facilities built by local landowners would be regulated by Federal and county agencies with jurisdiction over wetlands and waters protection.

In addition, BPA would take the following measures, when practicable, to assure consistency with the county's Shoreline Master Plan.

1) Location of structures within the identified shoreline would be avoided if possible. If locations within the shoreline area could not be avoided, BPA would consult with the appropriate state and local agencies to determine the best placement of the structure.
2) In shoreline areas, disturbed land would be restored as closely as possible to pre-project contours and replanted with native and local species. However, there might be locations where site topography would require bank disruption. A restoration and monitoring plan would be prepared before shoreline areas were disturbed.
3) Erosion control measures would be implemented within the 61-m (200-ft.) shoreline area.

4.6 Floodplains/Wetland Assessment

In accordance with the Department of Energy regulations on Compliance with Floodplain/ Wetlands Environmental Review Requirements (10 Code of Federal Regulations (CFR) 1022.12), BPA has prepared the following assessment of the impacts of the Methow Valley Irrigation District Conversion Project on floodplains and wetlands. A notice of floodplain/ wetlands involvement for this project was published in the Federal Register on October 30, 1996. No comments were received.

Four alternatives for the project, including the No Action alternative, are described in Chapter 2 of this EA. The floodplain and wetlands locations are described below. Alternatives A, B, and C would all involve actions in the floodplains of the Twisp and Methow rivers, at the diversion points. All of the action alternatives could involve the drilling of wells for individual landowners in the floodplain and/or associated wetlands along the Methow and Twisp rivers. Of the action alternatives, Alternative C would have the least impact on floodplains and wetlands. The existing diversions and water intake facilities would be removed, but no new construction would take place in floodplains and wetlands. Alternative B would involve improvements to the existing diversions, associated intake structures, and possibly canal structures in the floodplain and/or wetlands. Alternative A would involve the removal of the diversions and associated intake structures, but would also result in the construction of well fields, reservoirs, and laying of pipeline in the floodplain. Wetlands would be avoided if at all possible. The No Action alternative would not affect floodplains or wetlands, unless repairs were needed to existing facilities located in these areas.

4.6.1 Floodplain Effects

Under Executive Order 11988, Federal agencies must avoid or minimize adverse impacts associated with short-term or long-term modification and occupancy of floodplains. Modification and destabilization of the floodplain could have potentially adverse effects, not only near the disturbance, but also in the stream channel and floodplain great distances downstream. Adverse impacts include the potential for flood damage to the facilities, increased flooding due to displacement of water from the normal floodplain by the construction of the facilities, and increased potential for erosion of floodplain soil and sediment near the construction sites.

The existing sites located in the 100-year floodplains of the Twisp and Methow rivers include the diversions, headgates, fish screens, and portions of the canals. Detailed studies have not yet been conducted at the new facility sites; development and operation of these facilities could occur within the defined 100-year floodplain, although these would be avoided where possible. County authorities and FEMA would be contacted to ensure that any new construction would meet County and FEMA regulations. Certain design restrictions or limitations may apply. If facilities were located within the floodplain, they would be designed to withstand flooding. Overall, the proposed project activities would not adversely affect human life, property, or natural floodplain values.

4.6.2 Wetland Effects

Seepage from the canals has supported riparian vegetation along much of the length of the existing canals. However, since these riparian areas have been artificially created by the irrigation facilities and do not meet the hydric soils criteria to be designated as wetland, they are not protected under Federal, state, or local laws or regulations. There are, however, wetlands associated with the floodplains of the Methow and Twisp rivers and various natural streams and seeps that are crossed by the existing canal and facilities.

Detailed delineations of the facility sites have not yet been completed, but preliminary characterizations would be considered during selection of the sites for new construction. Delineations would be completed before facility final design, siting, construction and operation. Wherever possible, construction in wetlands or riparian areas would be avoided, and MVID groundwater pumping would be designed to avoid affecting surface wetlands through groundwater withdrawal. New MVID facilities would be designed to avoid or minimize impacts on wetlands, which are protected by Federal, state, and county law. Facilities constructed by local landowners would be regulated by Federal and county agencies with jurisdiction over wetlands and waters protection.

Disturbance of wetlands during construction and well-drilling activities would be avoided whenever possible. If disturbance could not be avoided, the area of disturbance would be minimized to the extent practicable. Most disturbance would be temporary and would not constitute any net loss to wetlands. Upon completion of construction, excavated areas would be backfilled, and disturbed land restored to its previous condition wherever possible.

Natural and beneficial values of the wetlands associated with the Methow and Twisp rivers would be enhanced under Alternatives A and C, and B (although to a lesser extent), through the return of water to these rivers in the sections upstream of their confluence. At present, the irrigation diversions remove large amounts of water from these rivers and have, over the years, adversely affected riparian wetlands associated with them.

4.7 Farmlands

The Farmland Protection Policy Act (7 U.S.C. 4201 et. seq.) requires BPA to identify and quantify adverse impacts of the proposed action on farmlands. The location and extent of prime

and other important farmlands designated by the Natural Resource Conservation Service (NRCS; formerly Soil Conservation Service) were obtained from NRCS soil survey information. The NRCS has designated most of the soils on the valley bottoms next to the Methow River as farmland of statewide importance. Small acreages of irrigated land and orchards have also been classified as prime and unique farmlands. Evaluation of the proposal according to criteria set forth in the Act indicates the project would have minimum impact on area farmlands, for the following reasons:

- The intended project is fully compatible with existing agricultural use of surrounding farmland.
- No additional non-farmable farmland would be created by physically interfering with existing land use patterns.
- The project would follow an existing canal right-of-way and would not affect previously unaffected existing agricultural operations.
- No existing substantial and well-maintained on-farm investments would be adversely affected.
- The project would not cause the agricultural use of adjacent farmlands to change, nor would it jeopardize the continued existence of area farm support services.

4.8 Water Resources Protection

4.8.1 Permits for Structures in Navigable Waters

No Section 10 permits would be required from the U.S. Army Corps of Engineers (Corps) for work in the Methow or Twisp rivers. Neither of these rivers is considered by the Corps to be navigable at the existing diversion areas (Jim Green, Regulatory Branch, Corps, pers. comm., 1997).

4.8.2 Permits for Discharges into Waters of the United States

No point discharges requiring National Pollutant Discharge Elimination System (NPDES) permits are proposed. However, facility design plans will be reviewed to determine the applicability of storm water discharge permits for construction activities disturbing land of 2 or more ha (5 or more ac.).

It is anticipated that most new proposed MVID facilities could be sited to avoid wetlands or discharges. However, diversion and intake structure work might require that fill be placed in wetlands or the rivers themselves. Information from wetland delineation surveys at the facility sites would be used during final design to develop mitigation measures, if necessary, to ensure that the project would result in no net loss to wetlands. Well-field locations for the MVID facilities would be reviewed to determine whether their operation would affect wetlands through groundwater withdrawal. Review and concurrence through the Corps Section 404 permit

process and County shorelines review process would be completed as necessary before site development.

4.8.3 State Laws

Before initiating work on any of the action alternatives for the proposed project, the MVID would apply for all permits required under State law. These would include water rights permits from the WDOE and Hydraulic Project Approval from the WDFW.

4.9 Public Lands

The existing MVID canal crosses about 3.2 km (2 mi.) of land owned by WDFW and 0.8 km (0.5 mi.) of Federal land managed by the Bureau of Land Management. Under Alternative A, these agencies would be contacted to determine whether any changes to existing easement agreements would be needed to convert the open canal to a pipeline. Under Alternative C, the easements would be abandoned and revert to these agencies. Under Alternatives B and D, there would be no changes to the existing easements.

4.9.1 Wild and Scenic Rivers

The Methow River system, including the Twisp River, has been recommended for inclusion in the Washington State Scenic Rivers Program. The Twisp River is considered a River of Statewide Significance (USFS, 1995). The entire Twisp River and over half of its tributaries are recommended for inclusion in the National Wild and Scenic Rivers System (USFS, 1995). Alternatives A, B, and C would require short-term construction work in the Twisp and Methow rivers at the diversions. Any in-stream work would be coordinated with the appropriate public entities to preserve the values under which these rivers were determined to be eligible for inclusion. In the long term, removal of the diversion dams and in-stream structures under Alternatives A and C would enhance and contribute to the wild and scenic values of these rivers.

4.10. Pollution Control

4.10.1 Air Quality

The proposed actions would be located in a Class II air quality attainment area (meets or exceeds primary and secondary air quality standards set by the Environmental Protection Agency.) Neither construction-related increases in dust, smoke, or construction vehicle emissions nor operations of the MVID facilities would result in significant air emissions that would require air quality permits under the Clean Air Act (42 USC 7401 et seq.). Construction equipment exhausts would meet applicable regulatory requirements. Any fugitive dust caused by construction would be mitigated by water sprinkling.

4.10.2 Water Quality

See section 4.8.

4.10.3 Noise

Noise generated during construction is regulated by the Washington Noise Control Act of 1974. It states that noise from temporary construction sites is exempt from regulation, except between the hours of 10 p.m.. and 7 a.m., when noise should not exceed 45 dBA in residential areas (WAC 173-60-040). Since all construction work would occur outside of these hours, no exceedances of the standard are anticipated.

Noises generated by the operations of the facilities would mainly result from the operations of the groundwater pumps and reservoirs under Alternative A. These noise levels are not anticipated to exceed Washington state standards.

4.11 Other

The following items addressed by Federal laws and statutes would not be affected by the proposed project:

- Global warming
- National Trails
- Wilderness Areas
- Parks, Campgrounds, Trails, National Scenic Areas
- Energy Conservation at Federal Facilities
- Hazardous Waste, Toxic Substances, and Pesticides
- Drinking Water
- Environmental Justice.

CHAPTER 5: PERSONS AND AGENCIES CONSULTED[2]

Clark, Bob. 1997. Letter. Okanogan County Office of Planning and Development, Okanogan, WA. March 5, 1997.

Clark, Bob. 1997. Personal Communication. Okanogan County Office of Planning and Development, Okanogan, WA. February 14, 1997.

Jolley, Vaughn. 1997. Personal Communication. La Conner, WA. February 10, 1997.

Lackey, Kirk. 1997. Personal Communication. The Environment Company (formerly of Parametrix). February 22, 1997.

March, Kathryn. 1997. Personal Communication. WDFW, Ephrata, WA. February 11, 1997.

Monk, Bobbie. 1997. Personal Communication. Olympia, WA. March 17, 1997.

Montgomery, Bob. 1997. Personal Communication. Montgomery Water Group, Inc., Kirkland, WA. February 13, 1997.

Montgomery, Bob. 1997. Personal Communication. Montgomery Water Group, Inc., Kirkland, WA. February 15, 1997.

Montgomery, Bob. 1997. Personal Communication. Montgomery Water Group, Inc., Kirkland, WA. February 28, 1997.

Montgomery, Bob. 1997. Personal Communication. Montgomery Water Group, Inc., Kirkland, WA. March 5, 1997.

Peterson, Mary Lou. 1997. Personal Communication. Noxious Weed Control Board of Okanogan County. March 3, 1997.

Phillips, Don. 1997. Personal Communication. USFS Okanogan National Forest, Twisp District Office. February 10, 1997.

Spotts, Jim. 1997. Personal Communication. Fish biologist USFS, Okanogan, WA.

Sprague, Ann. 1997. Personal Communication. USFS Okanogan National Forest, Twisp District Office. February 11, 1997.

Streeby, Sandra. 1997. Personal Communication. Okanogan County, Office of Planning and Development, Twisp WA. February 10, 1997.

Tabor, James. 1997. Personal Communication. WDFW, Ephrata, WA. February 13, 1997.

[2] Personal communications (letter, telephone conversation) that are cited in the text are listed in Chapter 6.

This page intentionally left blank.

CHAPTER 6: REFERENCES

Almack, J. A., S. H. Fitkin, and B. Cunningham. 1993a. Research Progress Report: Gray wolf investigations in Washington state. Washington Department of Fish and Wildlife, Large Carnivore Investigations, Sedro Woolley, WA. Interagency Contract, FFY 1991 and 1992. Unpublished report.

Almack, J. A., W. L. Gaines, R. H. Nancy, P. H. Morrison, J. R. Eby, G. F. Wooten, M. C. Synder, S. H. Fitkin, and E. B. Garcia. 1993b. North Cascades Grizzly Bear Ecosystem evaluation; final report. Interagency Grizzly Bear Committee, Denver, CO.

Archer, Monty. 1997. Personal Communication. Assessor, Okanogan County Assessor's Office, Okanogan County, Washington. Telephone communication. April 3, 1997.

Bambrick, Dale. 1997. Personal Communication. Fish biologist, Yakama Indian Tribe. March 5, 1997.

Boreson, Keo, Kathleen A. Calaway, and Steve Emerson. 1996. A Cultural Resources Survey of the West Side and East Side Canals, Methow Valley Irrigation District, Okanagan County, Washington. Short Report 535. Archaeological and Historical Services, Eastern Washington University, Cheney, WA.

Cain, Nick. 1985. The Chillowist Trail. *Okanogan County Heritage* 23 (4):15-18.

Caldwell, Brad, and Dave Catterson. 1992. Methow River Basin Fish Habitat Analysis Using the In-stream Flow Incremental Methodology. Washington Department of Ecology, Olympia, WA.

CH2M Hill. 1997. Cost Evaluations of Alternatives A-C. May 14, 1997.

CRITFC (Columbia River Inter-Tribal Fish Commission). 1995. WY-KAN-USH-MI WA-KISH-WIT: Spirit of the Salmon. The Columbia River Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs and Yakama Tribes. Vol. I.

Comprehensive Plan for Okanogan County. 1964. Joint planning office, Chelan County Court House, Wenatchee, Washington. October, 1964.

Bureau of Reclamation. 1994. Deschutes Canal Lining Demonstration Project. May 1994.

Emerson, Stephen. 1996. National Register of Historic Places Registration Form. Archaeological and Historical Services, Eastern Washington University, Cheney, WA.

Fitkin, S. 1996. Population status and trend reports 1995/1996: Mule deer. Region 2, PMU 21 (GMU's 203-242). Washington Department of Fish and Wildlife, Winthrop, WA. Unpublished report.

Fitkin, Scott. 1997. Personal Communication. Washington Department of Fish and Wildlife. Winthrop, WA. February 12, 1997.

Franklin, J. F., and C. T. Dyrness. 1988. Natural Vegetation of Oregon and Washington. Oregon State University Press, Corvallis, OR.

Fredin, Adeline. 1994. Personal Communication. History/archeology, Colville Confederated Tribes, Nespelem, WA. Letter to Philip Thor, Bonneville Power Administration, Portland OR, commenting on the Preliminary Draft EIS for the System Operation Review. March 30, 1994

Fulkerson, Cathy. 1988. Predictive Locational Modeling of Aboriginal Sites in the Methow River Area, North-Central, Washington. Department of Anthropology, Washington State University, Pullman.

Green, Jim. 1997. Personal Communication. U.S. Army Corps of Engineers, Regulatory Branch. June 3, 1997.

Hoffman, Linda. 1997. Personal Communication. Washington Department of Fish and Wildlife, Twisp, WA. February 12, 1997.

Hong West & Associates. 1996. MVID Hydrogeologic Evaluation (in Montgomery, 1996). Hong West & Associates, Kirkland, Washington.

Hong West and Associates. 1997. MVID Hydrogeologic Evaluation (Revised January 15, 1997). Hong West and Associates, Lynnwood, WA.

Irrigation Management Practices to Protect Groundwater and Surface Water Quality. 1995. State of Washington, Washington State Department of Ecology, and Washington State University. April 1995.

Laumeyer, Philip, Field Supervisor, U.S. Fish and Wildlife Service, Upper Columbia River Basin Field Office, Spokane, Washington. Letter to Lauri J. Croff, Bonneville Power Administration, Portland, Oregon. FWS Reference: 1-9-97-SP-103. February 28, 1997.

Menninick, Johnson. 1997. Personal Communication. Yakama Indian Nation. Telephone conversation with Nancy Weintraub, Bonneville Power Administration, Portland OR. February 28, 1997.

Methow Valley Water Pilot Planning Project Planning Committee. 1994. Draft Methow River Basin Plan. January 27, 1994.

Monahan, John. 1997. Personal Communication. Environmental Specialist, Water Resources Section, Washington State Department of Ecology, Olympia, WA. March 14, 1997.

_____. Personal Communication. Environmental Specialist, Water Resources Section, Washington State Department of Ecology, telephone communication. April 14, 1997.

Montgomery, Bob. 1997. Personal Communication. Montgomery Water Group. Telephone communication. April 8, 1997.

Moore, Ellen Nickell. 1965. *Okanogan County Heritage.* March, 1965:4-5.

Mullan, James, Kenneth Williams, Granville Rhodus, Tracy Hillman, and John McIntyre. 1992. Production and Habitat of Salmonids in Mid-Columbia River Tributary Streams. SFWS, Leavenworth, WA.

MWG (Montgomery Water Group). 1996. Methow Valley Irrigation District Water Supply Facility Plan, Vols. I II, Appendices. Montgomery Water Group, Inc., Kirkland, WA.

Myers, W. L., R. H. Nancy, T. M. Lloyd, M. A. Quinn, K. R. Dixon. 1990. Guidelines and considerations in managing mule deer in western Okanogan County, Washington. Washington Department of Wildlife, Olympia, WA. Project No. W-95-R.

_____, R. Nancy, and K. R. Dixon. 1989. Seasonal movements and home range sizes of female mule deer in northcentral Washington: A preliminary report. Washington Department of Wildlife, Olympia, WA. Project No. W-95-R.

Noxious Weed Control Board of Okanogan County. 1997. 1997-1999 Policy. Noxious Weed Control Board of Okanogan County, Okanogan, WA.

Okanogan County. 1994. Growth Management Critical Areas Regulations. Okanogan County, Office of Planning and Development, Okanogan, WA.

_____. 1997. MVID Fisheries Enhancement Project, Okanogan County Critical Areas Regulations. Okanogan County, Office of Planning and Development, Okanogan, WA. Letter dated March 5, 1997.

Okanogan Office of Planning and Development. Personal Communication. Building Permit Records. March 6, 1997.

Pakootas, Joseph. Personal Communication. Chairman, Colville Confederated Tribes Business Council. Letter to David Byrnes, Bonneville Power Administration, Portland OR. October 18, 1996.

Parametrix, Inc. 1995. Wetland Assessment for the Methow Valley Irrigation District Water Conservation Plan, *in* Montgomery Water Group, 1996. Parametrix, Inc., Kirkland, WA.

Peterson, M. L. 1997. Letter from the Noxious Weed Control Board of Okanogan County. Noxious Weed Control Board of Okanogan County, WA. March 14, 1997.

Potts, Gene. 1997. Personal Communication. Hydrologist, Washington State Department of Ecology, Central Regional Office, Yakima, Washington. Telephone communication, April 11, 1997.

Reed, P. B., Jr. 1988. National List of Plant Species that Occur in Wetlands: Northwest (Region 9). USDI Fish and Wildlife Service, Washington, DC. Biol. Rep. 88(26.9).

_____. 1993. 1993 Supplement to List of Plant Species that Occur in Wetlands: Northwest (Region 9). USDI Fish and Wildlife Service, Washington, DC.

Reiber, Roy. 1997. Personal Communication. EMT and member of the Fire District #6. Telephone communication, April 3, 1997.

Rohrer, John. 1997. Personal Communication. USFS Okanogan National Forest, Twisp District Office. February 18, 1997.

Spier, Leslie. 1936. Tribal Distribution in Washington. General Series in Anthropology, No. 3. George Banta Publishing Company, Menasha, Wisconsin.

Teit, James A. 1928. The Middle Columbia Salish. University of Washington Publications in Anthropology 2(4):89-128. University of Washington Press, Seattle.

USFWS (US Fish and Wildlife Service). Undated. National Wetland Inventory Maps. USDI Fish and Wildlife Service, Washington, DC. Twisp West, Twisp East, Winthrop, and Blue Buck Mtn. 7.5' quadrangles.

_____. 1997. Endangered Species Program Database. USFWS, Washington, D.C.

U.S. Forest Service. 1989. Land and Resource Management Plan, Final Environmental Impact Statement. USDA Forest Service, Okanogan National Forest, Washington, DC.

_____. 1995. Twisp River Watershed Analysis. USDA Forest Service, Okanogan National Forest, Methow Valley Ranger District, Twisp, WA.

_____. 1997. Amphibians, reptiles, birds, and mammals known or suspected to occur on the Okanogan National Forest. U.S. Forest Service, Twisp District Office. Unpublished list.

Wandschneider, Philip, and James C. Barron. 1993. Economic Issues in Protecting Groundwater Quality. Washington State University Extension Bulletin 1751. June 1993.

Washington Administrative Code (WAC 173-60-040, Maximum Environmental Noise Levels). March 4, 1987.

WDOE (Washington Department of Ecology). 1992. Methow River Basin Fish Habitat Analysis Using the In-stream Flow Incremental Methodology. Department of Ecology, Olympia, WA.

_____. December, 1996. River and Stream Ambient Monitoring Report for Water Year 1995.

_____, and Washington State University. April 1995. Irrigation Management Practices to Protect Groundwater and Surface Water Quality, State of Washington.

Washington Irrigation Guide. 1990. State of Washington Irrigation Guide. United States Department of Agriculture, Soil Conservation Service, and Washington State University Cooperative Extension Service.

WDFW (Washington Department of Fish and Wildlife). 1996a. Washington Department of Fish and Wildlife Habitat Program, Priority Habitats and Species Database. Washington Department of Fish and Wildlife, Olympia, WA.

_____. 1996b. Species of special concern list. Washington Department of Fish and Wildlife, Wildlife Management Program, Olympia, WA.

_____. 1997a. Wildlife Heritage Database. Washington Department of Fish and Wildlife, Olympia, WA. Prepared by Lori Adkins, February 27, 1997.

_____. 1997b. Description of fish and wildlife map products. Washington Department of Fish and Wildlife, Fisheries, Habitat, and Wildlife Management Programs, Olympia, WA. March 1997. 55 pp.

_____, with the Confederated Tribes and Bands of the Yakima [sic] Indian Nation, Confederated Tribes of the Colville Indian Reservation, and Washington Department of Fisheries. 1990. Methow and Okanogan Rivers Subbasin Salmon and Steelhead Production Plan. September 1, 1990.

WDW (Washington Department of Wildlife), Confederated Tribes and Bands of the Yakima [sic] Indian Nation, Confederated Tribes of the Colville Indian Reservation, and Washington Department of Fisheries. 1990. Columbia Basin System Planning Production Plan: Methow and Okanogan Rivers Subbasin Salmon and Steelhead Production Plan. WDW, Olympia, WA.

Washington State, Office of Financial Management. 1990. 1996 Population Trends, Table 4, Population of Cities, Towns and Counties.

Zeigler, D. L. 1978. The Okanogan mule deer. Washington Department of Game, Olympia, WA. Biological Bulletin No. 15. 106 pp.

This page intentionally left blank.

APPENDIX A

WATER RIGHTS INFORMATION

APPENDIX B

ENGINEERING COST DETAIL

APPENDIX B
ENGINEERING COST DETAIL

The following tables present cost estimates prepared by the environmental engineering firm CH2M HILL, consultant to BPA. The conceptual cost estimates shown were prepared for guidance in project evaluation and implementation from the information available at the time of the estimate. The final costs of the project will depend on actual labor and material costs, competitive market conditions, final project scope, implementation schedule, and other variable factors. As a result, final project costs may vary from the estimates presented on each of the tables. Because of this, project feasibility and funding needs must be carefully reviewed before making specific financial decisions, to help ensure proper project evaluation and adequate funding.

This page intentionally left blank.

CH2M HILL

BPA / METHOW VALLEY IRRIGATION DISTRICT

ENGINEER'S OPINION OF PROBABLE COST

PROJECT: BPA / METHOW VALLEY IRRIGATION DISTRICT ENVIRONMENTAL ASSESSMENT
CLIENT: BPA / MVID
TASK: ALTERNATIVE A - PIPED SYSTEM WITH PRIVATE GROUNDWATER WELLS
NOTE: PRICES ARE ESTIMATES, IN 1997 DOLLARS, BASED ON INFORMATION AVAILABLE AT THE TIME THIS ESTIMATE WAS PREPARED AND ARE SUBJECT TO CHANGE.

ITEM	DESCRIPTION	QUAN.	UNIT	UNIT COST	COST
1	MOBILIZATION	1	LS	$200,000.00	$200,000
2	DIVERSION DAM DEMOLITION	1	LS	$3,000.00	$3,000
3	INTAKE STRUCTURE DEMOLITION	1	LS	$10,000.00	$10,000
4	FISH SCREEN DEMOLITION	1	LS	$7,000.00	$7,000
5	TRENCH SAFETY SYSTEM	61,000	LS	$1.00	$61,000
6	EXCAVATION	29,609	CY	$2.10	$62,179
7	IMPORTED PIPE BEDDING	1,807	CY	$21.15	$38,218
8	SELECT BACKFILL	6,830	CY	$8.50	$58,055
9	NATIVE BACKFILL	19,082	CY	$3.20	$61,062
10	GRADE SPOIL MATERIAL	10,527	CY	$1.05	$11,053
11	15" PIP PVC PIPE	21,450	LF	$13.00	$278,850
12	12" IPS PVC PIPE	26,250	LF	$11.00	$288,750
13	8" IPS PVC PIPE	9,700	LF	$7.00	$67,900
14	6" IPS PVC PIPE	3,600	LF	$6.25	$22,500
15	FITTINGS, VALVES, TBs, ETC.	1	LS	$65,800.00	$65,800
16	TURNOUT & SLIDE GATE	68	EA	$550.00	$37,400
17	FLOWMETER @ WELL HEAD	10	EA	$3,000.00	$30,000
18	ROAD X-INGS, ACP PAVED	1	LS	$30,000.00	$30,000
19	ROAD X-INGS, CSTC GRAVELED	1	LS	$20,000.00	$20,000
20	ROAD X-INGS, UNIMPROVED	1	LS	$10,000.00	$10,000
21	18" WELLS, 100 FT DEEP	10	EA	$18,000.00	$180,000
22	WELL PUMP CONTROLS	10	EA	$26,500.00	$265,000
23	WELL HOUSE STRUCT. & ELECTR.	10	EA	$10,300.00	$103,000
24	EQUALIZING RESERVOIR	3	EA	$51,500.00	$154,500
25	REESTABLISH DRAINAGE PATTERN	1	LS	$100,000.00	$100,000
26	BARKLEY DITCH REHABILITATION*	1	LS	$50,000.00	$50,000
27	EXCLUSION COMPENSATION	1	LS	$1,345,000.00	$1,345,000

The cost for Item 27 is excerpted from Table 5-5, page 39, of the MWG Water Supply Facility Plan, June 1996, for the removal of 1,346 acres from the MVID.

* This was the original cost estimate for lining the ditch only. Current plans call for a pipeline to be installed for the Barkley users. Discussions are underway with Okanogan County for a cost-share agreement, so updated costs are not yet available.

** Contingency; state sales tax; and engineering, legal, and administrative fees are not computed on the exclusion compensation.

SUBTOTAL CONSTRUCTION COSTS		$3,560,268
CONSTRUCTION CONTINGENCY**	20%	$443,054
ESTIMATED CONSTRUCTION COSTS		$4,003,321
ESTIMATED WASHINGTON STATE SALES TAX**	8%	$212,666
DESIGN ENGINEERING, LEGAL, & ADMIN. FEES**	15%	$398,748
(No costs for services during construction are included in this estimate.)		
TOTAL ESTIMATED PROJECT COST		$4,614,735

CH2M HILL
BPA / METHOW VALLEY IRRIGATION DISTRICT
ENGINEER'S OPINION OF PROBABLE COST

PROJECT: BPA / METHOW VALLEY IRRIGATION DISTRICT ENVIRONMENTAL ASSESSMENT
CLIENT: BPA / MVID
TASK: ALTERNATIVE B - OPEN CANAL SYSTEM
NOTE: PRICES ARE ESTIMATES, IN 1997 DOLLARS, BASED ON INFORMATION AVAILABLE AT THE TIME THIS ESTIMATE WAS PREPARED AND ARE SUBJECT TO CHANGE.

ITEM	DESCRIPTION	QUAN.	UNIT	UNIT COST	COST
1	MOBILIZATION	1	LS	$665,000.00	$665,000
2	CLEAR & GRUB CANAL BANKS	15	AC	$2,400.00	$36,000
3	PREPARE COMPACTED BASE	129,470	LF	$5.00	$647,350
4	CONCRETE LINING	129,470	LF	$42.00	$5,437,740
5	GRAVEL CANAL ACCESS ROAD	12,787	TON	$12.00	$153,444
6	TURNOUT & SLIDE GATE	122	EA	$550.00	$67,100
7	DIVERSION DAM REHABILITATION*	1	LS	$15,000.00	$15,000
8	INTAKE STRUCTURE REHAB.	1	LS	$25,000.00	$25,000
9	FISH SCREENING FACILITIES	1	LS	$275,000.00	$275,000
10	EXCLUSION COMPENSATION	1	LS	$1,056,868.00	$1,056,868

Item 10 is based on the compensation formula in Table 6-1, page 60, of the MWG Water Supply Facility Plan, June 1996, applied to the total acreage within the MVID, then prorated to the unserved (999) acres left out of the MVID after implementation of this alternative.

* Rehabilitation consists of placement of simple pre-fab diversion structures; actual cost for diversion with acceptable fish passage could cost up to $500,000 for inflatable rubber dam and fish passage on both Methow and Twisp Rivers.

** Contingency; state sales tax; and engineering, legal, and administrative fees are not computed on the exclusion compensation.

SUBTOTAL CONSTRUCTION COSTS		$8,378,502
CONSTRUCTION CONTINGENCY**	20%	$1,464,327
ESTIMATED CONSTRUCTION COSTS		$9,842,829
ESTIMATED WASHINGTON STATE SALES TAX**	8%	$702,877
DESIGN ENGINEERING, LEGAL, & ADMINI. FEES**	15%	$1,317,894
(No costs for services during construction are included in this estimate.)		
TOTAL ESTIMATED PROJECT COST		$11,863,600

CH2M HILL
BPA / METHOW VALLEY IRRIGATION DISTRICT
ENGINEER'S OPINION OF PROBABLE COST

PROJECT: BPA / METHOW VALLEY IRRIGATION DISTRICT ENVIRONMENTAL ASSESSMENT
CLIENT: BPA / MVID
TASK: ALTERNATIVE C - MVID DISSOLUTION & REHABILITATION OF BARKLEY DITCH
NOTE: PRICES ARE ESTIMATES, IN 1997 DOLLARS, BASED ON INFORMATION AVAILABLE AT THE TIME THIS ESTIMATE WAS PREPARED AND ARE SUBJECT TO CHANGE.

ITEM	DESCRIPTION	QUAN.	UNIT	UNIT COST	COST
1	MOBILIZATION	1	LS	$17,000.00	$17,000
2	DIVERSION DAM DEMOLITION	1	LS	$3,000.00	$3,000
3	INTAKE STRUCTURE DEMOLITION	1	LS	$10,000.00	$10,000
4	FISH SCREEN DEMOLITION	1	LS	$7,000.00	$7,000
5	REESTABLISH DRAINAGE PATTERN	1	LS	$100,000.00	$100,000
6	BARKLEY DITCH REHABILITATION*	1	LS	$50,000.00	$50,000
7	DISSOLUTION COMPENSATION	1	LS	$2,407,796.00	$2,407,796

* This was the original cost estimate for lining the ditch only. Current plans call for a pipeline to be installed for the Barkley users. Discussions are underway with Okanogan County for a cost-share agreement, so updated costs are not yet available.

** Contingency; state sales tax; and engineering, legal, and administrative fees are not computed on the MVID dissolution compensation.

SUBTOTAL CONSTRUCTION COSTS		$2,594,796
CONSTRUCTION CONTINGENCY**	20%	$37,400
ESTIMATED CONSTRUCTION COSTS		$2,632,196
ESTIMATED WASHINGTON STATE SALES TAX**	8%	$17,952
DESIGN ENGINEERING, LEGAL, & ADMIN. FEES**	15%	$33,660
(No costs for services during construction are included in this estimate.)		
TOTAL ESTIMATED PROJECT COST		$2,683,808

APPENDIX C

ALTERNATIVE METHODS TO LINE CANALS

APPENDIX C
ALTERNATIVE LININGS FOR CANAL UNDER ALTERNATIVE B

In developing Alternative B, we researched a number of alternative lining approaches. Concrete was the method selected for this option. Below are discussions of the other options, including their benefits and drawbacks.

- Spray-on synthetic liners (such as CIM 1000® and Boot®) are inappropriate for this application because of their very high maintenance requirements and relatively short useful life. They would suffer degradation by ultraviolet (UV) light; would require a continuous anchorage mechanism to prevent shifting or peeling of the liner; are not fire-proof; would require careful, labor-intensive, manual removal of sediment and debris to avoid puncturing the liner; would require a protective blanket above the liner to protect against vandalism and sharp objects; and are subject to penetration by vegetation. For these reasons, spray-on synthetic linings would not be appropriate for this project.

- Geomembranes (impermeable synthetic lining materials) were evaluated and found to be inappropriate for the MVID Alternative B project. Materials commonly used as liners include the following: high-density polyethylene (HPDE), polyvinylchloride (PVC), polypropylene, Hypalon, and reinforced asphaltic materials. Some of these materials were evaluated by the US Bureau of Reclamation in their Deschutes Lining Project. Others have been used on canal and lagoon lining projects. Any of these linings, when exposed to the elements, suffers from weathering, physical damage (from maintenance equipment, animals, vandals, and so on), and displacement by wind or water flow. The more successful lining materials have been found to be those that are protected with a soil or concrete covering system. Soil or rock covering systems can be used only on relatively flat-sided slopes (3:1 or flatter). The flatter side slopes require additional right-of-way width. The cost of the membrane lining with a protective cover is equal to or higher than a more conventional concrete lining system. There are very few long-term examples of geomembrane canal lining systems that are competitive with the initial cost, life expectancy, and maintenance characteristics of concrete.

- Polyvinylchloride (PVC) and high-density polyethylene (HDPE) pipe "half rounds" were also determined inappropriate for this application. The pipes would have to be oversized to fit the existing canal's cross-section to avoid large amounts of fill and earthwork. In addition, they would suffer degradation by UV radiation; are not fire-proof; would be difficult to connect to turnouts; would be subject to floating and frost-heaving without a drainage blanket; and would require a labor-intensive installation procedure because of the special connections required at each joint to seal the pipe along its length. Such connections are not required for installation of a full pipe. Besides UV degradation, the thermal expansion coefficient of HDPE pipe would preclude the use of this material in this application. The changes in temperature from day to night and from summer to winter would pull the system apart by expansion and contraction. For these reasons, PVC and HDPE "half rounds" would not be appropriate for this project.

- Similarly, corrugated metal pipe (CMP) "half rounds" are inappropriate for this application. Although CMP is fire-proof, is not affected by UV radiation, is slightly more resistant to vandalism than synthetic liners, and resists vegetation penetration, it has inherent problems similar to those associated with the PVC and HDPE materials (labor-intensive jointing, oversized sections, floating and frost-heaving, and complexity in making turnout connections). In addition, CMPs leak badly by the very nature of their jointing mechanism, and would ultimately break down through galvanic corrosion. Galvanization of steel CMP only delays its ultimate failure, and aluminum CMPs are expensive. Lastly, cutting a spiral-wound CMP lengthwise to produce two "half rounds" would cause the ribs to unwind. (It is the cap on each end of a spiral-wound CMP that maintains its integrity.) For these reasons, CMP "half rounds" would not be appropriate for this project.

Information sources: (1) Bureau of Reclamation, May 1994. Deschutes Canal Lining Demonstration Project.; (2) Professional experience of Paul Soboleski, consultant to CH_2M HILL.

APPENDIX D

WDOE LETTER TO CANAL ASSOCIATES

APPENDIX E

WATER QUALITY AND QUANTITY DETAILED DATA

APPENDIX E
WATER QUALITY AND QUANTITY DETAILED DATA

Part 1: Method for Determining Contribution of Canal Seepage to Winter River Flows

The following simplified model was used to determine the *amount* of canal seepage:

- Average the net irrigation requirements for the Methow and Winthrop areas, taken from the *State of Washington Irrigation Guide* (Washington Irrigation Guide, 1990),
- Apply these rates to the existing cropping patterns in the MVID (MWG, 1996), and
- Assume, based on professional judgment and experience, that evaporation losses from the open canals are 2 percent of the total river diversions and spills at 10 percent of the total river diversions.

The following equation is then used to make the calculation:

CS = D - NIR - S - E

Where: CS = canal seepage

D = total river diversion (Montgomery Water Group, 1996)

NIR = net irrigation requirement (application rate from Washington Irrigation Guide, multiplied by 776 acres currently irrigated, according to MWG, 1996, page 6)

S = operational spill (10 percent of D)

E = evapo-transpiration loss from the surface of the canals and transpiration from vegetation in and immediately adjacent to the canal (2 percent of D).

From this equation and the values discussed above, the amount of water seeping from the canal and contributing to groundwater or surface leakage is:

CS = 66.8 cfs - 7.62 cfs - (0.1 * 66.8 cfs) - (0.02 * 66.8 cfs) = 51.16 cfs.

Under this method, one may conclude that about 51.2 cfs of the total peak season irrigation diversion of 66.8 cfs either seeps to the groundwater table or leaks to surface or near-surface waters (including riparian areas along and downslope of the canal system).

However, this water does not immediately return to the Methow River. The return extends beyond the irrigation season, which normally ends at the beginning of October. Although there is some delay of the canal seepage returning to the river, we believe that virtually all of the return flows reach the river by the end of December. This assumption is based on the permeability of the soils and the proximity of the canals to the Methow and Twisp rivers. Greater return flows would occur during the latter part of the irrigation season (August, September, and October), while much smaller flows would occur after the end of the irrigation season after the canal contribution to groundwater ceases. No flows originating from the canals and irrigated fields would be expected after December. Given that groundwater generally

follows the gradient of the local topography, it can be assumed that all return flows, for No Action (existing) conditions and the action alternatives, return to the Methow River below the confluence of the Methow and Twisp rivers.

Part 2: Canal Seepage Contribution to Groundwater

The importance of seeps and leaks from canal system to groundwater can be evaluated by comparing historic MVID diversions from the Methow and Twisp rivers to the amount of water needed for crop irrigation. Historically, the MVID has diverted 66.8 cfs from the Twisp and Methow rivers (Montgomery, 1996). If *all* of the water that MVID diverted were lost to return flows**,** and none reached the irrigated fields, about 2.4 cfs would be contributed per mile of canal, along the 45 km (28 mi.) of canal.

If we then assumed that the whole 921 ha (2,276 ac.) of the MVID were irrigated, and deducted maximum crop needs of 45.5 cfs, then about 21.3 cfs would be going to return flows over the entire system. (Please note that this is a simplistic approach: it does not consider the fact that the whole 921 ha would not be irrigated, nor does it account for evaporation losses from the canals and lateral spills that flow directly to the rivers.) The return flow value of 21.3 cfs demonstrates the scope of the losses that are distributed over a relatively large area (45 km or 28 mi. of canal). Divided out by the length of the canal, the contribution would be about 0.8 cfs per mile of canal. Therefore, the rate of contribution of canal seepage to groundwater likely falls somewhere in the range of 2.4 cfs to 0.8 cfs per mile of canal, or less. Even at the higher rate, the amount of groundwater recharge lost due to the termination of the canal seepage is *very* small in relation to subsurface flows through the aquifer. Thus, the recharge from the leaking canals has a very limited and local influence on the groundwater quantity and level.

Part 3 Detailed Water Quality Data

Table E-1: Water Quality Measures at two monitoring sites (RM 39.4, near Twisp; RM 5, near Pateros) along the Methow River, between 1989 and 1995

	Methow River at Twisp		Methow River near Pateros		WAC[1] Standards
Variable	**Max**	**Min**	**Max**	**Min**	
Temp(C)	15.5	0	19.8[a]	0	< 18
Flow (CFS)	7610	192	8300	263	
Conductivity (umhos)	194	59	300	59	
Oxygen (mg/L)	14.1	7.9[a]	14.7	9	> 8
Oxygen Sat. (%)	119.8	71.4	111.9	94.4	
pH (units)	8.8[a]	7.3[a]	9.5[a]	7.5	7.5 to 8.5
Suspended Solids (mg/L)	103	1U	8300	263	
TPN	0.349	0.082	0.393	0.056	
NH3-N	0.04	0.01U	0.03	0.01U	
Total Phosphate (mg/L)	0.101	0.01U	0.115	0.01U	
Dissolved Ortho Phos (mg/L)	0.01	0.005U	0.013	0.005U	
Turbidity (NTU)	40	0.2	45	0.3	
Fecal Coliform (#/100ml)	68	1	84	1	
NO2+NO3-N (mg/L)	0.287	0.016	0.355	0.018	

1 = Washington Administrative Code
a = Value is above or below WAC standards

Source: *River and Stream Ambient Monitoring Report for Water Year 1995* (Washington Department of Ecology, December, 1996)

Table E-2: Irrigated Acreage and Maximum Instantaneous Water Use by Alternative

Alternative A			
Acreage/Water Use	**West Canal**	**East Canal**	**Total**
Irrigated acreage in MVID to be served by piped groundwater system	491	439	930
Former MVID acreage to be served by individual wells and LIDs	206	1140	1346
Total Irrigated Acreage	697	1579	2276
Maximum instantaneous groundwater provided by MVID (acreage*0.02 cfs)	9.8	8.8	18.6
Maximum instantaneous groundwater provided by individual wells and LIDs (cfs) (acreage*0.02 cfs)	4.1	22.8	26.9
Total maximum instantaneous irrigation groundwater use (cfs)	**13.9**	**31.6**	**45.5**

Alternative B			
Acreage/Water Use	**West Canal**	**East Canal**	**Total**
Irrigated acreage in MVID served by open canal system	592	685	1277
Former MVID acreage to be served by individual wells and LIDs	105	894	999
Total Irrigated Acreage	697	1579	2276
Maximum instantaneous diversion rate (MVID) (acreage*0.02 cfs)	11.8	13.7	25.5
Maximum instantaneous groundwater provided by individual wells and LIDs (acreage *0.02 cfs)	2.1	17.9	20.0
Total maximum instantaneous irrigation water use (cfs)	**13.9**	**31.6**	**45.5**

Alternative C			
Acreage/Water Use	**West Canal**	**East Canal**	**Total**
Total Irrigated Acreage (all former MVID acreage to be served by individual wells and LIDs)	697	1579	2276
Total maximum instantaneous irrigation groundwater use (cfs) (acreage * 0.02 cfs)	**13.9**	**31.6**	**45.5**

Alternative D (No Action)			
Acreage/Water Use	**West Canal**	**East Canal**	**Total**
Current MVID irrigated acreage	330.6	445.4	776
Current MVID non-irrigated acreage	366.4	1133.6	1500
Total MVID Acreage	**697**	**1579**	**2276**
Maximum instantaneous irrigation water use (cfs)*	**26.1**	**40.8**	**66.8**

*Plus some unknown amount of existing groundwater use from existing wells.

Note: No Action diversion amounts are from Montgomery Water Group, 1996, page 15; diversion amounts for other alternatives based on crop irrigation requirement and acreage irrigated.

Part 4: Application of Instream Flow Incremental Methodology

The Instream Flow Incremental Methodology (IFIM) is a standard tool used to develop habitat-versus-streamflow relationships to assist in making water management decisions. A basic IFIM premise is that fish populations respond to changes in the environmental conditions of their habitat. Therefore, if one quantifies their habitat and understands how habitat changes in response to environmental variables (such as streamflow), the information can be used to help make decisions in water management.

The fisheries and water management community has largely accepted the assumption that the potential for fish population is related directly to available habitat. Note that the IFIM is designed to help make decisions by providing information that can be interpreted and used in cases involving out-of-stream water uses (such as irrigation) and more than one fish species at a time. However, it does not provide *all* the information needed to assess impacts related to changes in flow. Other factors, including water temperatures, harvest, downstream fish passage, and management objectives, must also be considered when assessing the overall impacts of a project flow change. Nonetheless, IFIM has remained the tool most widely accepted and used by fisheries scientists and managers to evaluate the impacts of flow changes on fish.

For all alternatives, changes in in-stream fish habitat were evaluated as they relate to changes in flow for one section of the Methow River and one section of the Twisp River:

- **Methow.** The uppermost section of the Methow River in the study area, which extends from the diversion point of the West Canal down to the confluence with the Twisp River, a distance of about 6.5 km (4 mi.).
- **Twisp.** The affected section of the Twisp River extends from the diversion point of the West Canal to the confluence with the Methow River, a distance of about 6.5 km (4 mi.).

The factors evaluated were also divided by river section:

- **Methow:** adult holding, spawning habitat, and juvenile rearing habitat for spring chinook salmon; spawning habitat for summer chinook; juvenile rearing habitat for summer steelhead; and juvenile rearing habitat for Bull trout.
- **Twisp:** spawning and juvenile rearing habitat for spring chinook; spawning habitat for summer chinook; juvenile rearing habitat for summer steelhead; and juvenile rearing habitat for Bull trout.

These species and life stages are those most likely to occur in each of the specified locations and are of greatest concern from a commercial, recreational, and species status standpoint. Other life stages of these fish do occur in the project area during the irrigation season; however, their occurrence does not correspond to times when flows are an issue. For instance, summer chinook juveniles and summer steelhead spawners are present in the project area from about March until June. However, flows in the lower Methow River range between about 2,000 and 10,000 cfs during this time, and any small changes in flow during these high flow periods would be inconsequential to fish.

September flows were evaluated because they reflect the time when flows are lowest during the irrigation season, and irrigation demand is still high. This approach allowed the evaluation of

habitat conditions that are probably most limiting to the affected fish species. Habitat values were computed (weighted usable area, or WUA) for each species/lifestage using the 50-percent and 90-percent exceedance flows (normal and dry conditions, respectively) in September; these were compared to No Action conditions and to project alternatives. Analysis of habitat changes focuses on the Methow and Twisp rivers above their confluence because, as indicated in section 3.1.2.1, it is difficult to determine the precise location and quantity of return flows, and therefore the net benefits, that would occur below the confluence. Table E-2 presents the September flows for the reaches used in the habitat analysis for Alternative A; Table E-3 presents the September flows used for the Alternative B analysis.

Table E-3: Comparison of September Irrigation Water Use and Net Streamflows Between No Action Conditions and Alternative A

Irrigation Water Use/Streamflows	No Action	Alternative A
Methow River Above Twisp		
Irrigation Water Use (cfs)[1]	39	0
Natural Streamflow (cfs)—50% Exceedance	272	272
Natural Streamflow (cfs)—90% Exceedance	196	196
Net Streamflow (cfs)—50% Exceedance	233	272
Net Streamflow (cfs)—90% Exceedance	157	196
Twisp River at Twisp		
Irrigation Water Use(cfs)	25	0
Natural Streamflow (cfs)—50% Exceedance	80	80
Natural Streamflow (cfs)—90% Exceedance	49	49
Net Streamflow (cfs)—50% Exceedance	55	80
Net Streamflow (cfs)—90% Exceedance	24	49

[1] Irrigation water use is the amount of water removed through direct streamflow diversion or the amount that is proposed to be pumped from groundwater wells, or a combination of both, depending on the alternative.

Table E-4: Comparison of September Irrigation Water Use and Net Streamflows between No Action Conditions and Alternative B

Diversions/Streamflows	No Action	Alternative B
Methow River Above Twisp		
Irrigation Water Use(cfs)[1]	39	32
Natural Streamflow (cfs)—50% Exceedance	272	272
Natural Streamflow (cfs)—90% Exceedance	196	196
Net Streamflow (cfs)—50% Exceedance	233	240
Net Streamflow (cfs)—90% Exceedance	157	164
Twisp River at Twisp		
Irrigation Water Use (cfs)	25	14
Natural Streamflow (cfs)—50% Exceedance	80	80
Natural Streamflow (cfs)—90% Exceedance	49	49
Net Streamflow (cfs)—50% Exceedance	55	66
Net Streamflow (cfs)—90% Exceedance	24	35

[1] Irrigation water use is the amount of water removed through direct streamflow diversion or the amount that is proposed to be pumped from groundwater wells, or a combination of both, depending on the alternative.

APPENDIX F

VEGETATION DETAIL

APPENDIX F
VEGETATION

Part 1: Upland Vegetation

South-facing slopes, mainly above the east canal and the southern portion of the west canal, consists of scattered ponderosa pine (*Pinus ponderosa*). Shrub species on these aspects include sagebrush (*Artemesia* spp.), bitterbrush (*Pushia tridentata*), squaw current (*Ribes cereum*), and serviceberry (*Amelanchier alnifolia*). Native grasses include Idaho fescue, bluebunch wheatgrass (*Agropyron spicatum*), basin wildrye (*Elymus cinereus*), and cheatgrass. Forbs include arrowleaf balsamroot (*Balsamorhiza saggittata*), and Wright buckwheat (*Erigeronum wrightii*). Weed species include whitetop (*Cardaria draba*), dalmatian toadflax (*Linaria genistifolia* ssp. *dalmatica*), musk thistle (*Carduus nutans*), knapweeds (*Centaurea* spp.), and others.

The north-facing slopes, mainly above the northern portion of the West Canal, are dominated by Douglas-fir (*Pseudotsuga menziesii*), intermixed with scattered ponderosa pine.

The understory consists of wild rose (*Rosa woodsii*), creeping Oregon grape (*Berberis repens*), snowberry (*Symphoricarpos albus*), poison oak (*Rhus radicans*), and serviceberry. The herbaceous groundcover consists of pinegrass (*Calamagrostis rubescens*), heartleaf arnica (*Arnica cordifolia*), and star-flowered false Solomon's seal (*Smilacina stellata*).

Part 2: Wetlands Along Canals

The natural and artificial wetlands systems indicated on the US Fish and Wildlife Service's National Wetlands Inventory (USFWS, undated) as falling within 91 m (300 ft.) of the MVID canals are shown by canal and reach in Table F-1.

Table F-1: Natural and Artificial Wetland Systems within 91 m (300 ft.) of MVID Canals

Canal	Reach	Wetland System*
East	1	R4SBKCx, R3OWH, PEMC, PFOC
	2	R4SBKCx, PSSC, PEMC
	3	R4SBKCx, R3OWH
	4	R4SBKCx, PFOC, PSSC
	5	R4SBKCx, PEMCx, PSSC, PFOC
	6	R4SBKCx, R3OWH, R4SBC, PEMA, PSSA, PFOA
West	1	R4SBKCx, R3OWH, PEMC, PSSC
	2	R4SBKCx
	3	R4SBKCx, PEMC, PSSC, PFOC
	4	R4SBKCx, R3OWH, PSSC, PFOC
	5	R4SBKCx

*System	*Subsystem	*Water Regime	*Modifier
R3 Riverine Upper Perennial	OW Open water	A Temporarily flooded	x Excavated
R4 Riverine Intermittent	SB Streambed	H Permanently flooded	
P Palustrine	EM Emergent	C Seasonally flooded	
	SS Scrub/Shrub	K Artificial	
	FO Forested		

Part 3: Vegetation Along the Canals

Common hydrophytic riparian species include red-osier dogwood (*Cornus stolonifera*), peachleaf willow (*Salix amygdaloides*), and Pacific willow (*Salix lasiandra*). Herbaceous species include cattail (*Typha latifolia*), hardstem bulrush (*Scirpus acutus*), and reed canarygrass (*Phalaris arundinacea*).

Drought-tolerant riparian vegetation along the canals includes ponderosa pine, Douglas-fir, black locust (*Robinia pseudoacacia*), choke cherry (*Prunus virginiana*), bittercherry (*Prunus emarginata*), wild rose, snowberry, poison oak, Oregon grape (*Berberis repens*), sagebrush, bitterbrush, bearberry honeysuckle (*Lonicera involucrata*), Canada goldenrod (*Solidago canadensis*), and bluebunch wheatgrass (*Agropyron spicatum*).

Facultative riparian vegetation includes black cottonwood, red alder (*Alnus rubra*), and trembling aspen (*Populus tremuloides*), serviceberry, poison oak, and stinging nettles (*Urtica dioica*).

Table F-2 lists the dominant existing hydrophytic, facultative, and drought-tolerant riparian species by canal and reach.

Table F- 3 lists the areas of hydrophytic riparian vegetation potentially affected by the proposed alternatives. Again, the existing conditions are shown as Alternative D (no action).

Table F-2: Vegetation Along MVID Canals[1]

Canal	Reach	Dominant Vegetation		
		Hydrophytic[2]	*Facultative[3]*	*Drought-tolerant[4]*
East	**1**	red-osier dogwood, peachleaf willow, Pacific willow	black cottonwood, red alder, trembling aspen, bearberry honeysuckle	wild rose, black locust, serviceberry, poison oak
	2	red-osier dogwood	stinging nettles	choke cherry, wild rose, black locust, poison oak
	3	red-osier dogwood	black cottonwood	wild rose, big sagebrush, bitterbrush
	4	red-osier dogwood	black cottonwood, trembling aspen	choke cherry, wild rose, bitterbrush, poison oak
	5	red-osier dogwood, reed canarygrass, waterhemlock	black cottonwood, trembling aspen, stinging nettles	choke cherry, wild rose, black locust, bitterbrush, poison oak
	6	red-osier dogwood, peachleaf willow, Pacific willow	black cottonwood, trembling aspen, stinging nettles	--
West	**1**	red-osier dogwood, scouring rush horse-tail, reed canarygrass	black cottonwood, red alder	Canada goldenrod, ponderosa pine, Douglas-fir, wild rose, service-berry, Oregon grape, snowberry
	2	peachleaf willow, Pacific willow, cattail, hardstem bulrush	black cottonwood, red alder	ponderosa pine, Douglas-fir, wild rose, serviceberry, Oregon grape, snowberry
	3	red-osier dogwood	black cottonwood, red alder, trembling aspen	Canada goldenrod, ponderosa pine, Douglas-fir, serviceberry, Oregon grape, snowberry
	4	red-osier dogwood	black cottonwood, trembling aspen	choke cherry, big sagebrush, bitterbrush, serviceberry, poison oak, bluebunch wheatgrass
	5	--	__	ponderosa pine, wild rose, big sagebrush, serviceberry, poison oak, bluebunch wheatgrass, bittercherry, arrowleaf balsamroot

1 After Parametrix, 1995; Reed, 1988; Reed, 1993.
2 Hydrophytic = Refers to plants that tend to grow in water or soils with excessive water content.
3 Facultative = Plants equally likely to occur in wetlands or non-wetlands.
4 Drought-tolerant = Plants able to withstand prolonged dry periods.

Table F-3: Areas in Acres[1] of Hydrophytic Riparian Vegetation Potentially Affected by the Proposed Alternatives[a]

Canal	Type	Reach 1	Reach 2	Reach 3	Reach 4	Reach 5	Reach 6	Total
Alternative A								
East[b]	Trees	1.4	0.7	0.5	1.0	1.6	1.8	7.0
	Shrubs	0.7	2.3	2.2	0.9	1.4	0.7	8.2
	Herbs	0	0	0.4	0.4	0.8	2.0	3.6
West[b]	Trees	3.6	3.1	4.2	0.4	0	--	11.3
	Shrubs	0.2	0.2	1.5	0.9	0	--	2.8
	Herbs	0	0	0	0	0	--	0
Total		5.9	6.3	8.8	3.6	3.8	4.5	32.9
Alternative B								
East[c]	Trees	1.3	0.6	0.5	0.9	1.5	1.7	6.5
	Shrubs	0.6	2.1	2.0	0.8	1.3	0.6	7.4
	Herbs	0	0	0.4	0.4	0.7	1.8	3.3
West[d]	Trees	3.3	2.8	3.8	0.4	0	--	10.3
	Shrubs	0.2	0.2	1.4	0.8	0	--	2.6
	Herbs	0	0	0	0	0	--	0
Total		5.4	5.7	8.1	3.3	3.5	4.)	30.1

(con't)

[1] For simplicity's sake, metric equivalents have been omitted from this table. However, 1 acre is generally equal to 0.4 hectares.

Table F-3 Areas in Hectares (and Acres) of Hydrophytic Riparian Vegetation Potentially Affected by the Proposed Alternatives[a] (con't)

Canal	Type	Reach 1	Reach 2	Reach 3	Reach 4	Reach 5	Reach 6	Total
Alternative C								
East[b]	Trees	1.4	0.7	0.5	1.0	1.6	1.8	7.0
	Shrubs	0.7	2.3	2.2	0.9	1.4	0.7	8.2
	Herbs	0	0	0.4	0.4	0.8	2.0	3.6
West[b]	Trees	3.6	3.1	4.2	0.4	0	--	11.3
	Shrubs	0.2	0.2	1.5	0.9	0	--	2.8
	Herbs	0	0	0	0	0	--	0
Total		5.9	6.3	8.8	3.6	3.8	4.5	32.9
Alternative D								
East[e]	Trees	0	0	0	0	0	0	0
	Shrubs	0	0	0	0	0	0	0
	Herbs	0	0	0	0	0	0	0
West[f]	Trees	0	0	0	0	0	0	0
	Shrubs	0	0	0	0	0	0	0
	Herbs	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0

[a]After Montgomery Water Group, 1996; numbers may not add due to rounding

[b]Assume no seepage (100% loss of hydrophytic vegetation)

[c]Assume 2.1 cfs seepage (91% loss of hydrophytic vegetation)

[d]Assume 1.8 cfs seepage (91% loss of hydrophytic vegetation)

[e]Assume 23.73 cfs seepage (no loss of hydrophytic vegetation)

[f]Assume 18.37 cfs seepage (no loss of hydrophytic vegetation)

APPENDIX G

GLOSSARY

APPENDIX G
GLOSSARY

acre-feet	amount of water (43,560 cubic feet) that would cover 1 acre to a depth of 1 foot
aquifer	an underground water-bearing layer of permeable rock, sand, or gravel; it receives, holds, and releases water
alluvial aquifer	an aquifer created by deposits of glacial till and outwash in a valley
anadromous (fish)	fish species that migrate from fresh to salt water when young, spend most of their adult life in the ocean, and then return to their ancestral drainage to spawn
backfill	the material used to fill in excavated areas
basin	geographically defined area in which all of the land is drained by a specific river and its tributaries
cascade	a series of small steps of alternating small waterfalls and small pools
cfs	cubic feet per second, a measure of the rate of flow of water
char	any of several fishes of the genus *Salvelinus*, related to the trout
cobble	streambed rocks, 14 to 29 cm (5-119 in.) in diameter
confluence	the location where two or more streams or rivers flow together
conveyance efficiency	a number that describes the efficiency with which water is transported from its source (a river, for instance) to a destination (such as fields needing irrigation); it is figured by the current demand for irrigation water divided by the total amount of water diverted
depressed	when referring to a population of a certain species, the abundance or production that is substantially lower than would be expected based on natural variation and available habitat, but above the level where permanent damage is likely
diversion	the withdrawal of water from its natural flowpath into another flowpath; i.e., into an irrigation canal system

easement	a right or privilege that a person or agency may have on another's land, a right-of-way
emergence	coming out of the spaces between streambed gravel by fry following the development period after hatching
escapement	the number of adults of an anadromous species or stock returning to spawn in an area or stream
exceedance flow	with reference to the percent chance of observing flows greater than a specified amount; e.g., 90-percent exceedance flows are flows that are exceeded 90 percent of the time, and represent dry conditions
facultative	when referencing plant species, those that occur in both wetlands and nonwetlands, i.e., any plant that can trhive under both wet and dry conditions
fish passage	the ability of fish to pass by a potential obstacle, such as a diversion dam, or through a section of a stream that has been substantially dewatered.
fish screen	wire mesh over or in front of a diversion intake to prevent juvenile fish from entering
flume	an artificial channel, usually an inclined chute or trough, for carrying water
fry	early life stage of fish, juvenile
glacial till	unstratified clay, sand, gravel, and boulders intermingled in any proportions deposited by glaciers as they receded
glides	a moderately shallow stream or river reach with an even flow and no pronounced turbulence
groundwater	water that fills all the unblocked pores of underlying material below the water table, which is the upper limit of saturation
herbaceous	non-woody vegetation
hydraulic	referring to water in motion
hydraulic continuity	used to describe two water bodies that are easily demonstrated to be directly linked; for example, a river and a lake, two linked subsurface groundwater aquifers, or an aquifer and an adjacent river

hydrophytic	plants associated with wet or moist places
IFIM	Instream Flow Incremental Methodology, a tool used to develop fish habitat-versus-streamflow relationships; used to assist in making water management decisions
instantaneous	the flow in a stream or river at a specific point in time
in-stream habitat	areas within a stream or river that can be used by fish for rearing or spawning
lateral	a pipeline or smaller canal that takes water from the main pipeline or canal and delivers it to an irrigated field
lek	areas where certain types of birds (such as grouse) congregate and display during the breeding season
life stage	each period during a plant's or animal's life history
mean	the average of a range of numbers
mitigation	actions proposed or taken to avoid, minimize, rectify, reduce, eliminate, or compensate for impacts on a resource
nocturnal	adapted to being active during the night
out-migrate	the oceanward movement of anadromous salmonids from stream spawning and rearing areas
palustrine	descriptive of nontidal wetlands dominated by plants, and with salinity less than 0.5 ^{o}.
passive restoration	restoration of a damaged or degraded habitat or vegetation type using primarily natural processes (e.g., the return of historic water flows or vegetative regeneration) rather than active human intervention (such as irrigation or replanting)
percolate	to pass through a porous substance
physiographic area	a landform that is distinct in its appearance and development; used to characterize and categorize landforms

point-of-diversion	the legally recognized location from which the holder of a valid water right or claim can take *surface water*
points-of-withdrawal	the legally recognized location from which the holder of a valid water right or claim can take *groundwater*
reach	a section of a stream or river
redd	a salmon nest
regime	a regular pattern of occurrence or action
resident (fish)	fish that are permanent inhabitants of a body of fresh water and do not migrate long distances from the area (compare with anadromous fish)
restoration	putting or bringing back into a former, normal, or unimpaired state or condition
riffles	type of stream habitat characterized by fast-flowing turbulent water
riparian	growing or living on or adjacent to the banks of streams and rivers
riverine	freshwater wetlands and waters contained within a channel
semi-permeable	a material that allows some, but not a full amount of, water to pass through it
smolt	juveniles of anadromous species migrating to the ocean and in a physiological state to transition from fresh to salt water
smoltify	the process by which juvenile anadromous salmonids metamorphose into saltwater fish, usually during the downstream migration period
spawn	the act of fish releasing and fertilizing eggs
spillway	an opening in a canal that allows excess water to leave the canal and return to the main stream or river; prevents the canal from being overfilled with rainwater or other water draining into the canal in addition to the water being diverted
steppe	area that is arid to semi-arid, with low precipitation, warm-to-hot summers, and relatively cold winters
subbasin	geographically defined area in which all of the land is drained by a specific river and its tributaries, and is a subset of a basin

successional development	the sequence of changing plant communities over time
surface water	water which is present or flows on top of the ground in channels, streams and rivers
terrestrial	consisting of land or living on land
water claim	those water rights in use prior to legislation to establish water law in the state
water right	given the authority from the state to use or transport a specified amount of water from surface or groundwater of the state, as provided by state laws and regulations
weir	a small dam that raises the water level in a river or stream to force water into an irrigation diversion
WUA	weighted useable area, a measure of habitat value used in the Instream Flow Incremental Methodology (see IFIM, above)

This page intentionally left blank.

APPENDIX H

COMMENTS ON THE PRELIMINARY EA AND BPA RESPONSES

Index of Comments and Responses, by Commenter

Letter / Comment Form Number	Name & Affiliation	Comment Number	Page Number
MVID-02-001	Charley Lehman Barkley Irrigation Ditch	01 02 03	H-88 H-88 H-89
MVID-02-002	Bud Hawkins N/A	01 02 03 04	H-63 H-26 H-66 H-10
MVID-02-003	Debbie Knaub Army Corps of Engineers	01 02 03	H-48 H-49 H-66
MVID-02-004	Mary A. Bean N/A	01 02 03 04	H-63 H-05 H-38 H-01
MVID-02-005	Bill White N/A	01 02 03 04 05 06 07 08 09	H-65 H-01 H-08 H-06 H-51 H-38 H-39 H-30 H-06
MVID-02-006	Joe Gubser N/A	01 02 03 04 05 06 07 08 09 10 11	H-54 H-22 H-66 H-23 H-23 H-78 H-46 H-38 H-57 H-97 H-10

Letter / Comment Form Number	Name & Affiliation	Comment Number	Page Number
MVID-02-007	Vaughn W. Jolley Jolley Associates	01	H-67
		02	H-13
		03	H-78
		04	H-67
		05	H-80
		06	H-26
		07	H-49
		08	H-39
		09	H-46
		10	H-81
		11	H-54
		12	H-02
		13	H-56
		14	H-91
		15	H-89
		16	H-58
		17	H-68
		18	H-68
		19	H-31
		20	H-14
		21	H-11
MVID-02-008	Verne Donnet N/A	01	H-40
		02	H-53
		03	H-02
		04	H-89
		05	H-56
		06	H-83
		07	H-90
		08	H-09
		09	H-98
		10	H-56
		11	H-15
		12	H-15
		13	H-16
		14	H-15
		15	H-50
		16	H-51
		17	H-40
		18	H-54

Letter / Comment Form Number	Name & Affiliation	Comment Number	Page Number
MVID-02-009	Jim Archambeault N/A	01 02 03 04 05 06 07 08	H-12 H-83 H-50 H-15 H-16 H-51 H-69 H-40
MVID-02-010	Don Phillips N/A	01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19	H-69 H-69 H-58 H-70 H-47 H-55 H-74 H-17 H-17 H-51 H-89 H-31 H-32 H-70 H-71 H-58 H-91 H-92 H-65
MVID-02-011	J. Michael Harris Washington Department of Ecology, Water Resources	01 02	H-92 H-71
MVID-02-012	Ray and Sidney Walsh N/A	01 02 03 04 05 06	H-63 H-98 H-24 H-88 H-71 H-63
MVID-02-013	Duey Hadfield N/A	01 02	H-63 H-47

Letter / Comment Form Number	Name & Affiliation	Comment Number	Page Number
MVID-02-014	Edward D. Tennant N/A	01 02 03 04 05 06 07 08 09 10	H-93 H-41 H-90 H-72 H-75 H-63 H-75 H-09 H-100 H-63
MVID-02-015	Kreg Sloan N/A	01 02 03 04 05 06 07 08 09	H-75 H-33 H-76 H-28 H-24 H-29 H-18 H-52 H-42
MVID-02-016	Stina Booth N/A	01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17	H-71 H-33 H-18 H-30 H-35 *misnumbered* H-36 H-34 H-59 H-59 H-48 H-52 H-84 H-93 H-63 H-65 H-77
MVID-02-017	Dave Sebold Gardner Gardens	01 02 03 04	H-55 H-57 H-26 H-19

Letter / Comment Form Number	Name & Affiliation	Comment Number	Page Number
MVID-02-018	J. Max Judd	01	H-63
	N/A	02	H-42
		03	H-71
		04	H-93
		05	H-63
MVID-02-019	Michael D. Gage	01	H-63
	N/A	02	H-59
		03	H-64
		04	H-64
		05	H-93
		06	H-72
		07	H-34
		08	H-19
		09	H-36
		10	H-20
		11	H-36
		12	H-37
		13	H-20
		14	H-94
		15	H-02
		16	H-20
		17	H-29
		18	H-21
		19	H-72
		20	H-46
		21	H-40
		22	H-54
		23	H-51
		24	H-41
		25	H-42
		26	H-21
		27	H-38
		28	H-11
		29	H-85
		30	H-03
		31	H-03
		32	H-11
		33	H-90
		34	H-12
		35	H-07
		36	H-72

Letter / Comment Form Number	Name & Affiliation	Comment Number	Page Number
		37	H-100

Letter / Comment Form Number	Name & Affiliation	Comment Number	Page Number
MVID-02-020	Vaughn W. Jolley Jolley Associates	01 02 03 04 05	H-94 H-90 H-95 H-83 H-60
MVID-02-021	Richard B. Parkin U.S. Environmental Protection Agency	01 02 03 04 05	H-95 H-27 H-22 H-22 H-42

APPENDIX H

METHOW VALLEY IRRIGATION DISTRICT PROJECT COMMENTS ON PRELIMINARY EA AND RESPONSES TO COMMENTS

The Methow Valley Irrigation District Project Preliminary Environmental Assessment was published and circulated for public comment beginning June 16, 1997. A public meeting was held in the town of Twisp, Washington on June 30, 1997, to receive comments on the Preliminary EA. A total of 141 comments was received at the meeting. We also received 11 letters, 9 comment forms, and 1 phone call commenting on the EA. All comments were carefully considered in revising the EA. Where appropriate, changes have been made to produce this Final Environmental Assessment.

All comments also receive a direct response, below. Comments that addressed a similar or related topic are grouped together. The numbers refer to a code we use for handling comments.

- Comments from the meeting were each given a unique number (1, 2, 3 etc.).
- Comments from letters and forms have identifiers that include project letters (MVID); a number -02 indicating that the comment is on the preliminary EA; the comment letter or form number (01 through 21); and a specific number for each comment in the comment letter.

The preceding index lists all comments by commenter name and shows the page number where the comment and its response can be found.

I. ENVIRONMENTAL ISSUES

A. Social and Economic

1. Operations and Maintenance Costs

Comments

MVID-02-004-04

Being on a fixed income I doubt I will be able to stay in this area if assessments go higher.

MVID-02-005-02

I have concerns about the more than <u>double</u> cost for water I will pay on the new system. Many people want into the MVID and could share and help lower the expense to all of us. This has not been considered at all. Half of my gross income from my hay will go for water. Looks like I'll be out of the farming business. Don't guess anybody cares about that.

MVID-02-007-12
The Methow Valley Irrigation District has approximately 2,300 acres. Of these acres**,** approx. 10 percent or 230 acres are difficult or impossible to service, largely due to improper maintenance. In addition, some properties have been sub-divided with no provision for easements or lateral distribution from the District's point of delivery.
In 1988, certain members of the district, unsuccessfully attempted to have the district dissolved. After that effort, three category of users were established, Category 1 members are those who cannot receive water, Category 2 members are those who receive water, but don't wish to use it and Category 3 members are those who receive water and use it. The 1997 assessments for the different categories are as follows:

Category 1:	$10.80 per acre
Category 2:	$32.40 per acre
Category 3:	$54.00 per acre

In contrast, there are seven other irrigation districts in the Methow Valley with assessments as follows:

Chewuck District:	$100 minimum and $10 per acre
Fulton District:	$50 minimum and $10 per acre
Barkley District:	$100 minimum and $10 per acre
Twisp River:	$50 minimum and $10.80 per acre
Wolf Creek:	$40 per acre and $35 per acre stand by
Fog Horn:	$25 per acre and $15 per acre
Early Winters:	$25 minimum and $2 per acre

Any of the alternatives as presented in your PEA have the effect of destroying the MVID facility, either by disbanding it altogether or creating a cost of water to high too make it economically feasible for the user. The current rates are already exorbitant and are caused by spreading the delivery cost over to few users (Category 3). The proposed alternatives take an already exorbitant rate and more than double it. Any alternative considered should not reduce the size of an already too small District, but instead, should be designed to provide service to all of the district members.

MVID-02-008-03
All the alternatives in the [environmental] assessment will have higher costs to the MVID members (Alternatives A and B). Alternative D will not improve administrative or cost efficiencies.

MVID-02-019-15
Concerned about high operating cost.

MVID-02-019-30
Concerned about high cost of water. We pay $50 an acre for water now. We feel this will go to over $100 an acre under the pipe line. We're told $70 to $80 but no one is guaranteeing this in

writing and other irrigation districts in North Central Washington that pump pay this much. How can we do it any cheaper.

MVID-02-019-31
Concerned about increasing electric costs. There is no way to stop this. It's scary to think of what our costs could go to. Again no guarantees.

16. Concerned about the cost/per acre for O&M.

17. I wouldn't be interested in staying in if the cost is too high.

38. Concerned about cost.

82. Concern about future O&M costs; cost of electricity is going higher.

91. Concern about spending money and not getting results.

111. $100/acre too much for water. Piped system too expensive.

113. Proposal is pushing me out of the MVID, and will have to drill my own well because of continuing high O&M cost of piped system.

Response: Many MVID members are concerned about the projected assessment costs for Alternatives A and B. Unfortunately, the assessments for the MVID are likely to rise, with or without a new irrigation system. Appendix B, Table 4, shows the total estimated administrative, operations, and maintenance costs for Alternatives A and B, and the actual 1996 MVID costs for Alternative D, the existing situation. (Under Alternative C, the MVID would be dissolved and each individual would be responsible for their own operations and maintenance costs.) Assessments are based on these costs. Table 4 points out that the total MVID costs can be fully paid from the current assessments *only* if all members pay into the system, regardless of whether they receive water or not. If the total 1996 costs were divided only among those acres that actually receive water (776 ac.), the per-acre costs would be $133/ac. Also, money is not being collected for needed replacements of the failing portions of the system. If Alternative D were selected and the MVID consequently did not receive funding for a new system from WDOE and BPA, future assessments would need to be increased substantially to cover the costs of the $2.4 million in needed replacements and repairs to the identified high-risk sections of the existing system.

Under Alternatives A and B, WDOE and BPA have offered to pay for a new system; however, the MVID would need to fund future replacements and repairs. The O&M cost estimates for Alternatives A and B reflect a line item in the budget for collecting enough money over a number of years to fund these future replacements and repairs. Although this would increase the assessments under these two alternatives, it is considered to be financially prudent to plan ahead for these replacements.

As two of the commenters have pointed out, the per-acre O&M costs depend upon the number of acres that remain in or that are added to the MVID during the reorganization. The more acres that remain in or are added to the MVID, the lower the cost to the individual member. Conversely, the more acres that are excluded from or lost to the district, the higher the costs will be to the individual members. We will not know exactly how many acres would be in or out of the MVID until members are asked to submit exclusion petitions and the Board of Directors makes a final decision.

The idea of allowing people to join the MVID to lower assessment costs has been considered and is a possibility. If Alternatives A or B were selected, it is anticipated that "extra water users" would be included within the revised MVID boundaries. The MVID could also consider expanding to include lands that are not currently served by the MVID after the reorganization process has occurred. If Alternative C were selected, the MVID could include "extra water users" if Local Improvement Districts (LIDs) were formed before the district was dissolved, to facilitate delivery of water to those that could not access groundwater. If Alternative D were selected, the MVID would be free to address the inclusion/exclusion process, but there would be no assistance from WDOE or BPA.

The O&M costs cited above (in comment MVID-02-007-12) are for several local irrigation companies. All these companies are much smaller than the MVID, and do not have comparable facilities or costs. In order to compare our estimated costs for the MVID with a similar system, we looked at costs for similar-sized irrigation districts with pumped-piped irrigation systems. Overall yearly costs for the Outlook Irrigation District near Sunnyside, for example, are much higher ($322,974) than those estimated for MVID; however, almost two-thirds of their costs are for conveyance of water through the Sunnyside Canal ($130,680) and for repayment of the debt for the rebuilding of their system ($64,830). (Outlook ID paid for the work through low-interest loans.) Because the Outlook ID has more acreage in their system (1883 hectares (ha) or 4,654 ac.), their per-acre costs of $69.40 are lower than those estimated for the MVID. The table on the following page compares actual costs for Outlook Irrigation District against estimated costs for Alternatives A and B, and actual 1996 MVID costs.

MVID Actual and Estimated O&M Costs vs. Outlook ID Actual O&M Costs

	Outlook ID (1996 Actual)		MVID Alt. A (CH2M HILL est.)		MVID Alt. B (CH2M HILL est.)		MVID Alt. D (1996 Actual)	
Acres Served	4,654		930[A]		1,277[A]		2,276 (only 776 currently served)	
Cost Item	Cost	Cost/Ac	Cost	Cost/Ac	Cost	Cost/Ac	Cost	Cost/Ac (based on 2,276 ac.)
Labor[B]	$40,212	$8.64	$54,552	$58.66	$57,192	$44.79	$70,836[B]	$31.12
System Expenses [C]	$87,252	$18.75	$21,650	$23.28	$29,729	$23.28	$32,618	$14.33
Conveyance Charge [D]	$130,680	$28.08	$0	$0.00	$0	$0.00	$0	$0.00
Debt Repayment [E]	$64,830	$13.93	$0	$0.00	$0	$0.00	$0	$0.00
Capital Replacement [F]	$0	$0.00	$28,061	$30.17	$40,328	$31.58	$0	$0.00
Total Costs	$322,974	$69.40	$104,263	$112.11	$127,249	$99.65	$103,454	$45.45 [G]

Notes:
[A]The number of acres served will vary depending upon the number of acres that leave the MVID. These numbers are our best estimates at this time, based on the number of acres the system is designed to serve.
[B] Labor includes salaries for a manager, secretary, and seasonal labor, as well as for legal advice. For MVID Alt. D (1996 actual), it includes $17,700 in extraordinary legal expenses. This will be paid by WDOE as part of the project expenses.
[C] System Expenses include supplies, power, repairs, consumables, office rent, etc.
[D]Conveyance charge is the cost to Outlook ID for conveyance through the Sunnyside Canal.
[E]Debt Repayment is Outlook ID's cost for repaying debt for the rebuilding of its system
[F]Capital Replacement is funds set aside for future replacement (100+ year life)
[G] The current cost structure for MVID is: Category 1 - $10.80 per acre; Category 2 - $32.40 per acre; Category 3 - $54.00 per acre. As mentioned above, these rates do not address needed repairs or conveyance efficiency improvements to the existing MVID system.

Comment

MVID-02-004-02

I have concerns about digging wells. The cost and maintenance of pumps etc. would be prohibitive.

Response: For information on digging wells and their effects, please see section 3.1.2 of the EA. The proposed low-pressure system would be operated by a number of electric pumps. These pumps would be purchased with funds contributed by WDOE and BPA. Estimated costs to members for the operation, maintenance, and replacement of the pumps are included in the System Expenses and Capital Replacement costs in Appendix B, Table 4, of the EA. With the

possible exception of power costs, the operations and maintenance costs would be expected to be relatively stable over time. In the Methow Valley, the cost of electricity for pumping groundwater is exceptionally low, due to the shallow aquifers and the widely dispersed availability of groundwater.

Comment
MVID-02-005-04
Why can't we all have a choice to leave the district? I don't get to choose but I am forced to stay and pay more for water than my hay crop is worth. This will force all of us farmers into subdividing or moving. Apples are the only crop we could produce to warrant paying $100+ per acre. This is very poor apple country.

48. There is no way to cap or limit continuing exclusion requests.

Response: Under Alternatives A and B, all members would be given the opportunity to petition the MVID for exclusion. The MVID Board of Directors will call for exclusion petitions at the close of the environmental process. If the number of members wanting to be excluded from the District is so large that the operation and maintenance costs for those remaining would be too high, the MVID could opt for total dissolution, as described under Alternative C. Dissolution of the MVID would require a petition from MVID members and membership vote.

Comment
MVID-02-005-09
I have 7 neighbors that presently purchase excess water from MVID. They do not have a vote but they pay the district and receive water. What will they do for water on the new system? If they are excluded from the new system, we lose approximately $900/per year desperately needed M&O money. Why can't I be allowed off the MVID and receive a free drilled well just like all the others that are opting off the MVID? Plus why can't these 7 neighbors hook up to my well? I use way more water on my field that all 7 of them put together. We could all share the M&O expense. These neighbors are: *(named 7 neighbors).*

Response: Assuming that the new system is constructed as designed in Alternative A (pumped-piped system fed by wells), it is possible that your neighbors could receive water from the MVID as a result of the MVID re-organizing, re-establishing its boundaries, and incorporating such lands into the district. This would also be possible under Alternative B. Under Alternative C, LIDs would need to be formed before the MVID was dissolved to facilitate delivery of water to your neighbors. If Alternative D were selected, there might not be water available in the future for "extra water users," as WDOE would need to enforce efficiency improvements. As far as your being allowed to leave the MVID, please see the response above to comment MVID-02-005-04, page 6.

Comment
MVID-02-019-35
Concerned about loss of agricultural land to development due to high cost of water. When a crop costs more to raise than you can sell it for, its time to go out of business and sell your land. The high costs of water will cause this.

Response: Although the costs associated with Alternatives A and B are expected to be higher than the current costs, the reorganized MVID would be more equitable because the costs would be borne by those who would actually receive water. Many of those presently on the system pay for water they don't receive. Also, as explained in the response to comment MVID-02-004-04 and others above (page 1), the MVID assessments would need to rise with or without the project, as the current assessments do not provide for the $2.4 million of needed repairs or replacement.

As the costs associated with irrigating farmland rise and it becomes no longer feasible to produce a crop whose value is below the cost of producing it, the landowner's options are: (1) to continue growing the crop even though its value is below the cost of production, (2) to plant a crop with a higher value such as a specialty crop, or (3) to stop farming altogether. All decisions are not made on economics alone, however. Even though the costs associated with producing a hay crop could be higher that the cost of purchasing the product on the open market, some landowners would continue to grow grass hay for other reasons, such as for aesthetics, for grazing farm animals, or for weed control. This decision would likely hinge on whether the landowner depended on farm income for his or her livelihood.

Comment
21. Lives at end of east ditch, doesn't now get water - hasn't for many years - but still pays for pump maintenance, MVID dues.

Response: The proposed project would result in a more equitable distribution of costs. Those not included in the reorganized MVID would no longer be assessed for water not received.

Comment
37. A lot of members are afraid of cost of O&M (after the fact), because of what happened at Oroville - Tonasket.

133. Is the proposed system like the Oroville/Tonasket system, which hasn't worked well and was very expensive?

Response: The Oroville/Tonasket system was a new irrigation system installed by the Bureau of Reclamation in the early 1990s. The new system consisted of an underground high pressure pipe that moved surface water for irrigation though the use of electric pumps. The high O&M costs and problems experienced with the Oroville/Tonasket system resulted mainly from the fact that high-pressure pipeline was installed. The system had problems such as sediment loading and algae problems that caused the pipe to clog, and a lack of reliability.

The proposed system (Alternative A) differs from the Oroville/Tonasket system in that:

- the proposed system would be smaller—between 3238 and 36442 ha (8,000 and 9,000 ac.) vs. 1883 ha (2200 ac.) for MVID;
- it would involve moving groundwater at low pressures and should not experience the problems experienced by the high-pressure, surface water system, because turbidity and algal blooms are rare in groundwater and lower pressures would result in less clogging; and
- the pipes would be accessible for maintenance above ground in the canal (vs. underground in the Oroville/Tonasket system).

Comment

102. $100/acre - is that per irrigable acre?

Response: The per-acre cost estimate was based on the assumptions about the number of acres remaining in the MVID under each of the alternatives—376 ha (930 ac) for Alternative A and 497 ha (1277 ac.) for Alternative B (no per-acre costs were estimated for Alternative C because the district would be dissolved). One assumption was that all acres shown on the MVID assessment rolls that would be served by the facilities proposed under each of the alternatives would be included, whether they are currently irrigated or not.

2. Compensation

Comments

MVID-02-005-03

The only people that come out with a fair shake are the people leaving the district. They get a free well drilled, plus their water rights, plus no more payments to the MVID for water. The remaining ditch users get a pipe system they don't want, loss of wildlife habitat, loss of a huge greenbelt and more than double expense for water for eternity.

81. Those remaining in the District will receive greater compensation, in terms of the rehabilitated system, than those seeking exclusion.

Response: Those who remain in the District would receive an entirely new, reliable system, the capital costs of which would be totally paid for by WDOE and BPA. Many districts that have converted their open canal systems have had to pay for the new system themselves and now have debt repayment added to their assessments. Those remaining in the MVID will also have settled the issue of the Yakama Indian Nation's lawsuit about wasteful use of water, and will have improved in-stream conditions for fish. Please see the response to MVID-02-002-04 (page 10) and other comments above regarding O&M costs, as well as the responses to comments in the **Wildlife, Vegetation**, and **Visual** sections regarding the loss of wildlife habitat and greenbelt.

Comments

MVID-02-008-08

Compensation provided to landowners leaving the district should be used strictly for irrigation system improvements applied for by the ex-MVID members similar to the compensation discussed in Section 2.1.2 Alternative B.

MVID-02-014-08

Don't pay people large sums of money for wells they already have. Don't put me in a pipe that no one wants and will start out costing twice what water costs now.

66. Concern that patrons with wells would get paid double (once for new, once for upgrade).

115. Not fair that some folks who haven't received water for years might make a lot of money through the compensation formula.

Response: Thank you for commenting. As stated in the EA (section 3.6.2), the compensation money is (in addition to money for new or upgraded wells for those who need them) a partial reimbursement for those who have been required to continue to pay assessments to the MVID over the years while not receiving their entitled water.

Comment

80. Paying people who are leaving MVID is a conflict of interest. Especially those who are making the decision shouldn't hold financial "carrot" out to influence vote.

Response: The compensation is not meant to influence votes—it is meant to compensate people who must drill new or upgrade existing wells, and/or who have paid assessments over the years and not been served by the MVID. The MVID Board of Directors will make the decision whether or not to allow people to leave the MVID. They must act in the best interest of the District.

Comment

96. Concerned about $6,000 compensation being adequate for a well. [Commenter] is not in the pressurized system area.

Response: $6,000 may or may not cover the cost of drilling a new well, depending upon your site-specific conditions. However, you may be able to use an existing well by improving it or putting in a new pump. Contact John Monahan at the Washington Department of Ecology (509) 457-7112, for information regarding your specific situation.

3. Other Social and Economic Issues

Comment
MVID-02-002-04
I didn't understand why so much money is being spent? Why WDOE is involved in the first place? It must have cost $5000 for each copy of the environmental assessment.

Response: Construction costs for each of the alternatives range from a low of $2.4 million (Alternative D) to a high of $11.9 million (Alternative B). The total cost for each alternative reflects the costs associated with repairing high-risk areas and properly installing a system, including all of the necessary site preparation work, and building the necessary access roads to construct and maintain the system.

WDOE is involved in and co-funding a major portion of the proposed project in response to a law suit filed in 1991 by the Yakama Indian Nation (YIN). The YIN asserted that WDOE had failed to insist that the MVID meet a reduced water consumption level. WDOE is committed to funding a share of the construction cost of the proposed project, provided that it meets the necessary efficiency improvements, is capable of serving water to all members of the MVID, and has in-stream and fish benefits.

With respect to the environmental costs incurred to date, BPA has spent a total of approximately $150,000. This includes federal employees' and contractor time, and a relatively small amount for printing. Six hundred copies of the preliminary EA were printed and distributed for public and agency review and comment. BPA anticipates printing and distributing approximately the same number of final EAs.

Comment
MVID-02-006-11
We [people who purchase water from MVID but are not members] are not asking for any special treatment. We are just asking that you take into consideration the consequences and repercussions that will affect all current water users on the proposed closed sections of the canals.

If this is a "must happen" situation, then give us an alternative. To some people, this is all just paper pushing - to us and some of our neighbors, it is our way of life that is being, threatened, not to mention a financial catastrophe if our property is without water rights.

Thank you for listening. I don't know what the answers are. But certainly if Alternative A or C is decided upon, give our predicament a second thought and make water available to us through some other means.

Response: We understand that projects such as that proposed for the MVID are not just exercises on paper, but that there are "real-life" actions and consequences. We researched your water rights as a non-member of the MVID and gave you information about the existing authorizations (separate from the MVID) for water use on your property. Any other people in your situation are welcome to contact John Monahan at the Washington Department of Ecology (509) 457-7112, to determine whether they have existing water rights that are separate from the MVID rights.

Comment

MVID-02-007-21

As Bob Mattison put it: " No one will ever improve on the cost effectiveness of gravity where water is concerned."

Response: Gravity water systems are normally relatively inexpensive to operate, and the O&M costs for the proposed action (Alternative A) are expected to be higher than what is currently assessed. However, the proposed project would be more equitable than the existing gravity system, in that only those who would use water would be assessed a fee for O&M. Also, the current assessments do not cover the entire costs of maintaining the current MVID irrigation system. Please see the response to MVID-02-004-04 and others, above (e.g., page 1).

Comment

MVID-02-019-28

Concerned about reduced property values due to high cost of water and loss of aesthetic/scenic values.

MVID-02-019-32

Loss of Aesthetic/Scenic Values. Reduction in property values.

Response: With respect to the issue of reduction in property value, BPA does not anticipate a reduction in property values with the proposed project. The effect of increased water costs would most likely be offset by the advantages of new, reliable irrigation system and the resolution of water right claims and other issues with the MVID. Also, as discussed in response to comment MVID-02-004-04 (and related comments, page 1), MVID assessments for irrigation water would need to be raised even under Alternative D (No Action).

With respect to the concern over the loss of aesthetic/scenic values, as stated in the EA, all four alternatives, including Alternative D (No Action), would require that trees or other vegetation along the canal or pipeline alignment, that would interfere with operations or pose hazards to the safety and integrity of the system, be eliminated or their growth controlled. Under Alternatives A, B, and C, landowners could use a portion of their water right to irrigate riparian areas if they wanted to maintain those areas.

Comment
MVID-02-009-01
My understanding is that some portion of the "saved" water from MVID improvements will end up in a "water bank." Please clarify how this water will be used, the potential impacts positive or negative of that water use, in the EA, rather than in the appendixes.

Response: As discussed in sections 3.6.2.1 and 3.9.5 of the EA, the WDOE is considering a proposed rule change that would require a portion of the water saved through increasing efficiencies (such as that proposed by the MVID) to be placed in a water bank. If the rule were adopted, a portion of the water saved would be available for future growth, both for domestic use and for agricultural/irrigation purposes. The EA concludes that some growth might occur because of the of the water that would be set aside for growth in domestic use. The remainder of the water saved would be designated for in-stream flows, based on the State of Washington's Water Rights Trust program. If the proposed rule change does not occur, and the water bank is not created, the entire amount of saved water would be placed in the State Water Rights Trust Program, as discussed in section 3.6.2.1 of the EA.

Comment
MVID-02-019-34
Concerned about increased development. This will happen under the Pilot Planning Project which will be implemented if alternative A, B, or C is approved and implemented.

Response: The implementation of the Pilot Planning Project is independent of all of the alternatives under the MVID Water Supply Facility Plan Project, and vice versa. The potential for increased development under the MVID project alternatives was addressed in the EA in sections 3.6.2 and 3.9.5. Alternatives A, B, or C all might contribute to growth and development, in that the saved water would go into the State Water Rights Trust to be used for new development and for water management goals in the basin (such as in-stream flow enhancement). This would happen whether or not the Pilot Planning Project goes forward.

Comment
9. The land is not producing at the level it used to. Not so many farmers - more horses. Apple production is way down. Every acre was farmed. Cascade Hwy. changed that. It was suppose to help farmers expand market of their products. Instead, it brought tourists.

Response: The nature of agricultural production continues to change across America. The trend is for fewer but larger farms, as agribusiness has largely replaced family farming. Although specialty products grown on relatively small acreages, particularly in the western US, have found a market niche world-wide, cultivated crops such as hay or grain are grown increasingly on larger farms. The mechanization of the agricultural industry has resulted in fewer people involved in farming. This change has led more people to enter the work force in manufacturing and services, creating a form of wealth that has led to the demand for leisure

time—leading, in part, to the rise of the tourist industry in the northern portion of the Methow Valley.

Comment
56. Open canal provided source of fire protection water and fire break that helped save my house.

Response: The more fire breaks and available surface water, the more opportunity there is for fire crews to access available water to fight both range fires and urban fires, and for fires to be contained within relatively small areas. This was addressed in section 3.8.2 of the EA. Under all of the alternatives, the fire break afforded by the canal would remain. However, under Alternative A, the piped system would reduce the availability of water from the canal. River water would still be available. Pump ports could also be installed near road crossings that would allow the fire department access to the water in the pipe.

B. Water

1. Groundwater/aquifer recharge

Comment
MVID-02-007-02
A significant concern of any of the proposed alternatives has been the impact on ground water and aquifer recharge, instream flows and change in water temperatures when the 30-some miles of open canals are eliminated and simultaneous therewith, new wells are drilled to irrigate the same lands.

The true impacts of this scenario are significant and have not been disclosed or defined and could not possibly be, absent the studies your assessment lacks.

> Preliminary Environment Assessment (hereinafter PEA) pg. 28 "The amount of groundwater levels may also be affected as surface water is applied to fields and percolates back in the aquifer, and as the existing canal system leaks water back into the aquifer."
>
> PEA pg. 29 "Without a complex study beyond the scope of this document, it is not possible to determine exactly where and how much of this water enters the ground water table."
>
> PEA pg. 31 "No groundwater quality studies have been completed that address the study area."
>
> PEA pg. 32 "However, the location of these return flows, and the proportion that returns as surface water leaks and seeps versus groundwater, cannot be determined without extensive analysis of existing canal leakage, aquifer characteristics, and irrigation patterns."

Response: Each of the alternatives would have impacts on groundwater, aquifer recharge, in-stream flows, and water temperatures. The point of the statements quoted from the Preliminary EA was that the *exact* magnitude and location of the impacts cannot be quantified unless more detailed investigations are completed. However, the EA continues after these quoted passages to explain that studies done to date are adequate to indicate that, overall, the impacts would be minor or beneficial.

It is expected that the total amount of land now in the MVID that would be irrigated would remain approximately the same under any of the Alternatives. The only difference would be the mix of sources of the water (groundwater, canal, or pipeline). Therefore, the aquifer recharge due to deep percolation of applied irrigation water would continue unchanged. However, in-stream flows are expected to increase under Alternatives A, B, or C, because the increased efficiencies of water delivery would allow more water to remain in-stream, beginning at the points of diversion. This would be a benefit to fish, through both improved summertime water quality (lower water temperatures) and quantity.

As stated in the EA, new wells would be located in areas that are in direct hydraulic continuity with the river, in order to prevent adverse impacts on groundwater levels. The wells would replace in-stream irrigation diversions, and would not require the water lost through canal seepage and evaporation. These efficiencies would contribute to improved summertime habitat for fish.

Comment

MVID-02-007-20

The seepage and spills from the canals (which allegedly account for a significant amount of the diverted volume) must be re-entering the river/aquifer at some time after yearly operation has begun. There is a notion that the Methow river basin demonstrates "super hydraulic continuity." This is something I read in another study and “plan” whose success apparently depends on the acquisition of MVID’s ancient water rights. You can't have it both ways. If the water is seeping and spilling, then it is returning to the aquifer which makes the most compelling argument for a pressure system irrelevant.

Response: With the current canal system, the quantities of water diverted from the river that are in excess of the crop requirements either percolate to groundwater, are spilled back to the river, or are lost to evapotranspiration. With Alternatives A, B, or C, this water otherwise seeped, spilled, and evapotranspired would remain in the river. Because the aquifers are very permeable and connected to the river, the river water is expected to rapidly recharge the groundwater. Therefore, the loss of recharge from the canal seepage would be offset by increased recharge from the river. The argument for installing a pressure system is valid because the higher conveyance efficiency would allow more water to remain in the river, especially in the upper reaches starting at the diversion points (i.e., above the Methow/Twisp rivers’ confluence).

Comments

MVID-02-008-11
Groundwater quantities through out the irrigation district are unknown and need to be determined before switching from surface water to groundwater for irrigation purposes.

MVID-02-008-14
Groundwater studies should be implemented to verify the assumptions suggested about the groundwater in the MVID.

MVID-002-009-04
The discussion of groundwater recharge of wells, or the river, under the proposed action is confusing. "Saving" water in the river seems to be a reason for this action; however the effects of your proposed actions are variously listed as "unknown" (pg. 28), "minimal" (pg. 31), and "can not be determined" (pg. 33). Please clarify this, and explain why a thorough groundwater recharge analysis should not be done, particularly in light of the points in #2 above. EA pg. 34 says there will be "local impact on groundwater." Please explain this issue in more detail.

Response: Although detailed, site-specific studies would be required to provide information about the precise location and timing of groundwater return flows, the available information is entirely adequate to reach the conclusion that returning excess irrigation diversions beyond the amounts required for irrigating crops to the rivers will increase in-stream flows in the Methow and Twisp rivers.

We acknowledge that additional site-specific information on groundwater yields needs to be evaluated before new wells are sited and constructed. This information will be provided to and evaluated by WDOE on a case-by-case basis through its process of transferring points of withdrawal from surface water to groundwater. If sufficient groundwater cannot be accessed on a particular parcel or would result in impairment of an existing well, WDOE will work with the landowner to make sure water is available to them, either through sharing a well with a neighbor, creation of a Local Improvement District (LID), or through their remaining in the reorganized MVID and being served with a reliable source of water.

The Preliminary EA does not state that there will be "local impact on groundwater" on page 34. It quotes from the Hong West report that, "Withdrawal of substantial quantities of water (on the order of 10 cfs) would have local impacts on the groundwater levels in existing wells, and/or on river flows." It then goes on to explain how these impacts would be avoided by careful siting of the three major well fields under Alternative A and by the case-by-case evaluations for individual wells under Alternatives A and C discussed above. Also, please note that none of the alternatives calls for the withdrawal of more than 8.8 cfs from any one location, which is less than the 10 cfs amount quoted above.

Comment

MVID-02-008-12
The effect of surface water recharging the groundwater resources needs to be determined prior to utilizing groundwater only for irrigation purposes.

Response: We know that more water is being diverted from the river than is needed for crops. Some of the excess water leaks from canals and recharges groundwater. Much more water is applied to the ground as irrigation. The amount of water applied to the ground as irrigation water would not change under any of the alternatives. The work by Hong West and Montgomery Water Group indicates that the highly permeable aquifers would be recharged from the river if the canal leakage were stopped. The evaluations referenced in the response to comment MVID-02-008-11 above would verify the permeability of the formations and the recharge capability.

Comment

MVID-02-008-13

The effect of surface water recharging the groundwater table for long-term groundwater seepage or upwelling into the Methow River needs to be examined to determine the reduction in anadromous fish habitat in the Methow River.

Response: The presence of upwelling water in the river that is significant to fish habitat has not been documented. The subsurface formations in the MVID area are highly permeable and allow water to flow freely between the river and the aquifer. Although site-specific studies have not been conducted to locate the exact amounts and timing of groundwater return to the river, given the nature of the subsurface formations, the pattern of irrigated fields in the valley, and the length of the canal, it is likely that the water returns to the river over widely dispersed areas rather than in concentrated "upwellings."

Comment

MVID-002-009-05

In light of the points raised in my comments above, isn't the <u>number</u>, and annual water use of those wells, important? EA pg. 30 says the number of wells is unknown. Doesn't this constitute "unknown risk" from a <u>NEPA</u> standpoint?

Response: The EA states that the *total* number of wells is unknown. However, it goes on to state approximately the number of recorded wells that exist—more than 200. The only unknown is the number of unrecorded wells, which would most likely be small domestic wells drawing only small amounts of water. Also, we anticipate there would not be a significant number of new wells drilled by MVID members who leave the district. Based on our discussions with a number of MVID members, most have existing irrigation or domestic wells that they would use if they left the district.

In addition, we know the maximum quantity of water that WDOE would authorize to be withdrawn from wells—46 cfs. This is based on the per-acre water allowance of 0.02 cfs/acre maximum instantaneous (4 acre-feet/acre annual) for the entire 2276 acres in the MVID. This amount of water is substantially less than the 67 cfs currently being diverted to serve the MVID. Therefore, we do not believe that this constitutes an unknown risk from a NEPA standpoint.

Comment
MVID-02-010-08
If the benefits of a pressurized pipe with extensive groundwater withdrawals are so great, they should be described by local river and canal measurements. Establish river cross-sections on the Twisp and Methow Rivers sequentially downstream from each of the points of diversion to measure stream flow and show just how much impact the present system has. Also measure cross-sections in the ditch to show how much water is "wasted." Operation of the ditch can be interrupted briefly and measurements would show the actual influence of the surface diversion.

Response: Cross-section measurements of MVID ditches are not required nor do operations need to be interrupted to measure water in the MVID ditches. The diversion records are adequate to show that quantities of water far in excess of the crop requirements are being withdrawn from the river. Allowing this water to remain in the river would result in an increase in in-stream flows. Also, there are U.S. Geological Survey stream gauges already established on the Methow and Twisp rivers. Flow measurements are taken from these gauges on a regular basis. These measurements have been and will continue to be monitored as part of WDOE's water resource management in the basin.

Comment
MVID-02-010-09
The EA describes a four mile reach of both rivers that would benefit from increased flows without a surface diversion. There is no discussion or disclosure of the relationships of diversion rates, canal seepage, return flows, groundwater recharge, and ground-surface water continuity on in-stream flows. Unless there is a known relationship, how can you determine effects on stream flow or, that by replacing the surface diversion with many wells would be any different? On page 47, the EA claims that the benefits of increased flow would occur below the confluence of the Twisp and Methow Rivers as well, but that the above relationships (diversion rates, canal seepage, etc.) could not be adequately modeled. Appendix E page 7 is contradictory and states there would be little flow change below the confluence. While there is disagreement below the confluence, I do not believe an adequate case of impact of the canal or benefit of pressurized wells has been modeled or described for the four miles of each river above the confluence.

Response: The major benefit of the proposed project is that the reaches of the Twisp and Methow rivers above their confluences would no longer be affected by diversions. While there is some canal seepage in these canal reaches that may return to the rivers, there is no irrigation recharge because the first MVID parcels are down near the confluence. Instead of being diverted 4 miles upstream and run in the canals for this distance before being used for irrigation, the water would be withdrawn from groundwater sources within a mile of where it would actually be used. Also, the losses due to evapotranspiration in the initial reaches of the canals would not occur. Figure 3-3 in the EA shows a diagram of these relationships. Please also see the responses to comments MVID-02-008-11 and MVID-02-016-03, pages 15 and 18. Appendix E, page 7, has been corrected to be consistent with the body of the EA, which states that while the flow benefits below the confluence cannot be easily estimated, they are expected to be positive.

Comment
MVID-02-015-07
The impacts from development of groundwater supplies are of serious concern to me. Hong West reported in its conclusions that "withdrawal of substantial quantities of water would have local impacts on the groundwater levels in existing wells, and/or on river flows." "Any nearby wells (new or existing) would probably be influenced by high rates of groundwater pumping." "In general, any new wells of comparable size, located farther from the river, would experience greater drawdowns and would have more significant negative influences on adjacent wells than would wells drilled near the river." "Note that even if the wells were drilled in areas in hydraulic continuity with the river, groundwater levels would be drawn down, and existing wells could, in theory, be affected in some cases." How will Hong West's conclusions be addressed in the project? These potential impacts must be addressed fully.

Response: These concerns, summarized in section 3.1.2.1 of the EA, are followed with an explanation of how they would be addressed for the proposed project. The three major well fields would be located next to the rivers, to maximize hydraulic continuity and minimize impacts. None would withdrawal more than 10 cfs, the caution level stated in the summary (the highest level would be 8.8 cfs). The additional site-specific investigations that would be conducted to satisfy WDOE requirements and to protect the interests of existing water users would address the concerns identified by Hong West (MWG, 1996) and others in regard to siting of individual wells. In practice, this may mean that the wells would need to be located close to the river as suggested by the Montgomery study (MWG, 1996) and in the EA. WDOE would work with landowners on a case-by-case basis to assure that they receive adequate irrigation water without affecting others.

Comment
MVID-02-016-03
A fault with the Montgomery plan was its lack of quantifiable change in groundwater due to the proposed action. The MVID EA has the same fault. It does not seem beyond the scope of this analysis to approximate groundwater flow and volume by canal reach using existing well log data and geologic cross sections. The EA states that "withdrawal of substantial quantities of water would have local impacts on the groundwater levels in existing wells, and/or on river flows." Without quantifying <u>how much</u> impact it is impossible to say whether it will be a significant impact or not. In other words, the supply wells for Alternative A (and C) *could* dewater the rivers just like the old diversions dams could. I realize intuitively it seems unlikely but the analysis needs to show that.

Response: Hong West Associates, in its report included as Appendix D in Volume II of the Montgomery Water Group's facility plan, did provide the information you request. Table 4 provides estimated groundwater flows and reasonable potential yields, based on the well log data and geologic cross sections in Table 3. Also, the summary statement quoted included a parenthetical statement "(on the order of 10 cfs)." Based on this information, the three major well fields needed for Alternative A would be placed as close as possible to the rivers, in areas

recommended by the Hong West report as having sufficient groundwater, and none would withdraw more than 8.8 cfs from any one location, as they would also be placed a minimum of 1.6 km (1 mi.) apart. Both the Methow and Twisp rivers have mean daily flows much greater than 8.8 cfs, so these wells could not totally dewater the river. Also, water would be withdrawn from the wells only when it is being used, as opposed to the existing situation, where water is withdrawn continuously during the irrigation season, whether it is being used or not.

Comment

MVID-02-017-04

Canal leakage contributes to groundwater in greatest quantities when the river reduces flow in August, September, and October. A delayed inflow of groundwater of even .8 - 2.4 cfs/mile makes a big difference to resident aquatic life at that time because that water would otherwise have gone out to the Pacific Ocean. Groundwater flows down a gradient to become the surface water we know as the river. The river precisely tracks the groundwater since they interconnect (maintain continuity).

Response: The time lag for canal seepage to return to the river may marginally help sustain river flows late in and after the irrigation season. However, irrigation water applied to and seeping into the land would contribute even greater amounts of groundwater return, and the total amount of irrigation is not anticipated to change under any of the alternatives. Also, water is lost as it evaporates during transportation in the open canal. This evaporated water would not be lost under Alternatives A or C. The amount of flow contribution to the river from the groundwater lag due to canal seepage alone has not been quantified, and would be difficult if not impossible to accurately model. However, reducing excess irrigation withdrawals and allowing more water to remain in the rivers would increase in-stream flows and more closely reflect natural conditions than those occurring with the current level and manner of irrigation withdrawals.

Comment

MVID-02-019-08

"It is not surprising that a significant amount of the water diverted upstream on the Twisp R. showed up immediately at the Twisp gage when the diversion ended, though there is some double counting of re-diverted water. The distance between the diversion and the gage is short, the reach is steep, and there is little alluvium to act as a sponge in between... Most water previously diverted upstream in the mainstream Methow did not show up downstream when diversions ended, even ignoring accretem from Gold Creek, Libby Creek, Beaver Creek, etc."
[Continuation of quote from J.W. Mullan on IFIM study]

Response: We acknowledge that the percentage of water diverted by the MVID from the Methow in relation to the total flow is much smaller for the Methow River than it is for the Twisp. This may be one reason why it was more difficult to track. The IFIM study does point out, and this comment affirms, that benefits to fish habitat from the project would be greater in the Twisp River than in the Methow.

Comment

MVID-02-019-10
Jim Mullen sent me a letter responding to a seminar that Dale Bambrick gave titled "Assessment of Flow Patterns in the Methow, and Twisp Rivers Relative to flow patterns in other local streams." The following is part of this letter.

"I still believe the Methow Valley offers a unique opportunity to improve instream flows and increase irrigation water. This is due to its glacial fill serving as a groundwater reservoir for the streams, something that is already happening to an unknown extent. The Methow Valley is entirely different than the Entiat and Wenatchee River Valleys; which have only limited groundwater storage capacity. Are there additional areas in the Methow Valley where spreading of excess snow melt waters would result in increased stream flows in summer-fall? We will never know until we have a detailed, holistic analysis of the geology and soils, etc. This is something for the best brains in the U.S. Geological Survey and not half-baked fisheries biologists."

Response: Please see the response to comments MVID-02-008-11, MVID-02-007-20, and MVID-02-008-12, pages 15, 14, and 15 respectively.

Comment
MVID-02-019-13
We need a new Methow River Basin Study. It needs to be done by an independent group of professional scientists with no ties to the DOE, BPA, Power Planning Council, Washington State, or Yakama Indians. The reason for this is there is strong feeling that Washington State, and maybe others involved in this Project have influenced their biologists/scientists with subtle threats that they support only the State Policy and keep their own professional assessments to themselves. In other words keep their mouths shut if they know what's good for them. How can we ever hope to save our fish or anything else with this kind of mentality in control of our resources and wasting our money. Look at the track record. It's terrible! This will be just more of the same if it's allowed to continue.

Response: Thank you for commenting. We disagree with the expressed opinion that our studies and information are biased. No agency personnel have been influenced not to comment on this project due to threats from any of the agencies involved.

Comment
MVID-02-019-16
Concerned about lack of groundwater studies below the Weeman Bridge (too many assumptions with little or no data for these assumptions).

Response: As stated in the response to MVID-02-008-11: although detailed, site-specific studies would be required to provide information about the precise location and timing of groundwater return flows, the available information is adequate to reach the conclusion that returning excess irrigation diversions beyond the amounts required for irrigating crops to the

rivers will increase in-stream flows in the Methow and Twisp rivers. Site-specific studies would be completed before new wells would be permitted by the WDOE.

EMCON Northwest, Inc., in their 1993 study entitled, "Upper Methow River Valley Ground Water Management Area Hydrogeological Summary Report," p. 2-5, did state that below Weeman Bridge [located on Highway 20 about 12.9 kilometers (8 miles) northwest of Winthrop] the valley fill may decrease from over 305 meters (m) (1,000 feet (ft.)) deep to about 152 m (500 ft.) deep. However, they state that there are insufficient data to demonstrate conclusively whether this valley bottom change is, in fact, a significant feature affecting overall groundwater flow. Hong West Associates in their report (Appendix D, Volume II of MWG) calculated valley fill thicknesses based on well log data ranging from 5-64 m (17-210 ft.). They still believe, even with this much reduced valley fill thickness, that groundwater should adequately supply the current demands for all of the reaches.

Comment

MVID-02-019-18

Concerned about inaccurate data of Montgomery's Water facility plan (too numerous to list here).

Response: Independent consultants from CH2M HILL have reviewed the data in Montgomery's Water Supply Facility Plan. They concluded that the data contained in the Montgomery report appear to have been obtained from the best available sources (MVID and other public records), and that, although the reader may contest specific details of the analysis, the data in the Montgomery report appear overall to adequately reflect the general conditions in the Methow Valley.

Comment

MVID-02-019-26

Concerned about lowering of the groundwater aquifers. May decrease instream flows in summer, fall and winter during critical periods.

Response: Overall, groundwater levels would not be lowered by the project because (1) the total amount of water diverted for irrigation would be lower than is currently the case, (2) the groundwater aquifer is generally in direct hydraulic continuity with the river and is expected to be rapidly replenished by the river, and (3) the evaluation process used to locate the new wells and the regulatory process that is in place to protect the water rights would assure no significant local groundwater impacts. The success of converting the surface water supply to groundwater is highly dependent upon the high rate of water movement within the aquifers. This has been generally identified and confirmed by various hydrogeologic investigations, and documented in the EA. As mentioned in the response to MVID-02-008-11, more detailed site-specific investigations would be conducted before wells are sited and constructed.

Comment

MVID-02-021-03

It is stated in the Pre-EA that "Although no studies of the effect of groundwater returns on river-water temperature or flow have been completed in the MVID area, it is likely that any such effects are too small to be measurable." While we were concerned, as were some MVID members, that irrigation canal seepage return flows might be important in moderating stream temperature and flows during critical periods, the high transmissivity of the aquifer and rapid return of flows to the stream from canal seepage together with the estimated canal seepage to ground water volumes in Appendix E would indicate that this is not a large concern.

Response: Thank you for commenting. We agree.

Comment
MVID-02-021-04
Ground water. Ground water levels around the wells are not expected to decline significantly because the transmissivity of the aquifer is high, i.e., the sandy, gravelly aquifer transmits water easily and does not allow for large water level declines. We are confident that all available ground water data were used in the assessment; thus, further ground water characterization is probably not necessary.

Response: We agree that further groundwater characterization is not necessary.

Comment
103. Aquifer question - did we address aquifer questions?

Response: Potential impacts on groundwater (in this aquifer) were addressed in Section 3.2 of the Preliminary EA.

2. Water supply for irrigation

Comment
MVID-02-006-02
I have concerns about our ability to continue getting irrigation water [from non-MVID member who purchases water].

Response: In response to your request of June 30, 1997 at the public hearing on the Preliminary EA, the WDOE has researched its files regarding authorizations for use of waters of the State of Washington. The letter in response to your research request explained existing authorizations (separate from the MVID rights and claims) for water use on your property. Anyone else who has similar concerns can contact John Monahan at WDOE (509) 457-7112, to find out what authorizations they may have to use water.

Comment
MVID-02-006-04
I didn't understand why we are able to land on Mars and unable to find a way for landowners to irrigate their property.

Response: The agencies have worked extensively with the MVID over the past several years to arrive at a mutually agreeable solution to the problems that have been identified. We believe that the EA presents a reasonable range of alternatives for accomplishing this.

Comment
MVID-02-006-05
The Okanogan County Zoning Ordinances specifically spell out that in the valley floor (outside city limits) you must have at least five acres in order to sell a parcel of land. That means that if you have 4-1/2 acres you are unable to put in a well, dig a septic, etc. The logical answer to this problem is that we purchase larger parcels. Okay, so now we have a hypothetical 20 acres - what are we going to do with it? We can't raise a crop, we can't even raise a good kitchen garden because we have no water. And why don't we have any water? Because we live on Reach 1 of the MVID, in the past two years, we have spent in excess of $5,000 to get water to our 5 acres under irrigation. We had to purchase and install a pump, have an electrical service put in, and this past spring we had a additional outlay of over $2,000 to appease the Board. We were accused of threatening the integrity of the ditch by removing trees damaged in last winters rampage. The Board never contacted an irrigation engineer, took any measurements, etc., but went directly on the word of one ex-board member, who took it upon himself to act as judge and jury. The only reason we are bringing this up is because the Board knew; they realized that the future of the ditch was hanging by a thread. Why weren't we told? When I asked this question, I was told I should have attended the meetings, but we are not members of the MVID, we have no vote. For argument's sake, let's just say we decide we want to sell. We are going to have a real problem and a financial calamity if we are unable to get water for some kind of irrigation on a 20-acre parcel.

Response: Much of what you are concerned about is not associated with the proposed project under review by the BPA. Your concerns and issues with the MVID should be addressed to the MVID Board of Directors. Also, for more information about Okanogan County building and development opportunities and limitations, it is necessary that you contact the Okanogan County building and planning departments, as they have the authority in these matters.

However, your assumptions that you cannot drill a well, raise a crop, or raise a kitchen garden are incorrect. Your ability to obtain water for irrigation of your land is not limited to or determined solely by the MVID, especially since you say you are not a member of the MVID. At this site, it is possible to drill a single-domestic well for use in your home, and to irrigate up to 0.2 ha (0.5 ac.) of lawn or garden. A half-acre kitchen garden would be approximately 46 m by 46 m (150 ft. by 150 ft.). Furthermore, the WDOE has been working cooperatively with Okanogan County, citizens of the Methow Valley, and others to develop a revised Water Resources Management Program for the Methow River Basin that would make water available

for irrigation and residential development throughout the Methow River Valley—water that low in-stream flows could not affect. For more information, contact John Monahan at the Department of Ecology's Central Regional Office in Yakima at (509) 457-7112.

Comment
MVID-02-012-03
I have concerns about huge amounts of water that must be diverted to irrigate relatively small acreage.

Response: We agree, and that is why WDOE and the MVID originally proposed this project. As shown in the Preliminary EA (see page 29), the existing MVID system is very inefficient, and only about one-fourth of the water diverted from the rivers is currently used for crop irrigation. If the system were made more efficient, as proposed, more water would be left in-stream to benefit fish.

Comment
MVID-02-015-05
What happens if it is determined that a farmer can not drill a well to irrigate due to surrounding influences and impacts? Members of the MVID throughout the entire MVID reorganization process were led to believe that they would be able to drill wells to replace their existing canal water. After reviewing the EA it appears that is clearly not the case at all.

Response: The EA does not intend to suggest that it will not be possible for a farmer to drill a well to irrigate. Rather, it is anticipated that most, if not all, of the MVID members who leave the district will either improve an existing well on their property, or will drill a new well on their property. What the EA does point out is that it will be necessary to check to make sure that water is available in sufficient quantity, and that wells will not interfere with each other, on a parcel-by-parcel basis. Furthermore, the EA points out that if well interference or a lack of availability of water were determined to be a problem, it would still be possible to develop a well source to serve excluded land. This would be accomplished through development of a common well source for several properties, rather than one well for each property, through the creation of a Local Improvement District (LID). Thus, BPA, the MVID, and the WDOE anticipate that members of the MVID that are excluded from the MVID will have the opportunity to develop a well supply for their property.

Comment
90. If someone could show you that the water use in this valley was much lower than what is shown in the Kleinhoffer report (late '80's), would that shoot this proposal down?

Response: The historic water use data were obtained from the best information available, although the accuracy of the data was not directly investigated in the Preliminary EA. If it were

found that the historic diversions have been much less than reported, that could have an effect on the feasibility of the project. From the verification work done by Montgomery and from observation of the existing facilities, it is believed that the historic records are sufficiently accurate to support the analyses in the EA and to justify the project.

Comment

98. Will be more water consumption with proposal. Irrigation acreage will go from 700 acres to 2400 acres.

Response: The Preliminary EA may have been inaccurate in Table 2-1, and has been corrected. It stated for Alternative D in row 10, "Irrigated acreage in/out of MVID," that about 314 ha (776 ac.) in the MVID is currently irrigated. This is the acreage that is currently served by the canal. It does not include the acreage that is still included in the MVID but is being irrigated with private well systems. Therefore, the current amount of land irrigated is actually much higher than 314 ha (776 ac.). It is expected that the total amount of land irrigated would remain approximately the same with the proposed project. The amount of land remaining in and served by the MVID would change with the various alternatives, but the balance would be served by private wells. Because the *total* irrigated acreage would remain about the same under all of the alternatives, the amount of irrigation water needed for consumptive use by crops would remain about the same for all of the alternatives.

Comment

99. EA is misleading in that they claim that there will be lower diversions in the upper reaches, but fail to point out the "big picture" impact of greater consumption in the basin. EA is silent about impacts of greater consumptive use in lower reaches.

Response: Please see the response to comment 98, above. No overall increase in consumptive use is anticipated. Even if there were greater consumptive uses in the basin as a whole, restoring flows in the MVID reaches would improve fish habitat and passage in these reaches.

Comment

125. We won't stay here if this valley goes brown. We need to be able to water our plants. We couldn't water last week. That just isn't acceptable.

Response: The proposed project would provide a way for all members of the MVID, (even those who do not currently receive water from the MVID) to receive adequate irrigation supplies to serve their irrigation needs.

3. In-stream flows

Comment
MVID-02-002-02
I have concerns about DOE making a big deal about water shortage when there is none. See Methow River in June of 1997.

Response: It is true that there were high flows in the Methow River during the spring and summer of 1997. However, the analysis in the Preliminary EA is based on measured historic flows in the Twisp and Methow rivers; it shows that irrigation diversions are a substantial portion of natural flows during some months (see Section 3.1.1.1 (page 28) of the Preliminary EA) and that restoring flows to the river would improve fish habitat (see Section 3.2.2.1 (pages 46 through 52) of the Preliminary EA).

Comment
MVID-02-007-06
Numerous representations are made with regard to the impact of increased instream flows as a result of the various alternatives. All of the data relied upon has come from either the MWG 1996 study or the IFIM study conducted by Caldwell and Catterson (1992). As stated above, the MWG data may be seriously flawed and deemed unreliable. The IFIM study has been deemed insupportable by the scientific community. Based upon the above, and as is true with a lack of good data for your ground water/aquifer study, a complex qualified study would be required to quantify the true impacts of instream flows for any of the proposed alternatives. It has long been believed that any of the proposed alternatives might indeed decrease instream flows, raise summer water temperatures, and lower winter water temperatures for fish. These impacts could well be significant, and further study is required to properly disclose and define each alternatives affect.

Response: We disagree that the MWG data is seriously flawed or unreliable. Independent review of this work by consultants from CH2M HILL has not identified serious flaws or problems. The IFIM study has not been deemed insupportable by the scientific community. Appendix E, Part 4, addresses the use of IFIM in the context of this project. For additional discussion relating to the applicability of IFIM and winter flows, please refer to the responses for comments MVID-02-019-11 and MVID-02-019-12 (page 36). We believe that the existing analyses are sufficient to demonstrate that in-stream flows will be increased and water temperatures will not be adversely affected.

Comment
MVID-02-017-03
Page E-2: The argument on this page follows out to the unintended conclusion that diversion of canal water has little affect on instream flow and fish habitat.

Response: The discussion on page E-2, Part 2, of the Preliminary EA pertains to the canal seepage contribution to groundwater and not to streamflow, as questioned by the reviewer. The discussion concludes that " . . . the recharge from the leaking canals has very limited and local influence on the groundwater quantity and level." The statement is only made in reference to the **groundwater aquifer** as a whole, and not to streamflow. The diversion of water out of the rivers into the canals does have a direct impact on streamflow directly below the points of diversion. This impact diminishes as groundwater returns downstream. Hence, we focused our in-stream habitat analysis on those portions of the rivers directly downstream from the diversions.

Comment

MVID-02-021-02

Instream flows. We believe there will be no negative impact to the Twisp and Methow Rivers resulting from implementation of the proposed action, Alternative A. This is because the allowable ground water withdrawals for the pressurized pipe system and the individual landowner wells will be significantly less than the amount of water that is currently being diverted to the canals. Consequently, instream flows will be greater.

Response: We agree that there would be no negative impact; in fact, we believe the increase in in-stream flows would be a benefit.

Comment

44. Doesn't think any alternative will affect level of water in the river.

Response: It is well documented that the MVID service area can be irrigated with substantially less water than is currently being diverted from the rivers. If the water that is saved water through the implementation of the project is allowed to remain in the river, the river level would be higher.

Comment

45. Twisp River has its own drainage problem - water is seeping away.

Response: In areas of highly permeable alluvium, it is very common for river flows to increase and decrease from one reach to the next. The water flows above or below the river bed, but it is not lost. It is not feasible or environmentally acceptable to modify this flow pattern. Therefore, the most practical method to mitigate the fish habitat problems in the low surface-flow reaches is to increase the flow rate. This is the purpose of the proposed project.

Comment
58. Water gets back into river anyway.

Response: Although the unused (seepage and spills) water does eventually get back into the river, it returns at a downstream location. The river reaches between the points of diversion and the point where the water returns have reduced flows, adversely affecting fish passage and habitat.

Comment
61. Leaving more water in the river is a good idea!

Response: We agree.

Comment
110. Pumping groundwater will pull water out of river; won't lead to increased flows in river.

Response: The increases in efficiency of water delivery under the proposed irrigation system would result in increased river flows, especially in the reaches of the Methow and Twisp rivers above their confluence. Please see also the response to comment MVID-02-019-26.

4. Effects of and on Wells

Comment
MVID-02-015-04
It appears that the amount of groundwater available in the project area, and the amount of groundwater currently being used, is unknown. On page 28 it states "The amount of groundwater use is unknown (MWG, 1996)." On page 31 it states "No groundwater quality studies have been completed that address the study area."

Is there going to be a complete assessment of groundwater availability in the project area before the project is implemented? It would seem to be a prudent measure considering that DOE will review every future well application on a case by case basis in the project area. The EA states that DOE may require pumping tests and/or additional tests and monitoring wells to assure that new wells were not located where they could impair existing wells. What information or data will DOE use to compare the test results with? Who will pay for the additional testing?

36. Who will be doing continuity studies for each landowner? And who pays for it?

Response: Please see the response to comment MVID-02-008-11 (page 15) regarding needs for more groundwater study.

Regarding the WDOE testing, the following from the response to MVID-02-007-03 explains the process: A determination about the ability of a well to provide adequate water and to extract the water from the appropriate aquifer, and its potential impairment of existing rights, is made on a case-by-case basis as a part of any routine application for a change in water rights. Once a change application is submitted to the WDOE, a field inspection is made by a permit writer employed by WDOE. Upon inspection of the site and existing well logs (descriptions of the geology and aquifer water levels found when wells are drilled), the permit writer will make a recommendation as to whether or not water is available, and whether or not the change can be made without impairment to other rights. If there is insufficient information, it may be necessary to have the proposed well drilled under the authority of a preliminary permit, to test the availability of water and to test for impairment. This type of test is done routinely throughout the state. The purposes of the compensation to be given to those who leave the MVID are to defray the cost of (1) well drilling, (2) well improvement, (3) the above-mentioned well pump-testing, and (4) for some, a partial reimbursement of past assessments that have been paid, but for which services were not provided by the MVID. The total cost of developing a well, testing a well, etc. will vary parcel-by-parcel, and will depend in part on the proposed location of the well by the landowner.

Comment
MVID-02-015-06
On page 32 of the EA it states in part " . . . new wells would be drilled into the groundwater, there would be no direct impact on either surface or groundwater quantity." Further down the page it states "All new wells would need to be located so as to withdraw water from the shallow alluvial aquifer, and therefore would be in direct hydraulic continuity with the river water." On page 33 it states "Pumping from the well fields located near the confluence would reduce river flows in the well fields immediate vicinity." There appears to be some discrepancies here.

Response: The wells in the shallow aquifers that are in hydraulic continuity with the river would withdraw water from the river. This would cause a local flow reduction in the river. In a much broader sense, however, the total amount of groundwater used for the piped system would involve one-third less water than is currently diverted by the canals. Therefore, from a basin perspective, the total water supply would not be reduced; in fact, due to the increase in the efficiency of water transportation in the proposed project, the total available water (groundwater and surface) would be greater. The points of groundwater withdrawal would be selected to minimize localized reductions in water levels.

Comment
MVID-02-019-17
Concerned about impacts on existing wells. Wells that depend on canal seepage; new wells' effects on existing wells.

76. Some wells fed by canal would dry up if canal stops.

Response: As stated in the EA, WDOE would **not** issue a change in water diversion for a new well that would impair the use of an existing well. It is unlikely that properly constructed and permitted wells would be directly affected by recharge from leaking canals.

5. Other Water Issues

Comment
MVID-02-016-04
Water quality improvements attributed to Alternative A are questionable. The EA states that the Methow River at Pateros has exceeded water temperature standards. It is difficult to attribute water quality of the Methow at Pateros directly to the actions of the MVID. There are too many river miles with irrigators all along between Twisp and Pateros to show a conclusive direct correlation.

Response: Unfortunately, the only published temperature data for the Methow River below the MVID system are for near Pateros (see page 31 of the Preliminary EA). It is probable that other factors, including other irrigation, influence water temperature between the MVID and the water temperature measurement point near Pateros. Nonetheless, it is reasonable (and generally accepted) to assume that diverting water out of the river during summer months increases the temperature of the river, by making it more shallow (thus increasing the influence of the sun's heat) and by warming the water that eventually flows back into the river through spillage, leakage, and return flows. Leaving more water in the river is therefore likely to help reduce in-stream water temperatures.

C. Fish

Comment:
MVID-02-005-08
If the Twisp River diversion prevents fish migration, then why (and how) do they still migrate up the Twisp River?

Response: The EA states that the river diversions **delay** upstream fish movement, not that they completely block fish movement. Fish may have to wait for higher flows to pass the diversions or may spend time searching for a suitable spot to pass the diversion at lower flows. Delays in upstream migration may be a particular problem for spring chinook, as they need to find deep, colder pools above the diversions in which to spend the summer before they spawn in the early fall.

Comment
MVID-02-007-19
"By the 1930's there appeared to be a decline in the fish population in the Methow and Twisp rivers." Did it just "appear" that there was a decline? Did someone measure this? Who was the old-timer who came up with this one? I have been in Twisp since 1955 and it is my opinion that the fishing in the Methow and Twisp rivers has always been adequate but not lucrative. It is further my opinion as an angler that the fishing has gotten better, not worse. Maybe someone has some hard numbers.

Response: This statement was based on several articles from the Methow Valley Journal and Wenatchee Daily World in March and April of 1932, which discuss the decline of fish in the Methow basin and the fight to get fish screens installed on irrigation ditches, including the MVID canals. Dams near the mouth of the river were also discussed as a reason for the decline. To quote an article from the Methow Valley Journal on March 31, 1932, entitled "Ranchers Oppose Installation of Fish Screens," "Especial emphasis was placed upon the absence during recent years of salmon in this river. . . . The Methow has practically ceased, it is said, to be a producer of food fish."

It may be that, since the damage to the fish populations in 1930's and before, efforts to install fish screens and stock hatchery fish in the Methow and Twisp rivers have had some measure of success. However, the recent listing of steelhead as an endangered species indicates that this species is in severe decline. Also, hard numbers from WDFW on spring chinook returns show declines over the period 1960-1995 from peaks of 3000 - 7000 fish in the early 1960s to peaks ranging from 1100 to 1600 in the early 1990's. The most recent data show record low returns of only 283 fish returning in 1994 and 32 fish in 1995 (O. Langness, WDFW, June 1996 *in* NWPPC Streamnet Database; Internet address at www.streamnet.org).

Comment
MVID-02-010-12
There is no mention of the fact that soon after the 1948 and 1972 floods, extensive clearing and disposal of large woody material (essential for fish habitat) occurred in both of the reaches claimed to improve without surface diversions. This habitat loss, and development of private land within riparian areas are much more influential in the demise of fish populations than low flows in September. In fact, winter flows and available fish habitat are more limiting to the local fish populations, yet these are not discussed in the EA.

94. Problem with anadromous fish in Twisp and Methow is that the Corps of Engineers "cleaned out the river" by removing logs, pools, etc. That's the reason for lack of fish, not the ditch. Floods in '48 and '70's.

Response: While we agree that there are a number of factors that have and continue to affect fish production, the in-stream flow analyses conducted for this project show that more water in the rivers would provide better habitat for fish under the existing conditions. The project alternatives propose to alter only the summer and fall flows in the affected river reaches. The

project would not affect high flow events, which occur most commonly in the spring. As it is during high flows that large woody debris (fallen trees, etc.) collects in the stream channel, the woody debris previously removed will be replaced through natural processes and will provide cover for fish. As for winter flows being a limiting factor for fish, please see the response to comment MVID-02-019-12 (page 36).

Comment
MVID-02-010-13
The EA describes the limitations of the IFIM (Instream Flow Incremental Methodology), but there is no modification of improvements to compensate for local factors shown for the proposed action in WUA (weighted usable average) curves. Fish in the Twisp River have adapted to low flows in late summer. The system is high gradient and stream flow is directly related to snow melt. As long as the snow lasts in the high country, flow is up and the fish are mobile. At low flow, the fish remain stationary until small increases in stream flow occur with fall rains. Deep pools and woody material would provide the habitat needed for fish to retreat during low flows. Fix that deficit before destroying a useful water delivery system. There is no mention of established minimum stream flows for the Twisp and Methow Rivers in the MVID project area. What are the minimums and how do average flows compare? Do the minimum flows consider existing claims to water? What about other surface diversions of irrigation water above or below the MVID points of diversion for the river reaches above and below the confluence?

Response: Modification of the WUA curves - The limitations presented in the EA relating to the IFIM methodology are not site-specific, but rather have to do with making sure factors other than just physical habitat are considered. These were listed on page E-6 of the Preliminary EA. The Preliminary EA did address other factors, such as fish passage and water temperature. Therefore, it is unclear what the reviewer means in asking us to compensate for "local factors." WUA curves represent only the physical habitat available at different flows, given a fish's preference for certain physical features such as depth, water velocity, and substrate. These factors represent habitat based on the modeling of the specific physical characteristics observed in the particular river.

Limiting factors - One of the purposes of the project is to increase the low flows. While other habitat features, such as a lack of deep pool habitat and large woody debris, may be a problem, neither would be affected by the project. Therefore, these existing conditions were treated as a constant in our assessment.

Minimum flows - Minimum flow standards for the Methow and Twisp rivers were issued by WDOE in 1976 (Washington Administrative Code 173-148). The following table shows the minimum flow standards and compares them to average and dry water year conditions.

Reach	Minimum flow standard	Normal conditions (50% exceedence flow)	Dry conditions (10% exceedence flow)
Twisp River	27 cfs	55 cfs	24 cfs
Methow River above Twisp	100 cfs	233 cfs	157 cfs

The average flows under normal water year conditions are roughly twice the minimum flow standards for both rivers. However, the average flows during dry water year conditions for the Twisp River are only 24 cfs, which is below the minimum flow standard.

All water rights and claims issued before 1976 (including those of the MVID) are senior to (have a priority over) the minimum flow standard. So even with minimum in-stream flow standards, the existing water rights and claims can legally dry up a river. Since *average* flows in the Twisp River are already close to the minimum flow standard during normal years, and below it during dry years, actual in-stream flows regularly fall below these minimum standards. However, there is no legal recourse because the MVID and other irrigators have senior rights and claims. There are other diversions both above and below the MVID diversions, but the MVID is by far the largest diverter of water in these river reaches.

Comment
MVID-02-015-02
In discussing the potential impacts of alternative A, the EA addresses in-stream fish habitat. The discussion of in-stream fish habitat impacts uses the word "probably" several times in describing flow increase, benefits to fish habitat, and groundwater return flows. Again where are these "probably" benefits defined or quantified?

Response: The word “probably” is used (twice) because we do not definitively know the exact location(s) where groundwater is presently returning to the Methow River below the confluence with the Twisp River. We do know that groundwater does return to the river downstream of the confluence with the Twisp River and we know that the return flow and river flow increase as one moves downstream. Therefore, any increase in in-stream flows (and in-stream habitat) gained by less diversion at the canals would be highest in the upper reaches of this stretch of river and lower downstream. Because the exact location of changes in flow are not known, we could not quantify the effects on in-stream habitat for the lower stretch of river, and could only state these benefits qualitatively.

Comment
MVID-02-016-02
The EA states that Alternatives A and C would “result in increased habitat area for anadromous and resident fish in the Methow and Twisp Rivers.” How much? Analysis should indicate a range of quantities for how much habitat will be “created.”

Response: Changes in river flow for Alternative C in the Methow River and Twisp Rivers above their confluence were the same as those for Alternative A. Therefore, changes in in-stream habitat would be the same for each alternative. Please refer to Section 3.2.2.1 under the heading "In-stream Fish Habitat" and Tables 3-5 and 3-6 for a discussion and presentation on the changes to in-stream habitat for Alternative A. The net changes in habitat vary with flow, species, and life-stages, but they range from 0 to 25% for the Methow River above Twisp and from 10 to 224% for the Twisp River at Twisp.

Comment

MVID-02-016-08

Figure 3-5 in the EA shows the times at which salmonids use the MVID project area. The note at the bottom says that the chart shows presence, not relative abundance. Such a chart is misleading, as it does not convey the importance of habitat through time. For example, the chart shows adult spring chinook immigrating through the MVID project area from May through August. It does not tell me what percentage of the immigrating population are trying to get by the diversion dams in August (the time of concern). Is it 10 percent? or 90 percent? or are they simply in the project area somewhere between Twisp and Carlton and not near the dams at all? Since the points of diversion seem to be the main concern in this whole project, it would be helpful to know exactly how much of a problem the dams are in fish life cycles.

Response: Given that the peak spawning period for spring chinook salmon occurs in late August in the Methow basin (Caldwell and Catterson, 1990), most of the spring chinook would have passed the diversion points by then. However, that does not diminish the importance of providing good passage for late-coming fish, because diversity in run timing helps maintain the viability of a fish stock. River conditions may vary considerably from year-to-year, and it is possible in some years that earlier spawning attempts are unsuccessful. These late-coming fish help ensure a stock's reproductive success in such situations. In addition, although spring-run fish were singled out in the report because of their need to pass the diversion quickly to find cooler water, other species, such as summer chinook and steelhead, migrate upstream (see Table 3-5) during the low-flow period. While delays in their migration may not be as critical as for spring chinook, any delays to fish migration can have compounding effects when coupled with other environmental factors that may adversely affect spawning success.

Comments

MVID-02-019-07

1 think the analysis would be better if you had done your job properly and investigated and researched all information that was given you, done valid studies of your own at the proper time or season instead of using invalid studies. (Methow River Basin Fish Habitat Analysis Using the Instream Flow Incremental Methodology, etc.) This study needs to be trashed. The Pilot Planning Project threw it out and would not use it. J.W. Mullan, U.S. Fish and Wildlife (Ret.) says: "This is not a comprehensive review of the above (Methow River Basin Fish Habitat Analysis Using the Instream Flow Incremental Methodology), but I couldn't restrain myself in pointing out that it illustrates what we have called attention to all along: the need for a mass balance accounting of water input and use in the Methow Basin by professional geologists. Brad

Caldwell's two page addendum to the report of Dec. 6, 1992 in which he tries to justify the conclusions of their study, is illustrative. Incredulously, evapotranspiration is not even mentioned as a factor affecting flow level between September and October (before and after irrigation)."

MVID-02-019-09
"The fish data in the main report is equally flaky, e.g., increase in "fall Chinook" in the Methow River from increased production in the Hanford Reach, estimating spawning flows for bull trout in reaches of stream where they do not spawn, velocity preference for bull trout juveniles of up to 3.0 FPS to 6.0 FPS, etc. Little hard information is provided on the habitat use curves used in the HABITAT model, key to the whole analysis. Professional judgment and trout curves modified by H. Beecher using data from "nearby basins?" is mentioned in passing. If the snorkeling observations reported on p. 189-191 are any indication of what went into curve formulation, God help the public. Obviously they had trouble separating brook from bull trout or cutthroat from ---[sic] and accurately assessing lengths. There was no ground truth whatsoever (fish-in-hand) and they record species assemblages and more trophy size trout (for the Methow) that do not jibe with an actual examination of more than 20,000 fish. You could conclude that Ken Williams management (catch-and-release, etc.) is really paying off!"
[Continuation of quote from J.W. Mullan on IFIM study]

Response: These remarks are primarily composed of excerpts from J.W. Mullen's comments on the "Methow River Basin Fish Habitat Analysis Using the Instream Flow Incremental Methodology." The author of the comments appears to be objecting to the use of IFIM. As stated in *Appendix E-6, Part 4: Application of Instream Flow Incremental Methodology,* "IFIM is a standard tool used to develop habitat-versus-streamflow relationships to assist in making water management decisions." The "Methow River Basin Fish Habitat Analysis Using the Instream Flow Incremental Methodology" document is a peer-reviewed report based on standard methodology. It was reviewed again by CH2M HILL fisheries biologists before it was used in this EA to evaluate changes in in-stream fish habitat under the alternatives. IFIM data can help make decisions about water management. Other factors, such as water temperature, fish harvest, fish passage, and management objectives, must also be considered when assessing the overall impacts of a flow change. These other factors were discussed at various places in Chapter 3: Environmental Impacts of the Proposed Action and Alternatives. Please see also the response to comment MVID-02-019-11 below.

Comments

MVID-02-016-05
There is considerable controversy within the scientific community and among managing agency biologists over the validity of the IFIM. The model is too simplistic for the variety of factors affecting fish populations. Behnke lists some of the factors affecting fish populations as follows: flow regime, habitat quality (roughly measured by IFIM), water quality, food abundance and availability, predator, competition and all interspecific interactions, movement and migration. (From Critique of Instream Flow Methodologies, Robert J. Behnke, May 1986. I'm sure [named person] has sent you a copy of this. If not, I can.) Of those 6 factors, IFIM only evaluates one. Behnke's critique recognizes the need for a better methodology, and that IFIM is a start. It also cautions against using IFIM as the only method of evaluating potential fish population increases

due to management activities, which the MVID EA has done. Others, notably James Mullan (US Fish and Wildlife, retired) and Ken Williams (Washington Fish and Wildlife), have written about the short-comings of IFIM. (Again, I'm sure [named person] has sent you all his stuff about this.) It seems shaky to base a whole analysis on a method that is recognized as limited in application.

MVID-02-019-11
The Washington Department of Ecology used the Instream Flow Incremental Methodology (IFIM) when they did the Methow River Basin Fish Habitat Analysis in 1992. An article from the American Fisheries journal, August 1996, *Uncertainty and Instream Flow Standards*, states: "Our claim that there is now no scientifically defensible method for defining flow standards implies that the Physical Habitat Simulation Model (PHABSIM), the heart of the IFIM, is not such a method." In other words, IFIM is not a valid or accurate method.

Response: We agree that the output of PHABSIM (the habitat model) is not the definitive answer for determining minimum flow standards. The authors of the essay quoted above, as well as other similar articles, state that other factors need to be considered when determining minimum flow standards. We agree with these statements. Factors such as the timing of use of certain species, fish passage, and water temperatures, also need to be considered. We evaluated these factors in the Preliminary EA. It should also be noted that the analysis in the Preliminary EA was not intended to set a "minimum flow standard" for the Methow and Twisp Rivers, but rather to determine the effects of the project alternatives on fish habitat as it relates to flow. Neither did the EA evaluate potential fish population increases due to management activities, which the first commenter states. The EA analysis used the IFIM data to evaluate fish *habitat* increases due to increases in in-stream flow. Given that the project alternatives will primarily affect flow, changes in physical habitat as related to flow are the most reasonable way to evaluate the alternatives. The output of PHABSIM is the most useful known tool for defining the relationship between physical fish habitat and flow.

Comments

MVID-02-016-07
The MVID EA assumes that *summer* low flows are the limiting factor for anadromous fish in the Methow basin. Yet the extensive study of the mid Columbia Basin, Production of Habitat of Salmonids in Mid-Columbia River Tributary Streams, states that *winter* low flows are the limiting factor, when irrigation is not a factor. If more recent research indicates that indeed summer flows are the bottleneck, then the EA needs to cover that. At the moment, it looks like there is a **significant** difference of opinion within the scientific community that needs to be addressed.

MVID-02-019-12
Winter time instream flows are what determine the carrying capacity of the Methow River for fish. Not **just** instream flows but water temperatures also. The Methow River Basin Fish Habitat Analysis was done in the summer. Some participants of this project, with their own agendas having nothing to do with fish, have stated that late-summer and fall flows are the

determining factor for fish production. The DOE did no studies during the winter months. They're making assumptions without proper facts.

Response: Some of the comments on the Preliminary EA (similar to the above comments) have focused on winter flows and their relation to fish habitat. Most of the comments have stemmed from a statement concerning winter flows presented in the report " Production and Habitat of Salmonids in Mid-Columbia River Tributary Streams" by J.W. Mullan et al. (1992). The following statement was made in the report regarding critical period stream flow:

> *The critical period stream flow (CPF) is the late-summer mean daily discharge, as opposed to annual mean daily discharge. The most critical period for salmonids in streams is widely believed to occur at low flows in summer, when volume of water is the least and water temperatures are elevated. Depending on elevation and aquifers, still lower flows may prevail October through March. This last point is important because it could well be that winter, not summer, is the true critical period for salmonids in many of the study streams.* (Mullan et al., 1992: 53)

This statement **does not** conclude that winter flows are the limiting factor that determines the carrying capacity for fish in the Methow River. It merely states that winter **could be** a critical period for salmonids in many of the study streams. We do not disagree that lower flows in the late fall through early spring could be problematic for fish if they were severely low. However, fish can withstand somewhat lower flows during these periods because of their metabolism slows in response to lower water temperatures. Often it is the refuge habitat that is limiting in the winter months (see response to comment MVID-02-019-19, page 72). In addition, it should be noted that the flows in the Methow and Twisp rivers in the affected project reaches are, on average, higher in October through March than they are in September (the low-flow month for which we evaluated potential changes in fish habitat). In fact, flow data to support this are presented in Table 2 of Appendix C in the report by J.W. Mullan et al. (1992). We did, however, evaluate the potential effects that the project alternatives may have on water temperatures in the winter. This analysis is presented on page 51 of the Preliminary EA for Alternative A and in subsequent sections for the other alternatives.

Comment

MVID-02-019-27

Concerned about reduction in the carrying capacity of the Methow River, reduced fish populations and possible extinction of some species because of implementation of alternative A, B, or C.

Response: In-stream fish habitat during the low-flow period would be expected to increase under all three alternatives listed by the commenter. The project is anticipated to benefit fish and not to cause any adverse impacts on fish. Please see the discussions in Section 3.2.2 of the EA under the heading "In-stream Fish Habitat" and Tables 3-5 and 3-6, as well as the responses to your other comments regarding fish habitat in this section.

Comment

78. Should add logs and other debris back in river to create habitat for fish.

Response: The project alternatives propose to alter only the in-stream flows in the affected river reaches. Our analysis indicates that in-stream habitat would increase compared to present conditions as a result of the proposed project. This by itself would have positive effects on fish. While adding woody debris to provide pools and riffles might be an additional benefit to fish, doing so is beyond the scope of this project.

Comment

119. One year my grandchildren collected 100 fish from the canal when it was shut down in the fall.

Response: One of the objectives of the project alternatives is to improve ways of keeping fish out of the canals. As stated in the EA, fish in the canal are essentially lost from the system. This comment illustrates one of the benefits the project would provide.

D. Wildlife/Habitat

Comment

MVID-02-004-03

I also have concerns about rattlesnakes invading this area if the ditch is discontinued.

Response: It is likely that wildlife species, including rattlesnakes that occur in upland areas, may recolonize the areas occupied by former canals. However, there is no reason to anticipate that snake species will be any more abundant or troublesome in the former canal areas than elsewhere in the vicinity.

Comment

MVID-02-005-06

There was also no mention of all the wildlife that now drink from the MVID or its leaks and will need to cross the highway to drink. They will eventually <u>all</u> be killed from cars since they'll have to cross twice, to and from, daily.

MVID-02-006-08

Another issue that should weigh heavily on DOE and BPA is the wildlife that gets a great deal of their water supply from the open ditch. Not only their water supply, but they feed on the vegetation that the water allows to grow. After this past harsh winter, we had between 15 and 18 deer who took up residence in our upper field. What's going to happen to these animals? They will have to cross Poorman Creek Road to get to any water, and we all know what that means. I can not believe that DOE is so insensitive as to let this happen. It amazes me that an objective, non-biased review of the impact on wildlife has never been conducted by an outside non-interested party. To allow the participants in this action to conduct the review, when those participants have a lot to gain monetarily by terminating the system, is ludicrous.

Response: The Preliminary EA states in Section 3.5.2 (for example, page 76) that the conversion, upgrading, or abandonment of existing canals would decrease the amount of open-water wildlife habitat, increase the amount of upland wildlife habitat, and displace some riparian wildlife habitat from the canal banks to the river floodplain. Wildlife behavior and movement patterns would undoubtedly change to some degree. Some of the original, naturally occurring seeps would continue to provide water and drinking sources for a variety of wildlife. Some wildlife may modify daily or seasonal activity patterns and some would move to accommodate new environmental conditions. These movement patterns and distribution shifts are difficult to predict for individual animals. It is possible that more wildlife might be killed as they cross the highway by colliding with cars. Please see wildlife responses to comment MVID-02-021-05, pages 43 - 45.

The wildlife analysis was conducted by BPA staff and its environmental consultant, CH2M HILL; they are not participants with any potential for monetary gain from the project.

Comment

MVID-02-005-07

One conclusion in the EA was totally wrong, all these animals and birds won't just move to the Methow River to new habitat. The Methow River habitat area is already inhabited by others of the same species. These new residents will be whipped and disallowed into the new habitat. These displaced animals will for the most part starve, be killed by the elements or other animals or birds.

MVID-02-007-08

The PEA does not adequately disclose the impact to wildlife of loss of these habitats. General statements are made that the wildlife will simply move to the habitats provided by the Twisp and Methow Rivers. Virtually all of the project area is protected by the Critical Area Ordinance of Okanogan County and provides habitat for literally hundreds of species including those listed as endangered or protected. These habitats are linear and for the most part upslope of the major highways.

Response: Section 3.5.2 of the Preliminary EA states (for example, page 76) that habitat modifications are anticipated to result in the direct loss or displacement of wildlife that depend on canal habitats. As natural and man-made habitat modifications occur, individual wildlife species would respond in different ways to these changes. Some would expand into newly developed habitats, some would recolonize similar habitats (which may cause increased population pressures), some would be displaced and die, and some would adapt in place to the newly modified habitat conditions. As explained in Section 3.5.2.1, improved riparian conditions along the rivers resulting from increased in-stream flows would provide additional new habitat for many species over the long term.

Okanogan County Resource Critical Areas are discussed in the Preliminary EA on pages 74 and 93, and mapped on Figures 3-7 and 3-8. The project facilities, both existing and proposed, are

located in fish and wildlife habitat conservation areas for several species. The Growth Management Critical Areas Regulations of Okanogan County do not prohibit, but do regulate activities in fish and wildlife conservation areas in Okanogan County. BPA, WDOE, and the MVID are working with Okanogan County to ensure that the MVID project would be consistent with these regulations.

Comments

MVID-02-008-01

Eliminating all seepage from the canal will have a significant effect on the birds and wildlife along the irrigation canals. Wildlife counts in the canal riparian areas need to be assessed to determine the effect on environmental resources.

MVID-02-008-17

Studies should be implemented to determine the population counts of the "Species of concern" living in or close to the canal's riparian and wetland areas prior to eliminating these areas due to the proposed action.

69. Biologist should have gotten out of car.

Response: Wildlife impacts that would result from the project can be reasonably well predicted, at least qualitatively, without wildlife counts. Wildlife population count information would not alter the EA's conclusions about the project's impacts on species of concern. These conclusions are based on a review of existing information from state and Federal wildlife agencies and on professional knowledge and judgment. Undoubtedly (as stated in the EA), some shifts in wildlife use would occur as habitats change. However, no unique habitat elements would be removed, and the effects of habitat changes are likely to be mitigated, as habitat along portions of the canals would be retained by landowner watering, and natural riparian habitats associated with the Twisp and Methow rivers would be enhanced through increased in-stream flows.

The Washington Department of Fish and Wildlife has concurred with us that further analysis of the wildlife impacts of this project are warranted (see letter in Appendix J).

Comment

MVID-02-009-08

The discussion of mule deer habitat, and possible effects, is lacking detail about the value of ditch-side vegetation as snow-intercept-thermal cover. Such an analysis is the normal model to display effects on mule deer of a proposed action, on that species' winter range in this area. Please discuss the lack of this detail.

Response: Detailed, specific discussions concerning the value of ditch-side vegetation as a snow intercept and as thermal cover for wintering deer were not considered necessary, given the general level of use of the canal areas and their relation to critical wintering areas. Because the

use of canal riparian areas is largely incidental for the wintering mule deer population as a whole, discussions of snow intercept value and of thermal cover would be unlikely to affect the conclusions about impacts on deer presented in the EA. See also the response to MVID-02-008-01 and other similar comments above (page 40).

Comment

MVID-02-014-02

I have concerns about loss of wildlife along the very rich habitat of the ditch canal.

MVID-02-019-24

Concerned about affect on wildlife due to destruction of wildlife habitat.

62. Will there be much impact to animals from project? Most deer go down to river.

Response: Thank you for commenting. The loss of wildlife and the habitats along the existing canals were described in the wildlife and vegetation sections of the Preliminary EA (pages 75-77). Please see also the responses to comments MVID-02-005-06 and MVID-02-005-07, pages 38-39.

Comment

MVID-02-015-09

Last winter I counted and classified over 1000 deer in the valley below the town of Twisp. Last winter there was a heavy snow fall in the entire basin. During the first portion of the heavy snow fall period I saw a large number of mule deer using the riparian vegetation along both the east and west canals of the MVID. The deer used the canal vegetation, both for foraging and bedding, for an extended period of time. This use seemed to taper off as the snow got deeper throughout the winter and deer moved further down the valley.

Response: Patterns of deer use on winter ranges are known to vary from year to year depending on a variety of conditions, such as snow depth, wind patterns, availability and access of forage, etc. As stated in Section 3.5.2.1 of the EA, wintering mule deer would lose a source of browse and cover as the vegetation along the canal changes. The wildlife specialist believes that there is sufficient other lowland agricultural and floodplain habitat that could provide food and cover to wintering mule deer.

Comment
MVID-02-018-02
I am enclosing a picture of a fawn on a weed rack about one mile north of Carlton on the east side ditch. I had not thought of the ditch's effect on fawn movement. In checking with the ditch employee, this is a common occurrence on the upper reach.

Response: Thank you for commenting. The potential for fawns to drown in the existing canals would be eliminated under Alternative A and lessened under Alternative C.

Comment
MVID-02-019-25
Concerned about insufficient data and/or studies of the increase or effect of wildlife habitat and wildlife due to the "increased instream flow."

Response: Alternatives A, B, and C would result in a net savings of water being returned to the Methow and Twisp Rivers. The increased stream flow would increase the potential for development of riverine riparian wildlife habitat. While the EA does not include project-specific data collection or studies of the effects of increased in-stream flow on wildlife habitat and wildlife, there is sufficient support in the technical and scientific literature to feel confident that increased in-stream flow would benefit wildlife and wildlife habitat.

For example, the National Research Council (1996) concluded that reduced in-stream flows caused by water diversions have had negative impacts on the diversity, abundance, and viability of natural ecosystems and the species they support. One of that study's important conclusions is that in-stream flows should be increased where water diversions have caused flows to be reduced compared with historical conditions.

Furthermore, the Scientific Assessment performed for the Interior Columbia Basin Ecosystem Management Project (Quigley et al., 1996) concluded that, in general, restoration of historical functions, processes, and disturbance patterns has the highest probability of achieving resilient ecosystems with high ecological integrity and relatively low risk of negative ecological outcomes. In the case of the Methow Basin, a key change from historical conditions has been the diversions of water from the Methow and Twisp rivers for irrigation.

Comment
MVID-02-021-05
Wildlife. Loss of artificially created wetlands and riparian areas along the canal are of concern to MVID residents. Apparently, Washington Department of Fish and Wildlife shares this concern, although they feel the benefits of the project to fish "are significant enough to warrant WDFW's endorsement for the proposed project." The Methow Band of the Colville Tribe has also expressed concern for wildlife habitat, and for the safety of mule deer and other species that will need to cross the highway to access riverine riparian areas once the canal system dries up.

EPA shares these concerns. We recommend that closer study of impacts to wildlife and wildlife habitat occur and that more information be provided in the final EA. A more accurate assessment, perhaps using aerial photos, of the non-jurisdictional wetlands and riparian losses should be made, and consideration given to possible mitigation for these losses. Similarly, wildlife movement patterns should be assessed and some provisions made for safe highway crossings for wildlife to access riverine riparian habitats. This is important for the safety and survival of wildlife as well as human travelers.

Response: Kirk Lackey, formerly of Parametrix, performed the wetlands and riparian area assessments for the MVID Water Supply Facility Plan that were the basis of the analysis in the EA. He has experience in Eastern Washington performing a number of wetlands and riparian assessments for irrigation projects. He provided the following clarifications of his contributions to the MVID project.

Wetlands Assessment Methodology

1. The office analyses relied on National Wetland Inventory maps, county soil surveys, and color copies of air photos obtained from the U.S. Forest Service. The National Wetland Inventory maps were overlaid on a U.S. Geological Survey topographic map on a light table to determine the location of wetland features on the landscape. Using this system, the map and photo information were cross-referenced, and a preliminary vegetation description was prepared.

2. During field reconnaissance, the office descriptions were revised based on field observations. The National Wetland Inventory maps were found to be reasonably accurate. The Wetlands Assessment for the MVID Water Supply Facility Plan (Appendix E, Tables 3 and 4) reports wetland conditions and potential impacts as revised through field observations.

3. Although most of the hydrophytic riparian areas are within 1.5 m (5 ft.) of the canal, tallies of riparian areas included those areas that extended away from the canal to their limits. At least one riparian area that was tallied was disjunct from the canal because water seeps down through a slope and discharges at the toe of the slope to a riparian area. The lengths of riparian communities along the canal (in feet) were scaled off the aerial photos in the field. Where two riparian types occurred at the same canal location, the riparian length was only tallied once, and it was classified as the dominant plant community structural type if the two were different.

4. In reporting riparian vegetation, only hydrophytic riparian communities were tallied. Xerophytic communities dominated by natural ponderosa pine and sagebrush are not included in Tables 3-4 of the MVID Water Conservation Plan.

5. The natural (historical) wetlands are limited in extent within the project area, and mostly confined to the water intake areas and wetlands associated with the water intakes (i.e., near the rivers and their floodplains). Therefore, there was no attempt to separate natural (historical) wetlands from “artificial wetlands” dependent on the canals. It should not be concluded that all the wetlands reported in the tables are artificial.

6. The methodology used to assess wetlands and riparian areas appears to be consistent with the recommendations from EPA and is deemed adequate for the purpose of identifying potential environmental consequences through this EA.

In regard to wildlife and habitat impacts, the wildlife specialist from CH2M HILL made the following wildlife habitat findings:

1. The wetlands and riparian study determined that no work was proposed in wetlands, with the exception of one area at the beginning of the East canal at the diversion (below the ordinary high water mark).

2. The study determined that if the canals were dewatered, the non-hydrophytic riparian communities (i.e., ponderosa pine, Douglas-fir, sagebrush communities) would persist and provide some mitigation for temporary habitat adjustments and plant species shifts. (The non-hydrophytic vegetation would not show appreciable shifts in species, but could show slower productivity. Evidence for this conclusion is borne out in the abandoned West Canal Reach 5.) Hydrophytic riparian areas (i.e., cottonwood) would persist in the bottoms associated with the river floodplains, providing more mitigation. Persistent ponderosa pine and Douglas-fir trees would mitigate impacts on perching habitat from death of cottonwoods.

3. Regarding potential temporary impacts on quail from dewatering the canal, private citizens could continue to provide water for quail, and irrigation on the hills above the canal could continue to provide water sources to maintain some artificial hydrophytic communities.

4. We recognize that wildlife movement patterns are likely to change; however, without study extending over several seasons, it would be difficult to predict these changes. What happens to wildlife movement would also depend on what happens to existing seeps and wet areas and landowners' decisions about using their irrigation rights to continue to water vegetation along the canal. We can anticipate that there will be some wildlife movement to the river under certain conditions. The appropriate mitigation is addressed in point 5, below.

5. Regarding the proposal to provide safe highway crossings for wildlife to access riverine riparian habitats, we agree that proper highway signage should be placed wherever highway traffic or speeds may conflict with wildlife usage. Wildlife must cross the highway during non-irrigation months to drink at the river, assuming the canal is their only water source apart from the river. They also cross the highway during the irrigation season when the canal water is available. Regarding other possible mitigation, we believe that the amount of mitigation proposed under each alternative would be adequate to prevent significant impacts on the natural resources. This is not to say that wildlife effects, particularly short-term ones, will not occur. However, the return of landscape elements to more naturally occurring, self-sustaining conditions (i.e., more similar to historical hydrological and floodplain conditions) is in the best long-term interest of the resources.

In addition, we shared your concerns with the Washington Department of Fish and Wildlife. They responded that they do not believe further analysis of this project's wildlife impacts are warranted, and encouraged us to proceed with implementation as soon as possible (see letter in Appendix J).

Comment

70. Lots more wildlife than report says.

Response: The 309 species of wildlife mentioned in the EA are based on updated records by U.S. Forest Service biologists. Not all of these species were discussed in the EA. The intent was to focus on those wildlife species that are generally considered to be scientifically, economically, or recreationally important or that are considered species of concern by state or federal resources agencies.

Comment

71. Concern about animals; the more people, the more animals get squashed.

Response: Thank you for commenting. Urbanization and increasing human populations can stress wildlife and their habitat. The proposed project would not result in a significant increase in the number of people using the project area.

Comments

57. Appreciates seeing duck and grouse around canal.

63. Deer cross highway and ditch to get to river; they seem to prefer river to ditch.

74. Wild turkeys, lots of cougar, grouse, partridge, quail have been seen in the vicinity of the canal.

73. Deer/animals use ditch as highway and browse area - but they won't when the ditch dries out and broadleaf trees die.

138. Canal important to animals and keeping things green

Response: Thank you for commenting. Please see the responses to the comments above.

E. Vegetation

Comment
MVID-02-006-07
In the meantime, while all this is taking place, the 5 acres that we now have in alfalfa will be gone and in its place we will have 5 acres of diffuse knapweed, just as we had when we purchased this property. I am attaching a couple of pictures that will show you what our field looked like before irrigation and what it looks like now.

The Okanogan County Noxious Weed Control Board brochure, "Knapweed has infested your property," states that cultural control suggests that the potential of a site to produce determines the level of managerial intensity or economic investment. Poor management of poor sites can provide a ready source of weed seeds that can, in turn, increase the costs of management on better sites which lie adjacent. It suggests that (1) if it can be farmed and reseeded, productivity is likely to be maximized in a minimum amount of time and (2) depending on the moisture regime nitrogen fertilizer combined with an herbicide significantly improves the competitiveness of the residual grasses. Basically what this is saying is if we water our land and use nitrogen fertilizer/herbicide, we can get rid of the knapweed; trouble is, we won't be able to water.

Response: Your concern about not being able to water is addressed in response to your comment MVID-02-006-02. It is our understanding that it is not the policy of the NWCB to recommend irrigation to control weeds. The NWCB's 1997-1999 Policy Procedures promote good land management through a variety of techniques, which are, in part, site-dependent. Techniques include herbicides, hand-pulling, grazing management, biological control, reseeding with desirable species, and revegetating with native species.

Comment
MVID-02-007-09
The PEA relies upon the MWG 1996 study which identifies an area of 5 feet on either side of the canal or a total of 32.9 acres of riparian area and wetlands which will be impacted. As has been previously presented, that estimate is grossly in error. On my own property, I have approx. 2,600 feet of canal. I have measured the impacted areas to be in excess of 5 acres or 15 percent of the reported total impacted area. If my property is more representative as to the actual loss, the total would well be in excess of 275 acres or a **significant** impact to the Methow Valley.

MVID-02-019-20
Concerned about inaccurate area estimate of riparian areas; (it is) much greater than five feet on either side of canal.

Response: The MVID Project EA clarifies the methodology used to estimate potential project-related riparian and wetland impacts, which was originally stated in the Montgomery Water Group, Inc. (1996) study. The methodology relied on office analysis (examination of U.S. Fish

and Wildlife Service National Wetland Inventory Maps, the USDA Natural Resource Conservation Service soil survey of Okanogan County, USGS 7.5' topographic quadrangle maps, and color aerial photographs), as well as field reconnaissance by Parametrix, Inc., a wetlands consulting firm. Although most of the potentially affected canal-dependent vegetation is within 1.5 m (5 ft.) of the canals, the canal-dependent vegetation areas were tallied to their limits where they extended farther away from the canals, even if that was well beyond 1.5 m (5 ft.). At least one riparian area that was identified and counted in the total acreage is separate from the canals; that is, it was created by a water seep that discharges downslope of a canal at the toe of a hill. The methodologies used in the canal-dependent vegetation estimates reported in the EA are adequate for determining the extent and significance of the environmental impacts. Please also see responses to MVID-02-021-05, pages 43-45.

Comment
MVID-02-010-05
A preliminary [well] location in the Alder Creek delta along the Methow River would impact riparian and bald eagle habitat.

Response: Potential well locations in the project area, including any near the Alder Creek delta, are not likely to lead to significant impacts on riparian areas and bald eagle habitat. There are no known bald eagle nests in the project area, and there are no known individual riparian trees upon which bald eagles are dependent. Well locations can be adjusted in the field to avoid any valued habitats or trees. Potential impacts related to well installation are expected to be small in area, and most would be of short duration. Any unavoidable impacts on riparian habitat or critical areas would be regulated and mitigated, if appropriate, through existing regulatory mechanisms to ensure that impacts do not rise to a level of significance.

Comment
MVID-02-013-02
I have concerns about the tall cotton wood trees bordering the ditch bank that would fall on our buildings if they should die after the ditch is shut off. Some action should be taken to remove these before any damage is done.

Response: Vegetation maintenance, including removal of hazard trees, would be included in any alternative that maintains active rights-of-way (Alternatives A, B, and D). Therefore, none of these alternatives should have much effect on increasing property damage from falling trees. Alternative C, however, would result in the dissolution of the MVID, and the canal right-of-way would revert to the landowner. The landowner would then be responsible for removing any dead or dying trees.

Comment
MVID-02-016-11
The EA does not say how weeds will be controlled in the project area in any of the Alternatives. Some weed control issues already exist with the County Weed Board. Nor does the EA address rehabilitation of the canal in Alternatives A and C. Ripping and seeding native grasses would be preferred.

Response: Weed control would be performed by those responsible for maintaining the rights-of-way (the MVID for MVID pipeline alignments under Alternatives A, B and D, individual landowners for sections of existing canal right-of-way returned to landowners under Alternatives A, B and C). It is recognized that a variety of techniques exist for weed control, and weed control prescriptions would need to be customized to each site and weed condition. Ripping and seeding with native grasses would be one direct approach to the ecological recovery of the canals. Passive recovery, or letting nature do the work, is preferred by some. If weeds are controlled, passive restoration should result in restoration of most ecological functions and processes with less potential for erosion, although more slowly than what would be expected following ripping and seeding.

Comment
2. Years ago there was no riparian habitat. All trees were cut in the past.

Response: Thank you for commenting. Vegetation clearing has been conducted (though irregularly) along the canals for most of the MVID's existence, in order to maintain the structural integrity of the canals.

Comment
127. Canal currently carries weed seed; causes noxious weed problem.

Response: We agree that the open canals function to carry and disperse weed seeds, both along the canal and into fields, and this can cause or increase weed control problems. This is addressed in Section 3.4.2.4 of the EA.

F. Wetlands

Comment
MVID-02-003-01
I have concerns about wetland impacts associated with construction in floodplain/ floodway.

Response: Potential wetlands impacts reported in the Preliminary EA are the best estimates available, and are based on office analysis, field reconnaissance, and conversations with representatives of natural resources regulatory agencies. (See response to comment MVID-02-021-05, pages 43-45.) There is the possibility that construction of some of the new facilities

under Alternative A could affect wetlands, as it is necessary to place them near the rivers. At this point in the process, we do not know the exact locations of these facilities, because we did not want to prejudice the selection of alternatives before the environmental process was completed, by committing funds to final designs for Alternative A. The facilities in question would include wells, pump houses, reservoirs, and new sections of pipeline to connect the well fields to the existing canal rights-of-way. We have committed in the EA (sections 4.6.2 and 4.8.2) to completing wetland surveys in the vicinities of the proposed locations of these facilities if Alternative A is selected as the preferred alternative. We would then avoid wetlands wherever possible in the final design and siting of these facilities. If they cannot be avoided, we would apply for a section 404 permit from the Corps of Engineers and commit to any mitigation required under that permitting process to minimize impacts and ensure that they do not rise to a level of significance.

Comment

MVID-02-003-02

I have concerns about wetland impacts due to work in irrigation water fed wetlands.

Response: None of the proposed work under any of the alternatives would occur in irrigation-water-fed wetlands. The Corps of Engineers has determined that the water-dependent vegetation areas along the canals are not wetlands. There are natural wetlands that occur around and near the Twisp River diversion and at the Hotchkiss spill on the west canal, but impacts on these areas would be minor, if any.

Also, we believe that any impacts on these natural wetlands would be offset 1) by allowing MVID members to use their water rights to water vegetation previously fed by the canal seepage and 2) by the rewatering of historic wetland areas along the rivers as diversions are removed or reduced. Any necessary wetland permits would be obtained and their conditions adhered to.

Comment

MVID-02-007-07

The MVID has approximately 145,000 linear feet of open canal that provides significant areas of riparian vegetation, wetlands and wildlife habitats that have been artificially created and in existence for the last 100 years. The PEA side-steps disclosure of the impacts of these areas' destruction by differentiating jurisdictional and non-jurisdictional Areas. Even artificially created wetlands would be jurisdictional under certain criteria evident with the MVID. However, even if these areas are deemed non-jurisdictional that would not absolve the responsibility to define and disclose what the significant impacts would be by destroying these areas. The precedent set by implementing this major action and destroying these jurisdictional or non-jurisdictional areas would be far reaching and should also be defined and disclosed. What will be the affect for regulatory bodies with regard to other private developments?

Response: BPA believes that the EA realistically portrays the potential impacts on riparian vegetation, wetlands, and wildlife habitats. Changes have been made to sections 3.4.2.1 - 3.4.2.4

and 4.6.2 to clarify some points regarding wetland definition and jurisdiction. Consultation with the Corps of Engineers has confirmed that the artificially maintained areas of water-dependent vegetation next to the canals do not meet the criteria that would classify them as wetlands. Distinctions are made between jurisdictional and non-jurisdictional natural resource areas because these designations have regulatory implications and are a consideration for determining significance. The fact that a natural resource is non-jurisdictional does not imply that it does not provide ecological functions or value; however, the lack of regulatory protection reflects social decisions that reflect the reduced environmental significance of the resource. We do not believe a new precedent would be set regarding jurisdiction. The Corps of Engineers and County have considered previous rulings as well as the existing situation before making decisions on jurisdiction.

Comment

MVID-02-008-15

Whether the wetlands or riparian areas have been artificially created or not, they exist and are dependent upon the seepage from the irrigation canal. Studies should be done to determine the significance of the proposed improvements to the District. An alternative to preserve the areas should be provided for each of the alternatives.

Response: Please see response to comment MVID-02-007-07, above, in regard to wetlands. It is unlikely that a project alternative can be developed that specifies preservation of the riparian areas along the canals while simultaneously meeting the underlying need for action; i.e., to increase in-stream flows and fish passage for resident and anadromous fish in the Methow and Twisp rivers. Alternative D (No Action) preserves riparian areas, but does not meet the underlying need for action. A provision has been made for landowners to be able to use their water right to water riparian areas along the canals if they choose to do so.

Comment

MVID-02-009-03

The loss of wetlands whether "jurisdictional" or not, under the proposed action, is an irretrievable and irreversible loss of that resource. Please document and discuss this further in the EA. Refer to pgs. 10 and 11 in the EA.

Response: See response to comment MVID-02-007-07 (page 49). Pages 10-11 of the Preliminary EA generally refer to assumptions for Alternative A (Proposed Action), which are expected to produce the environmental impacts described in Chapter 3 (Environmental Impacts of the Proposed Action and Alternatives). As noted elsewhere, the Corps of Engineers has determined that the areas of vegetation fed by canal seepage do not meet the criteria to be classified as wetlands. Therefore there would be few, if any impacts on wetlands from the project. Please see the response to comment MVID-02-003-02, page 49. As discussed there, the acreage of wetlands may actually increase as a result of the project, as historic natural wetlands along the reaches of the rivers partially dewatered by the diversions are rewatered.

Comments

MVID-02-010-10

I disagree with the characterization of the irrigation-fed wetlands as nonjurisdictional and not under regulation. These areas need to be determined, then an assessment can be made.

MVID-02-019-23

Concerned about lack of studies to determine significance of 100 year old artificial wetlands or its removal.

Response: We have consulted with the Corps of Engineers and they have determined that the areas of vegetation fed by the canal seepage do not meet the criteria to be classified as wetlands. Please see the revised section 3.4.1.3 in the EA.

G. T&E species

Comment

MVID-02-005-05

It amazes me that just a little more than one year ago this whole area (MVID included) was declared a Grizzly Bear Recovery Zone. We fought hard against it but it was shoved down our throats anyway. Now you're saying the Grizzly Bears won't be affected. If this ditch system doesn't affect them, then why are we still in the Recovery Zone?

Response: The Grizzly Bear Recovery Zone is a broad ecosystem management area. All areas within the zone are not necessarily suitable grizzly bear habitat. In fact, the entire valley floor between Twisp and Carlton is too developed to be suitable habitat for the grizzly bear. Therefore we determined, and the U.S. Fish and Wildlife Service has concurred (letter dated October 22, 1997 from K.R. Campbell), that the project would have no effect on grizzly bears.

Comment

MVID-02-008-16

Threaten and endangered plant species in the areas affected by the proposed alternative should be examined to determine if the assumption of "are expected to occur."

MVID-02-009-06

Discussion on effects on threatened, endangered or sensitive plant species indicates more field work is warranted. A computer search of a possibly incomplete WA state database is not adequate. (EA pgs. 62& 64). Please disclose why field surveys were not completed.

MVID-02-016-12
No threatened or endangered plant species are known to occur in the project area; has there been a T&E survey conducted?

Response: Project impacts on environmental resources cannot be stated with absolute certainty; however, reasonably diligent environmental analysis combined with professional experience provide results that satisfy the disclosure requirements of NEPA and the Endangered Species Act. This is particularly true for threatened and endangered plants, which may be present, yet go undetected, even under the most thorough sampling procedures. For this project, a combination of (1) field reconnaissance, (2) database searches for available information on threatened and endangered species occurrence, and (3) professional knowledge that threatened and endangered plants tend to be associated with relatively undisturbed native and natural habitats, not the artificial conditions found along the canals provided adequate information for impact assessment.

Comment
MVID-02-015-08
What are the potential project impacts to Bald Eagles within the valley? The other threatened and endangered species (non-anadromous) listed in the EA have potential impacts identified. The Bald Eagle does not.

Response: The potential for impacts on bald eagles is discussed on page 75 of the Preliminary EA. There are no anticipated negative impacts on bald eagles that use communal roosts and perching trees within the Methow River Valley. Increased stream flow would increase potential habitat for the fish species that serve as a prey base for bald eagles in the valley. Increased flows may also have a stabilizing influence on riparian systems, increasing productivity and allowing for the potential development in the future of more extensive riparian woodlands along the river bottoms. Riparian woodlands with mature trees are important roosting sites for bald eagles. Based on this information, we concluded, and the U.S. Fish and Wildlife Service concurred (letter dated October 22, 1997 from K.R. Campbell in Appendix J), that the project would have no adverse effect on bald eagles.

Comment
72. I hope the ditch runner finds spotted frogs [so the project can't go forward] (they are on the threatened and endangered species list).

Response: The spotted frog is a state candidate species and a Federal species of concern, but it is not classified as either threatened and endangered. There is no indication that spotted frogs are present in the canals.

H. Visual

Comment
MVID-02-008-02
Eliminating all seepage from the canal will have a significant effect on the landscape and aesthetics of the valley, studies need to be implemented to determine consequences.

Response: Undoubtedly, the landscape would change somewhat with changes in canal seepage-dependent vegetation. The existing vegetation patterns have an identity and familiarity that contribute to the social sense of place and to scenic values that may exceed other values of the resources. These impacts are addressed in Section 3.4.2 of the EA. The overall impacts on the broad landscape and aesthetics of the valley would be relatively minor because the losses of vegetation along the canals would be offset by improved riparian and vegetation conditions along the natural river corridors. Impacts on specific locations or views would probably affect individuals more. These impacts would be partially mitigated because MVID members would be able to use part of their irrigation water to maintain canal-seepage-dependent trees or other vegetation that grows on their property and that possesses especially high scenic values for them.

Comments
18. Is concerned that the land along the canal will turn brown.

25. Have 1/2 mile of ditch through my property, so I know I'll lose that green.

Response: Under the action alternatives, much of the canal vegetation would turn brown, at least seasonally; however, the vegetation would be more consistent with the natural vegetation surrounding the canals. It is not likely that all of the canal vegetation would turn brown; some native upland vegetation found along the canals is drought-tolerant and would survive the loss of the canal leakage water source. In addition, landowners would be able to water the vegetation with their water right, if they choose to do so.

Comment
118. Flood took out most of gravity irrigation between Carlton and Pateros; they manage with pumped system and remain green and pretty.

Response: Thank you for commenting.

I. Tribal/Cultural Resources

Comments
MVID-02-007-11
The MVID is a historic facility constructed nearly 100 years ago and is eligible for inclusion on the National Register of Historic Places (PEA pg. 87). As part of your scoping effort, it is

known that Eastern Washington State University was retained to assess the historic significance of the MVID. Why were these findings not made a part of your PEA? Please provide me with a copy of the historic significance report.

MVID-02-019-22
Concerned about inadequate disclosure and emphasis of historic places.

Response: The findings of the consultants from Archaeological and Historical Services at Eastern Washington University were that the MVID canal system meets the criteria for inclusion on the National Register of Historic Places. This was stated in the EA in sections 3.7.1.3 (p. 87) and 4.4.1 (p. 95). The impacts of the various alternatives on this resource are discussed in section 3.7.2. BPA does not provide copies of archaeological survey reports to the public, nor does it print them in the EA, due to the confidentiality provisions of the National Historic Preservation Act. We have, however, provided a copy of the non-confidential portions of the report to the commenter.

II. ALTERNATIVES

A. Additional Alternatives

Comments

MVID-02-006-01
Of the alternatives in the preliminary EA, I prefer B - if it is modified. The entire canal does not need to be repaired, only a few sections.

MVID-02-008-18
The MVID has the highest cost of irrigation water in the valley and has the lowest efficiency in water delivery. It would seem if the existing system were improved at no cost to the MVID the water delivery efficiency would increase significantly, the instream flows would increase, the anadromous fish habitat would increase, the cost of water to the MVID user would decrease and the potential problems occurring from the implementation of these four alternatives would be eliminated for a fraction of the cost, less than 50 percent of Alternative A. The BPA would be the hero of Twisp-Carlton section of the Valley preserving the aesthetics, wildlife and fish habitat in the Methow Valley.

MVID-02-010-06
The present canal system is amazingly resilient, and not nearly as fragile or destructive as some would state. The open ditch has stood the test of time, even with the maintenance neglect shown over the past few years by the present directors. Page E-2 of the EA minimizes leakage of the ditch to disarm the issue of ground water recharge. If the canal isn't leaking, then leave it alone. Determine where the leaks occur and fix them without destroying the whole system.

MVID-02-017-01
Pages 3-4: The whole canal doesn't need lining. That assumption inflates the cost of Alternative B by a factor of five. The known problem areas could be lined with long-lived membrane, or even with concrete, at a fraction of the stated cost, making the project less expensive than Alternative A.

86. Another alternative: just fix the sections that need it.

88. Implement a program to solve the problems. Put pressure pipe where needed. Use the money saved to do something else in another place for fish impacts. Then, another alternative to consider, you could still do the rest later. [Later the commenter also mentioned repairing only the minimum right now and putting the money saved in a trust fund for future repairs as needed.]

136. Reach 1 of West canal in good shape until you get to wood flume - wouldn't need to rehabilitate it.

Response: Several people have raised the question of why the entire canal would need to be lined (irrespective of the type of lining), not just the sections that have been identified as being at high risk for failure. We have added a discussion of this option to Section 2.2 of the EA.

One of the concerns of WDOE and BPA, as the funding agencies for this project, is that much of the canal is in a deteriorating condition, and the past track record of the MVID in maintaining the canal has not been good. WDOE has been called upon several times over the past 50 years to provide emergency funding for wash-outs and other problems with the canal. The assessments now being collected are not sufficient to cover the costs of much-needed repairs. WDOE and BPA are offering funding for a permanent, long-term solution to this ongoing problem. We believe this is in the best interest of the taxpayers and ratepayers. There is no guarantee that money will be available to fix future problems; in fact, WDOE has stated that they will not continue to fund emergency repairs to the MVID system in the future, if the MVID elects not to take action.

The second concern is that the agencies would also like to use taxpayer and ratepayer money wisely by obtaining the maximum water use efficiencies possible with their investment. Partial fixes of the existing canal system would not achieve the efficiencies that an overall rebuilding of the system would.

In response to comment MVID-02-010-06: Appendix E points out that the leakage from the canals is only part of the problem. Deliberate spills and evapotranspiration from the open canals

also contribute to the inefficiency of the open canal system. A closed pipeline system or individual wells would solve these problems.

Comment

MVID-02-007-13

The users who would be left with the MVID, the Methow Valley Canal Associates, have provided you with an alternative plan that has not been properly considered. This plan prepared by our engineer, Vern [Donnet], was carefully researched and investigated. This plan would repair the existing canal. Where needed, a liner or culvert would be installed, diversion from the rivers improved, and service would be provided the entire district. This plan would meet the BPA objectives for reduced diversions from the rivers and provide many of the same benefits of the proposed alternatives. The cost of this plan is estimated at $700,000 to $1,200,000 and our estimated annual assessment for maintenance and operation would be approx. $35 per acre. The reduced or saved water right would be placed in a water right trust by the District, or the equivalent value would be placed in a trust for future replacement of our rehabilitated system after its estimated 20-year life.

Response: The proposed modification of Alternative B prepared by Vern Donnet has many good features and provides would cost less initially to replace the canal system. However, the proposal does not provide the same level of water savings as any of the Alternatives and, over the anticipated 50- to 100-year lifespan of any of the other alternatives proposed in the EA, would have much higher operation and maintenance costs. Please see also the response to comment MVID-02-008-05 (and related comments) below.

Comments

MVID-02-008-05

An additional alternative should be provided to improve the existing system by lining the canals with a geomembrane similar to the Deschutes Canal Lining Demonstration Project done by the Bureau of Reclamation May 1994. Lining the canals of the MVID will cost significantly less than Alternatives A or B which should meet your criteria for achieving cost and administrative efficiencies.

MVID-02-008-10

The Deschutes Canal Lining Demonstration Project done by the Bureau of Reclamation in 1994 evaluated various types of systems for lining canals, the experience with totally concrete lining systems are discussed and evaluated in the report. Also the lower cost more flexible geomembrane lining systems seemed to provide a more economic and suitable lining systems. The cost of lining the canals with these types of systems would be from 700,000 to 1.5 million dollars based on the Deschutes Canal Lining Demonstration Project reported costs.

MVID-02-017-02
Pages 16-17-18: Alternatives Not Examined in Detail: Please go back and do so. Learn about canals which have been lined with materials with good longevity, ease of maintenance, as well as low cost. Use the three volume Deschutes study and call for info from manufacturers of geotextiles. Talk seriously with informed Methow Valley citizens with technical expertise. Any less effort exposes the inadequacy of the EA and makes it more vulnerable in a court challenge.

95. Look at Deschutes lining project.

Response: Geomembranes were initially considered as lining materials for Alternative B, as suggested in many of the comments above. The Deschutes Lining Project explored many materials to be considered for reducing water losses in open canals; however, CH2M HILL's review of that study and their first-hand experience with different types of liners did not reveal any materials that they considered suitable for this project (see Section 2.2 and Appendix C of the EA). The flexible liners (plastic materials) have demonstrated the capability of reducing water losses, but they have not been proven in time or durability. There have been numerous cases of failures due to physical damage or anchorage problems. Other materials are either unsuitable or more costly than the concrete lining proposed. On the other hand, the USBR has had many years of successful experience with concrete liners.

The cost to construct the lined canals in Alternative B includes specific work for the MVID that does not appear to have been included in the Deschutes Project cost estimates. To install any liner in the MVID canals, it would be necessary to do the following preliminary work: clear the vegetation from the right-of-way, reshape the canal cross-section, remove unsuitable sub-base material, place select sub-base material, and provide drainage facilities. Most of this preliminary work is beyond the work that was done on the Deschutes Project. Therefore, it is not appropriate to directly compare the costs of indicated for Alternative B for the upgrade of an entire canal system with the liner costs indicated in the Deschutes Project reports.

For the purposes of this project, a conservative, time-proven approach was chosen in order to assure that such a substantial public investment would have a life-span long enough to justify the investment. We do not anticipate that other innovative approaches would be orders of magnitude less expensive than the conventional techniques, when long-term maintenance and replacement costs are considered.

The discussion of alternative liners in Appendix C has been expanded in the final EA to specifically include geomembranes.

Comment
MVID-02-006-09
AN ALTERNATIVE? We understand there are approximately 40 "extra water users" in the district. Since there are Category 1 members of the MVID who do not wish to remain as participating members, would it not be feasible to transfer those memberships to the "extra"

water users. This would allow the people who need water to get it and those that don't need it would not have to pay for water and would not have any liability.

Response: This is possible under any of the alternatives in the EA. If an extra water user is willing to give up any individual water rights he or she may hold, a transfer from an MVID member to the extra water user can be made. WDOE would consider such a change only if it were voluntary, if it were approved by the MVID Board of Directors, and if the change would not impair existing rights. A change application would need to be submitted to WDOE to initiate this process. Note that both parties must be willing to do this transfer.

Comment

MVID-02-007-16

However, if we all step back, look at reasonable alternatives that meet your objectives as well as those of the MVID as a whole, I am confident that we could work together to meet our mutual goals.

Response: Thank you for commenting. We believe we have looked at a reasonable range of alternatives in the EA. We also believe that our objectives and those of the majority of MVID members, as represented by the elected Board of Directors, are the same. In fact, the final decision on which alternative to implement will be up to the MVID, not WDOE or BPA. We are willing to work with all MVID members to accommodate as many of their objectives as possible.

Comment

MVID-02-010-03

A more modest alternative which conserves water by lining certain portions of the canal with PVC piping is workable.

Response: The use of PVC pipe (or other materials) is the basic concept of Alternative A. Installing isolated segments of pipe in the open canal is not cost-effective and does not achieve the water conservation goals of the project. This is partially because a system with isolated segments of pipeline would need to retain the relatively flat gradient of the canal: the pipe sizes would have to be very large and expensive. A pumped, pressurized system as proposed under Alternative A could use smaller, less expensive pipe, and would result in better water delivery to the users.

Comment

MVID-02-010-16

Improved diversion structures and upgraded screens (already budgeted by WA Department of Fish and Wildlife) would conserve water without the drastic actions proposed.

Response: The money budgeted by the Washington Department of Fish and Wildlife would upgrade the fish screens but would not pay for improved diversion structures. We agree that these improvements would help, but the open canal system has other inefficiencies such as spill, leakage, and evapotranspiration that need to be addressed as well.

Comments

MVID-02-016-09

It is certainly true that the power needed to run well pumps in Alternatives A and C would be immeasurably small in comparison to all the power generated on the Columbia dams. It is also true that conservation of power yields "new" energy to the grid. And small things add up. In either Alternative A and C, I would like to see grants available for installing solar-powered pumps. It only makes sense; we irrigate only in the sunny months.

MVID-02-016-10

None of the Alternatives addresses on-farm efficiency. I flood irrigate because I can and it's cheap. I might be inclined to change my wasteful ways if I had to pay for water by the acre-foot, not by the acre. Since irrigators leaving the MVID will be getting a pay-off, grants to improve on-farm efficiency should be available to the those left in the District, or to everyone.

Response: The proposed rehabilitation project seeks to improve the efficiency of irrigation diversion/withdrawal requirements. The responsibility of assuring that water is put to its maximum net beneficial use, once it is diverted or withdrawn from its source, is the responsibility of the MVID and its patrons. While the proposed use of on-farm efficiency devices and practices certainly complements the proposed alternative (Alternative A) and Alternative C, it is beyond the scope of this proposed rehabilitation project. We agree that flood irrigation is a wasteful on-farm irrigation method. We recommend that you seek out other members of the MVID that share your interest in on-farm efficiency improvements and work with them in implementing these types of improvements.

If you have a proposal for a different disbursal of funds by the MVID to its patrons (which is currently limited to those members leaving the district) this should be brought to the attention of the MVID Board, which would be responsible for the disbursement of district assets. However, our understanding is that the proposed disbursement of funds is not "a pay off." Rather, it is a reimbursement for past MVID assessments that were paid, but for which services that weren't rendered (i.e., people paid for water but didn't get it), and/or reimbursement for the expense of developing a water supply separate from the MVID for those who do not or would not receive reliable delivery of service from the MVID.

Comment

MVID-02-019-02

You did not include the alternative proposed by the MVID Canal Associates. Why not? A lot of work went in to that alternative. The DOE promised us an engineer at our meeting in Dec. But they never came up with one. You were there (BPA). Why were we lied to? The BPA did not

even do an honest review of our proposed alternative. You did include an alternative (B) that no one even asked for. An alternative so expensive it would never be accepted by the DOE or the BPA. An alternative so ridiculous that neither side in this dispute would ever allow it to be implemented.

Response: We have addressed several alternatives proposed by the MVID Canal Associates. The "Ideas for MVID Alternative Delivery System" (presented to us at a meeting in December 1996) were reviewed by the WDOE engineer, Ray Newkirk, as promised. WDOE responded to these ideas in a letter dated March 14, 1997, which was included in the EA as Appendix D. BPA also hired an independent consultant, Dick Haapala of CH2M HILL, to review the lining proposals. Section 2.2 and Appendix C of the EA discuss both the December letter and a subsequent April 23 letter, and explain why both the WDOE and CH2M HILL engineers do not believe the non-concrete lining alternatives to be feasible. We included Alternative B because it does preserve the open canal system (one of the goals of the Canal Associates), and it is feasible from an engineering standpoint.

Comment

MVID-02-020-05

It would appear that the BPA instructed, or did not allow its consultant, CH2M HILL to thoroughly evaluate proposed alternatives. Our engineer has submitted a plan which would cost less and achieve many of the benefits you desire of your plan. This plan would improve the diversion points in the Twisp and Methow Rivers, for the most part retain the gravity flow canal system, and, where needed, a permeable liner would be installed. In the reaches furthest south, if it is determined that the gravity flow system is not practical, a pressurized pipe and well field could be installed. Importantly, the District would not be down sized. All members would be serviced and all members would pay an appropriate assessment. This plan could be designed and evaluated as to increased efficiency. The amount of saved diversions would be appraised and it could then be determined if that value is sufficient to warrant the cost of the plan. If the value is greater than the cost, that surplus could be placed in a trust account for future repairs of the new system.

Response: Dick Haapala, our irrigation engineer consultant at CH2M HILL, did thoroughly evaluate this proposed alternative, both in the EA and in person with you at the meeting in May 1997. This is his response to your alternative:

> The opportunities to improve irrigation water conveyance and application efficiency continue to be the basis of returning substantial amounts of water to the rivers. In order to achieve the water savings without reducing the irrigated acreage, it will be necessary to reduce conveyance system losses and improve on-farm application efficiencies. Although water could be delivered by gravity through pipes or open ditches, those alternatives have been found to be much more expensive to construct when appropriate construction quality standards are applied. The concepts of unlined earth ditches or semipermeable liners will not achieve the water conservation goals desired. Water losses from the conveyance system need to be minimized. If the water deliveries are limited to the quantities that are actually needed

for crop production (Washington Irrigation Guide adjusted for application efficiency), there will be substantial reductions in the diversions.

To achieve better on-farm application efficiency, it will be necessary to minimize flood, furrow, and rill irrigation practices. Because many of the parcels are already quite small and are farmed for recreational purposes, they are currently irrigated with sprinkler systems. Pressurized water delivered through a district-managed pipeline system would immediately benefit these users. Such a system would provide a reliable supply of good quality water without the need for on-farm pumping. It has been our experience that when pressurized systems are installed, the users quickly convert from surface systems to sprinkler systems (Yakima-Tieton ID, Kiona ID, Okanogan ID).

The per-acre cost of operating the MVID is directly linked to the size of the district. The larger the district and the more compact its service area, the lower its operating costs will be. Such a district (or series of district units) has the opportunity of lower costs and better service than individual farm systems. In order to be cost-effective, the district needs to be large enough to justify at least one full-time employee. Many districts have found it possible to run 809 - 1619-ha (2,000- to 4,000-ac.) projects with one employee plus seasonal and specialized part time help, while keeping assessments at reasonable levels.

In addition to Mr. Haapala's concerns about your proposed alternative, WDOE and BPA have concerns about an alternative plan that 1) would not obtain the same conservation savings as alternatives A and C, and 2) would not remove the diversion structures from the rivers. **In addition, the appraisal and trust fund part of your proposal may not be possible under state law.**

Comments

31. Lining the ditch is not the answer (considering yesterday's failure).

32. Lining of canals should have been done 50 years ago. Now is the time to shut them down.

Response: Thank you for commenting.

Comment

53. Where is the funding to develop an open canal system capable of diverting only 5 acre-feet per acre.

Response: An annual acre-footage of 5 acre-feet per acre does not meet the irrigation efficiency standards for the proposed rehabilitation project. The efficiency standards of 0.02 cfs, 4 acre-feet per acre are the instantaneous and annual quantities agreed upon to be the standards for the proposed rehabilitation project (see Section 2.1.1, first assumption for Alternative A, in the EA).

It may be possible to obtain funding from a bank or other lending institution for an open-canal delivery system with a 5 acre-foot-per-acre annual rate. However, an open-canal system (with 0.02 cfs/4.0 acre-feet per acre) was considered in Alternative B. As you can see in Table 2-1 (pages 5-8) of the Preliminary EA , the open canal alternative is more than twice the expense of Alternative A, and more than four times the expense of Alternative C. So, it may be difficult to convince a lending institution that such an investment would be prudent.

Comment

83. Is there some way for BPA to fund other wells - for those not on the ditch?

Response: First of all, the person not on the ditch (not a member of the MVID) would have to have an existing valid water right before WDOE could consider allowing them to drill a new well. If the person does not have a valid water right, then there is no right to change the right to a well, and WDOE is not presently authorizing new water rights in the Methow River Basin. It may be possible to have a well drilled under Chapter 90.44.050 RCW, depending on its proposed location in the Methow River Basin. We recommend that you contact John Monahan at the Department of Ecology (509-457-7112), and describe the location of the property, proposed well source, and its relationship to the proposed rehabilitation to find out if this is possible.

If WDOE says it is possible to obtain water rights for the new well, BPA would then need to evaluate the connection of this new well to the proposed project, and our available funding, before deciding whether we could pay for such a well.

Comment

105. Proposal regarding lining canal is blown out of proportion - way <u>too expensive!</u>

Response: We agree that Alternative B, the concrete lining of the canal system, is very expensive. However, the detailed cost estimate provided by our consultant, CH2M HILL, (Appendix B, page 4 of the EA) was reviewed by BPA and WDOE and found to be reasonable. CH2M HILL has had recent experience in central Washington with similar canal lining projects, and based their cost estimates on this experience.

Comment

109. Need to look further into permeable liners; would be less expensive.

Response: Permeable liners would not be appropriate for this project. The permeability of the liners is not predictable, in that the small openings quickly plug up with water-borne sediments. The plugged openings can't be cleaned. It is not reasonable to install a liner that leaks, when the objective of the project is to conserve water. If the underlying objective is to keep vegetation along the canals alive, then that issue needs to be addressed directly. The WDOE has indicated

that individual landowners would be able to use a portion of their water right to irrigate vegetation along the canals on their lands if they so desire.

B. Preferences

Comments

MVID-02-002-01
Of the alternatives in the Preliminary EA, I prefer to leave it as is (Alternative D).

MVID-02-004-01
Of the alternatives in the Preliminary EA, I prefer Alternative B. For cost and efficiency I think gravity flow is the way to go.

MVID-02-012-01
Of the alternatives in the Preliminary EA, I prefer alternative A.

MVID-02-012-06
Alternative A is a win-win situation for all.

MVID-02-013-01
Of the alternatives in the Preliminary EA, I prefer A.

MVID-02-014-06
This is a lose-lose deal for me while others get rich.

MVID-02-014-10
As a last resort come drill me a nice deep well then leave me alone forever.

MVID-02-016-15
Of the alternatives, it appears that there is no way we can keep any kind of open canal. I will miss the ditch.

MVID-02-018-01
Of the alternatives in the Preliminary EA, I prefer one and three with a preference for three.

MVID-02-018-05
I have worked on conservation and fisheries issues for about twenty years and I think the MVID rehab would be the best thing that could happen to our watershed!

MVID-02-019-01
Of the alternatives in the Preliminary EA, I prefer - Only Alternative D: No Action.

MVID-02-019-03
I do not believe the proposed alternative (A) is the alternative you're going to select. Half the District does not want it. There are too many problems with it and you'll be in court fighting law suits for ever.

MVID-02-019-04
Alternative (C) MVID DISSOLUTION is the alternative that I believe will be selected. We will vote it down again, just like we did the last time it was tried.

3. Support your proposal, alternative A.

5. Was hoping you would go with plan B, but it doesn't look like you will.

6. Liked "B" because of how it treats Barkley.

23. Compensation formula fine with me; would like to get out anyway.

26. It will be a mess, will take a lot of clean-up, but I support the proposal, alternative A.

39. If you don't keep MVID membership up, you might as well go to Alternative C.

40. Favor C - it would then be equal for everyone.

41. There is no way we can keep the ditch. DOE won't let us. It doesn't matter between A, B, or C: our water will be the same, and the cost will be higher for A or B.

50. I just want to get off the ditch!

54. I like the dissolution of the MVID alternative.

55. One way or another, need to get issue settled; enough spent on studies.

59. Has own well that can serve his property but appreciates having open canal.

65. Supports plan/proposal "A."

77. Would like to keep ditch.

116. Want out of MVID system (located above Beaver Spill) because: liability; weeds and fish that come down canal; pay for water and then to pump from storage ponds to fields. Use MVID water for only 2-3 months/year, but pay for entire season, and has liability.

Response: Thank you for commenting. Your comments and preferences have been noted.

Comment
MVID-02-005-01
Of the alternatives in the Preliminary EA, I prefer keeping the open ditch but repairing all the leaks and flumes. Let the folks out of the MVID that want out, plus let the folks in that want in.

Response: Thank you for commenting. Your preference has been noted. Please see the response to MVID-02-006-01 (page 54) regarding partial repair of the ditch. Also see the response to MVID-02-006-09 (page 57) regarding changes to the MVID membership.

Comment
MVID-02-010-19
'No action' should be selected until some basic river measurements are completed and a more complete scientific assessment is available.

Response: Thank you for commenting. Your preference has been noted. Please see the responses to MVID-02-008-11 and MVID-02-010-08 regarding the need for more hydrogeology studies (pages 15 and 17).

Comment
MVID-02-016-16
Given that choice, I would rather be done with the whole thing and put in my own well. Chalk me up for Alternative C, with grants available for solar pumps, on-farm efficiency improvements, and a guaranteed water right from DOE.

Response: Thank you for commenting. Your preference has been noted. Please see the response to your comments MVID-02-016-09 and -10 (page 59) above regarding on-farm efficiency improvements.

Comment
33. Alternative B does not address my concerns: having to pay O&M when others get money because they are leaving; and the habitat is used a lot more than described - it is used year-round.

Response: Thank you for commenting. Those who remain in the MVID will also be compensated with an entirely new, debt-free irrigation system totally paid for by WDOE and BPA. Others are receiving compensation if they leave the MVID to help pay for new wells or upgrades to existing wells so that they have a reliable source of irrigation water, and/or to compensate them for years of paying MVID assessments when they were not receiving any water. The issue of paying for O&M is also addressed in the responses to comments MVID-02-005-03, on page 8, and MVID-02-004-04 (and related comments) on page 1.

The year-round use of canal habitat by wildlife was considered in the analysis of impacts; however, the presence of some species of wildlife (e.g., deer) fluctuates seasonally while other

species (e.g., wintering eagles, summer-breeding migrants, etc.) are present only during certain times of the year. The impact analysis focused on wildlife at critical seasons or when they were most abundant.

III. ENVIRONMENTAL ASSESSMENT

A. Techniques/Adequacy

Comment
MVID-02-002-03
I think the analysis would be better if you forgot about it.

Response: Thank you for commenting. BPA is required under the National Environmental Policy Act to analyze and present to the public and decisionmakers pertinent environmental information about projects we propose to fund.

Comment
MVID-02-003-03
The EA does not consider section 404, Clean Water Act, permitting requirements. Please contact Corps of Engineers, (509) 682-7010.

Response: Section 404 requirements were addressed in section 4.8.2 of the EA. Debbie Knaub of the Corps of Engineers was contacted after this comment was received and Corps 404 permitting requirements were discussed with her. Subsequently, based on her recommendation, we submitted a Joint Aquatic Resource Permits Application to the Corps of Engineers and other pertinent agencies. **After a field review, the Corps of Engineers sent us a memorandum outlining our Section 404 permitting requirements.** It is included in **Appendix J**.

Comment
MVID-02-006-03
I think the analysis would be better if you had appointed an "independent" committee/ person to conduct review of the impact on not only wildlife, but on people!

Response: Section 3.6 of the EA, Socioeconomics/Land Use, addresses the impacts of the project on people. These impacts were analyzed by a BPA specialist in this area, who has no vested interest in the outcome of the project. Wildlife impacts were analyzed by an independent consulting firm (CH2M HILL) hired by BPA.

Comment
MVID-02-007-01
My general response to your draft preliminary environmental assessment for the Methow Valley Irrigation District, is that I find its form, content, and accuracy to be unsupported by law, fact or scientific findings. It does not seem to be an effort at objective environmental analysis, but rather, a document to support a desired course of action.

My comments are limited to those areas of most significant concern, however, the entire document contains statements which I believe to be inaccurate and misleading to the reader.

Response: Thank you for commenting. Your subsequent specific comments are addressed elsewhere in this comment/response document. We believe that the EA is indeed supported by law, facts, and scientific findings, and that it is objective. The analysis was conducted by a group of independent consultants and BPA specialists with no vested interest in the outcome of the project. **The conclusions and analyses were also confirmed by the Environmental Protection Agency (comments from letter MVID-02-021), the Army Corps of Engineers, and WDFW (see Corps and WDFW letters in Appendix J).**

Comment
MVID-02-007-04
Numerous statements are made in the PEA regarding historic use and future needs of the MVID, based upon the MWG 1996 studies. As discussed in detail at our May 9, 1997 meeting with yourself and your consultant, Mr. Richard Haapala with CH2M Hill, the MWG 1996 studies are grossly in error. The data from these studies should have, at the least, been verified by your consultant. Relying on inaccurate data for a project that will destroy a 100 year old facility and significantly change the environment in the Methow Valley is not responsible stewardship of the public interest. (See attached exhibit A attached hereto.)

Response: CH2M HILL was retained to incorporate the basic data developed by Montgomery Water Group into the EA prepared by BPA. It was not in the scope of the project to verify the accuracy of the historic water and land use data provided by MWG. However, CH2M HILL did not encounter any information that called into question the overall conclusions of the Montgomery report regarding ground- and surface water supplies and characteristics. The information provided by CH2M HILL irrigation demands and project costs is consistent with funding agency standards and information developed for many irrigation projects completed in Washington in recent years.

Exhibit A is addressed in the responses to comments MVID-02-007-17 and -18 (below), and MVID-02-007-19 and -20, on pages 31 and 14, respectively.

Comment

MVID-02-007-17

I am concerned with the emphasis placed on the apparent canal transportation efficiency. In chapter 1, section 1.2 of the Preliminary Environmental Assessment (hereinafter PEA), it states that the estimated conveyance efficiency is 20 percent.

This appears in "BACKGROUND" and is contained in the first chapter, it must carry some import. It is interesting to note that this "overall conveyance efficiency" was apparently defined and calculated as the following:

$$\frac{\text{CURRENT DEMAND FOR WATER}}{\text{VOLUME OF WATER DIVERTED}}$$

It is unfortunate that the 20 percent number may become legitimized through simple repetition of publication. It is so easy to "buy off" on a number and believe it is gospel.

Let me point out some problems with the "20 percent":

This is a number being applied to two different canals (namely the east and west) and is therefore a number being applied to the entire MVID. It does not reflect specific efficiencies that may be possible within the MVID system.

MVID-02-007-18

The 20 percent number is based on seepage and spills which contain an extreme amount of estimation on the part of the person(s) who conducted the engineering study and performed the calculations (Reference MVID Water Supply Facility Plan - Vol. 1, p. 16-18). By examining tables 3-5 and 3-6, it is very obvious that good data was either not collected or was unavailable due to lack of measuring apparatus. It is inappropriate to calculate a number that now looms so ominous using "sketchy" data.

Response: The canal conveyance efficiency listed in the EA was calculated by dividing the irrigation demand for the acreage served by the MVID canal by the flowrate diverted by the MVID. The acreage served was determined through aerial photo interpretation and on-site surveys performed in 1989. Since that time, it is our observation that even less acreage is being served by the canals, so the estimate of efficiency is conservative (high). The flowrate diverted by the MVID was determined by measuring head (water surface elevation) above a weir at both intakes. Those head measurements were converted to flowrate through standard equations for discharge over a weir. The flowrate was also directly measured and verified by using a current meter at both intakes.

The "Water Management Plan" (Klohn Leonoff, 1990) and the "Water Supply Facility Plan" (MWG, 1996) contain detailed information on the flow measurement program and the calculation of efficiencies. For example, the West canal was found to lose, through seepage, 21.2 cfs of the 30 cfs diverted from the Twisp River. The East canal was found to lose, through seepage, 17.8 cfs of the 30 cfs measured at Mill Spill. The project efficiency, which accounts for

seepage, spills, and field application efficiencies, was 14 percent for the West canal and 19 percent for the East canal.

Comment

MVID-02-009-07

Until a vote of MVID members is held, discussion (EA pg. 7) about numbers of acres remaining in the district is premature, unknown, and skews the effects you display.

Response: The table on page 7 describes the four alternatives addressed in the EA. The acreage numbers used are assumptions based on the canal reaches that would remain in the MVID under the reconfigured system (see section 2.1.1 of the EA). Assumptions about the canal reaches to be removed or to remain in the MVID were based on the member surveys of June 1995, as documented in the MVID Water Supply Facility Plan (MWG 1996). We agree that the actual number of acres that would remain in the District are not possible to determine at this time, but have used the best information currently available to form our assumptions about the alternatives. We do not agree that this is premature—NEPA requires that the environmental analysis be completed based on best available information *before* a decision is made on a project.

Comments

MVID-02-010-01

Enclosed are my comments on the Preliminary Environmental Assessment (EA) for the Methow Valley Irrigation District (MVID) Project (DOE/EA-1 181). I am disappointed in the document and do not think that it includes an adequate evaluation of the MVID situation. Flawed data methodology (e.g. the Instream Flow Incremental Methodology or IFIM fish habitat model) have been used, the alternative suggested by ditch users has been misrepresented (an expensive concrete lining was substituted), and much of the information used is from a Montgomery Water Group study that contains many inaccuracies (underestimated riparian acreage, among many).

MVID-02-010-02

For an action proposed that would have far-reaching consequences for individual property owners and the Methow Valley as a whole, I believe you really must rise to the occasion and utilize some fresh, locally-derived science to determine the consequences of the proposed action and valid alternatives.

Response: Thank you for commenting. We believe we have done an adequate evaluation of the MVID project. Because of the expressed concerns about the IFIM model and the Montgomery Water Group study, BPA hired an independent consulting firm, CH2M HILL, to evaluate the use of the IFIM and the hydrology and wetlands information in the Montgomery Water Group study. Their experts in fisheries, hydrology, and wetlands have confirmed the validity of the original studies. Please see, for instance, responses to MVID-02-021-05, pages 43-35. The reasons for including a modified version of the Canal Associates' proposed alternative were discussed in the EA in section 2.2 and Appendix C. CH2M HILL strongly recommended a concrete lining, and did not believe a flexible-type lining was a feasible alternative for this project.

Comment
MVID-02-010-04
The EA does not adequately disclose environmental effects of a pressurized pipeline fed by wells, including feasibility and well location, or identify adequately the consequences on irrigation-fed wetlands, aesthetics, and long term cost and maintenance. Particularly disturbing is the lack of information on well sites for the proposed action. Without knowing where wells would go, any evaluation of environmental consequences and comparison to the present open canal is inadequate.

Response: Exact well locations have not been identified at this time because we did not want to prejudice the outcome of the environmental studies. Determining these well locations would require detailed engineering and hydrology studies that would apply only to Alternative A. The investments in these studies *before* completing the environmental studies would be a substantial commitment of resources toward that alternative. We have used the best available information on preliminary well locations and estimates for costs and maintenance, and disclosed our assumptions about them. We have consulted further with the Corps of Engineers regarding the areas of vegetation fed by canal seepage, and they have determined that these areas do not meet the soils criteria required to be characterized as wetlands (see Corps memorandum in **Appendix J**). **Changes have been made to the EA (section 3.4.1.3) to clarify this issue.** Section 3.4.2 discusses impacts on aesthetics.

Comment
MVID-02-010-14
Some basic measurements should be made in the affected rivers for the public to ensure money spent would really provide the benefits claimed. What about monitoring? How would the public know that the project fulfilled any expectations? Until there is compelling evidence that sacrifices made by property owners would result in improvements, look out of the high rise office buildings for a view of urban sprawl; a good part of the reason fish are in decline.

Response: It is well documented that the water delivery system of the MVID is inefficient (see page 29 of the Preliminary EA). Improvements to the water delivery system would result in less water being diverted from the rivers, which would result in higher flows during the typical low-flow period. As stated in the EA, low flows affect fish passage and limit the amount of in-stream physical habitat for fish in the affected river reaches. Improvements in these areas would be beneficial to fish.

Flows in the Methow and Twisp rivers are regularly monitored and will continue to be monitored at the USGS gaging stations. Increases in fish habitat will be monitored through the review of the changes in flows.

Comment
MVID-02-010-15
While credit is given for doing a better assessment than that completed by the Department of Ecology (a mere checklist done by the MVID directors), I believe there are significant effects to the proposed action that have not been disclosed. To repeat, lack of site-specific well locations and effects; lack of accurate survey of irrigation-fed wetlands and effects; an inaccurate description of surface water withdrawal impacts on fish habitat (IFIM), and inadequate assessment of groundwater effects. Equally important, you have not shown clearly that benefits would be derived by replacing several surface withdrawals with many ground withdrawals.

Response: Thank you for commenting. The concerns you summarize here are addressed in the responses to your specific comments MVID-02-010-01, -02, -04, and -09 above (pages 69, 70, and 17) . Regarding the impacts on fish habitat (IFIM), please see to the response to comment MVID-02-019-11 (page 36).

Comment
MVID-02-011-02
The Department of Ecology has recommended that analyses and evaluation of wetlands, instream flows, socioeconomic, groundwater, and fisheries published in the *Methow Valley Irrigation District: Water Supply Facility Plan* be incorporated in BPA's evaluation of the proposed project. The BPA has incorporated elements of the Water Supply Facility Plan and review analyses and findings as appropriate. Furthermore, it is noted that the BPA had similar results and findings upon replicating analyses contained in the Water Supply Facility Plan.

MVID-02-012-05
The EA is very thorough.

MVID-02-016-01
Thank you for creating a clear, readable MVID draft EA.

MVID-02-018-03
I think you guys did an excellent job!

7. Thinks EA is well-written

29. I really think you guys did a good job on the EA.

30. I'll second that. [good job on EA]

35. Good job on the EA.

49. Impressed with your assessment.

Response: Thank you for commenting.

Comment
MVID-02-014-04
I think your EA is very misleading and prejudiced. Quotes like the temporary ditch changes liners every year. They use "plastic from a hardware store," not polymat that carries a warranty.

Response: Section 2.2 of the EA discusses concerns about the use of flexible semi-permanent liners. We stated an example of a district that uses a low-cost liner that needs to be replaced every year. However, we also discussed other problems and concerns with liners, both in this section and in Appendix C. The main concern with liners is that none of them, including polymat, have the proven long-term durability that WDOE and BPA need to see to justify their investment in this project. Please see also the response to comment MVID-02-008-05 (page 56).

Comment
MVID-02-019-06
You did not address any of the concerns members thought were significant. Why Not. A list of concerns is attached. I have sent you information on just about every concern listed. So I will not waste time going into detail on each concern. But if you need this information again let me know and it will be sent.

Response: We have seriously listened to and reviewed the information given to us by this commenter and others. We believe we have addressed these concerns in the EA. The commenter's individual concerns are addressed in this comment/response document as well. In addition, we have added a summary of issues (new Section 1.5 of the EA) with references to the sections of the EA that address those issues.

Comment
MVID-02-019-19
Concerned about insufficient study and analysis of instream flows encompassing all seasons.

Response: The in-stream flow studies that were done to identify fish habitat and passage problems were focused on the times relevant to fish. The impacts of irrigation diversions were evaluated during the irrigation season (and slightly thereafter) because that is the only time that the proposed alternatives could influence river flows.

Comment
MVID-02-019-36
Concerned about use of incorrect information. This has been done all through the Preliminary Environmental Assessment. Too many times to mention here.

Response: Without specific information about what is incorrect, we cannot address this comment, although other comments from your letter about the use of incorrect information are

addressed in response to those specific comments. We believe we have done an adequate evaluation of the MVID project. Because of the concerns about the IFIM model and the Montgomery Water Group study, BPA hired an independent consulting firm, CH2M HILL, to evaluate the use of the IFIM and the hydrology and wetlands information in the Montgomery Water Group study. Their experts in fisheries, hydrology, and wetlands have confirmed the validity of the original studies. Further consultation with the U.S. Army Corps of Engineers, Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and the National Marine Fisheries Service have further confirmed the validity of the information in the EA (see Appendix J for letters from these agencies).

Comment

11. Comments given at scoping meeting do not appear to be addressed by EA.

14. For those who feel their comments were not addressed, where (in the EA) can I tell them to look?

Response: We have seriously listened to and reviewed the comments and information given to us during scoping. We believe we have addressed these concerns in the EA. In addition, we have added a discussion of issues to Section 1.5 of the EA with references to the sections of the EA that address those issues.

Comment

12. It appears an EIS will be written.

13. I don't see how you could say there is no significant impact.

Response: BPA has determined, based on the revised EA and in consideration of the comments received, that an EIS is not required and that the project would not result in significant impacts as defined in the regulations for the National Environmental Policy Act. Please see the Finding of No Significant Impact in the EA for more information.

Comment

43. EA doesn't spell out as much as it could on Alternatives C and D.

Response: The discussions about Alternatives C and D are shorter than those for A and B. There are two main reasons for this: 1) Alternatives C and D do not involve nearly as much activity (construction, etc.) as Alternatives A and B, and, 2) to make the EA as concise as possible, we did not repeat information if it was the same for C and D as either A or B, but referred the reader to the pertinent section.

Comment

60. Question about appeal procedure for BPA NEPA decisions—how does one appeal?

Response: BPA does not have an agency or departmental appeals process. To appeal a final NEPA decision, you would need to petition the Ninth Circuit Court of Appeals sitting in San Francisco as provided for under the Northwest Electric Power Planning and Conservation Act. The petition would then be litigated before that court.

Comment
68. Liked some of the report, other parts not so much.

Response: Thank you for commenting.

Comment
112. Information on costs and results not well-founded and researched.

Response: Thank you for commenting. Please see the responses to comments in the Socio-economics: Costs section of this comment/ response document.

Comment
123. Water availability - are hydrogeologic studies needed?

Response: Please see the response to comments MVID-02-008-11 and MVID-02-009-04 (page 15).

B. Purpose and Need

Comment
MVID-02-010-07
I question the ability of the proposed action to meet the stated "mitigation" of the Federal Columbia River Power System (FCRPS). Though touted as a savior to fish, this is mostly a response to the whine of "get me off the ditch." It is unfortunate that an offer of public money derailed a process to resolve long standing lack of service by some in the irrigation district. The ditch is presented in the EA as the sole reason for the lack of fish. The rural community is an easy mark for an inflated bureaucracy that is under pressure to spend public money on fish recovery. The agencies have a pathetic track record of waste.

Response: The Northwest Power Planning Council reviewed this project and recommended it to BPA for funding as part of the Columbia River Basin Fish and Wildlife Program. The purpose of the program is to mitigate for the impacts of the Federal Columbia River Power System. Several studies and papers have indicated that the inefficiency of the MVID canal system is affecting fish in the Methow and Twisp rivers. Section 1.2 of the EA has been expanded to include references to these studies. This section of the EA also explains the most

recent (1989-present) history of the WDOE and YIN concerns, complaints, and lawsuits regarding the MVID's inefficient water practices. This is much more than a response to the MVID members wanting to leave the district. The YIN agreed to postpone their legal actions against the MVID in order to try to work out a compromise. This proposed project is the culmination of several years of negotiations to achieve that goal. Without WDOE and BPA funding of this project, the MVID faces legal action from WDOE and the YIN, and no funding for repairs to the current system.

Comment
MVID-02-014-05
You make us sound like we are out to kill fish because we need to water our gardens or crops.

Response: The concern of BPA, WDOE, and the YIN is the inefficiency of the MVID canal system. We are offering to help the MVID improve its ability to serve its members while improving the efficiency of water delivery. That way, members can continue to water their crops with fewer impacts on fish.

Comment
MVID-02-014-07
We all know where the fish went and why. They were written off so we could have cheap power. Now I feel you are going to write me off so you can B.S. people into thinking you are saving fish. "Stop the nets," pollution, overabundant seal lions. Fix the forebay on dams to help salmon survive predators.

79. Ditch was not responsible for loss of anadromous fish; dams and loss of spawning habitat, also illegal catch were.

140. Other things besides MVID are hurting fish - need to look at sea lions, Indian fishery.

Response: As noted, there are several factors throughout the Columbia River Basin that have led to the decline of the anadromous fishery. Currently, there is a massive effort underway in the Columbia River Basin to rectify the many causes of this decline. Because the Methow River is a tributary to the Columbia, improvements in the Methow River, as well as in other tributary basins, are incrementally important in improving the fishery throughout the Columbia River Basin. The MVID project is only one of about $127 million worth of fish mitigation projects BPA is currently funding. These projects include some of the ones you have suggested.

Comment
MVID-02-015-01
The EA states that the BPA is responding to a need to increase in-stream flows and fish passage in the Methow and Twisp rivers for resident and anadromous fish. In light of the pending salmon crisis this is admirable. However, after reviewing the EA I could find no information

that fish habitat and or passage is a problem on the Methow River. Where is it addressed? Where are the conservation/in-stream flow goals and benefits of the project listed? The EA makes several references that in-stream flow benefits have not been quantified. Why not?

Response: Issues relating to fish passage were addressed on page 46 of the Preliminary EA for Alternative A and in corresponding sections for the other alternatives. The benefits from changes in flow are presented as increases in physical habitat (WUA) and are presented in Tables 3-5 and 3-6. As for the reference to "benefits not quantified," this refers to the in-stream benefits downstream of the confluence of the Methow and Twisp rivers. The reason these benefits cannot be quantified is because no one knows exactly where groundwater presently returns to the Methow River below the confluence with the Twisp. This is explained in Section 3.1.2.1 of the EA. For a discussion on minimum in-stream flows, please refer to the response to comment MVID-02-010-13 on page 32.

In addition, several paragraphs providing further documentation of the need to increase the efficiency of water use, in-stream flows, and improve fish passage have been added to Section 1.1 of the final EA.

There is also corroboration in the technical and scientific literature to suggest that increased in-stream flows would benefit wildlife and wildlife habitat. For example, the National Research Council (1996) concluded that reduced in-stream flows caused by water diversions have had negative impacts on the diversity, abundance, and viability of natural ecosystems and the species they support. One of that study's important conclusions is that in-stream flows should be increased where water diversions have caused flows to be reduced compared with historical conditions.

Furthermore, the Scientific Assessment performed for the Interior Columbia Basin Ecosystem Management Project (1997) has concluded that, in general, restoration of historical functions, processes, and disturbance patterns has the highest probability of achieving resilient ecosystems with high ecological integrity and relatively low risk of negative ecological outcomes.

Comment
MVID-02-015-03

I think the Washington Department of Ecology's (DOE) role and interest in the MVID project should be fully explained in the EA or future EIS.

Response: The Washington Department of Ecology's (WDOE) role and interest in this project is to manage and administer the water resources of the State of Washington, as defined in rules and regulations, including the Revised Code of Washington (RCW) Chapters 90.03, 90.14, 90.44, and 90.54. Under these laws WDOE is responsible for insuring that the waters of the State of Washington are put to maximum net beneficial use. To do this, water uses must be measured against four tests:

1. Is water available?
2. Is the water use a beneficial use?
3. Is the water use in the public interest?
4. Would the use impair existing rights?

WDOE is interested in helping the MVID secure a reliable system that meets all of these standards. It is willing to help fund such a system for the MVID.

A paragraph explaining this role and interest has been added to Section 1.2 of the final EA.

Comment
MVID-02-016-17
Mostly, I would like to see improvements in fish habitat on the mainstream Columbia where the real problems are.

Response: Improvements in fish habitat and passage on the mainstem Columbia are also currently being funded by BPA. However, the Northwest Power Planning Council has recommended the MVID project and many other fish and wildlife habitat projects on Columbia River tributaries for funding to BPA as part of its Fish and Wildlife Program. Because the Methow River is a tributary to the Columbia, improvements in the Methow River, as well as in other tributary basins, are incrementally important in improving the fishery throughout the Columbia River Basin. The goal of the Program is to look at the Columbia River system as a whole, and address as many of the problems as possible.

Comment
92. The EA doesn't tell the real story. I don't think the flows really are the issue for fish. I've kayaked streams with less flows that have salmon. The canal was here when the salmon were here. I'd like you to find what the real problem is for the fish. I don't think it is the ditch.

Response: The purpose of the project alternatives is not to provide "the overall solution" for solving the fish problems in the Methow, as well as the Columbia River systems. However, the project does present the opportunity to improve in-stream flows and passage, as well as to provide a more efficient water delivery system. The improvement in physical in-stream habitat in the Methow and Twisp rivers is an incremental step in reversing the declining trend of fish populations in the Columbia River system. It has been the cumulative effect of all the water projects, water users, and harvesters that have led to lower fish numbers within the system.

We have added information to Section 1.1 of the final EA on documents that identify in-stream flow and passage as issues for fish in the Methow Basin.

IV. WATER RIGHTS/OTHER LEGAL

A. Water Rights

Comment
MVID-02-006-06
This is all a terrible situation, but it goes further. We would be willing to put in a well so that we can continue raising a crop - BUT DOE has said that "If you (or your predecessor) did not file a claim for a vested right, that right was relinquished." In order to find out if a vested claim was ever filed, DOE must do a records search of the claims registry. Hopefully, we will have a vested right - BUT, then DOE says that just because we have a vested right doesn't mean that we have a water right.

Response: WDOE has searched the records as you requested and provided you with a copy of Surface Water Certificate 1143. The transmittal letter states that it is advisable to have a title search completed to make sure that this water right has remained relevant to your property. Please contact the Department of Ecology at (509) 457-7112 to obtain information about options for developing a well use change authorization, if this is your preferred approach for obtaining water.

Comment
MVID-02-007-03
The DOE and MVID Directors have represented to the District Members that anyone wishing to be excluded from the District could be [excluded] and receive their portion of the $1,500,000 compensation package. That each excluded member would receive a water right with a change in the point of diversion. Exactly what the DOE will agree to needs to be disclosed to the MVID members. Will the affected members be responsible for the cost of meeting the conditions required by the DOE? What would those costs be?

> PEA pg. 37 “WDOE could authorize the transfer of MVID surface water right points-of diversion to groundwater points-of-withdrawal . . . . if several conditions are met. . . . water right transfers would be handled on a case by case basis . . . . "
>
> PEA pg. 38 "WDOE would not authorize water rights for new well if they would impair authorized uses of existing wells, and the agency might require pumping tests and/or additional test and monitoring wells to assure that new wells were not located where they could impair existing wells.

Response: First of all, WDOE assures members of the MVID that they will **not** be left high and dry. The process for changing a point of diversion to an individual well would be as follows: Members of the MVID that wish to be excluded would first need to petition the MVID Board of Directors. If the Board decides they can be excluded, they would apply for

authorization from the WDOE to change a portion of the right held by the MVID. This authorization would allow the individual to drill a well (or use an existing well) that would withdraw water from the shallow alluvial aquifer that is connected to the river. This authorization would be made, **provided** that the well would not impair existing rights, and would provide adequate water for irrigation of the authorized acres. Such an authorization would include specifications regarding the land to which water would be applied, the season of use, instantaneous and annual quantities of water (measured in gallons per minute and acre-feet per year, respectively), date by which the water must be put to beneficial use, and related details routinely made a part of a water right decision, and that are a part of any MVID right or claim.

A determination about whether a well can provide adequate water, whether the water would be withdrawn from the appropriate aquifer, and whether or not such withdrawal would impair existing rights is made on a case-by-case basis as a part of any routine water-right change application. Once a change application is submitted to the WDOE, a field inspection is made by a permit writer employed by WDOE. Upon inspection of the site and existing well logs, the permit writer will make a recommendation as to whether or not the change can be made without impairment of other rights, and whether or not water is available. If there is insufficient information, it may be necessary to have the proposed well drilled under the authority of a preliminary permit, to test the availability of water, and to test for impairment. This type of test is inexpensive, and is done routinely throughout the state. The purposes of the compensation package are to defray the cost of well drilling, well improvement, well pump-testing, and for some, to be a partial reimbursement of past assessments that have been paid, but for which services were not provided by the MVID. The cost of developing a well, testing a well, etc. will vary parcel-by-parcel, and will depend in part on the proposed location of the well by the landowner.

When parcel-by-parcel inspections are made by the WDOE, consideration will need to be given to the probable availability of water, potential impairment of other wells, and related expenses. After initial consultation with WDOE staff, the landowner may elect to choose a different location for a proposed well where there is no risk of impairment and better availability of water, thereby reducing costs. In many cases, the cost and time associated with developing a well would be minimal, because some landowners already have drilled wells because they were not being served water by the MVID. In these circumstances, issues of availability and impairment have already been addressed, so costs would be minimal. Upon the request of the landowner, the WDOE could authorize that a portion of the appropriate MVID right or claim be assigned to that individual's well.

As you can see, the circumstances, process, and costs will be determined on a case-by-case basis. Furthermore, the landowner will have some discretionary control over the costs associated with activities on an individual parcel of land.

Once a determination is made that water is available and the well will not impair existing rights, a change authorization is issued by the WDOE, authorizing the development and beneficial use of the well to the full extent of the authorization. Such an authorization would not exceed the general standards of 0.02 cfs per irrigated acre, and 4.0 acre-feet per year (ac-ft/yr) per irrigated

acre during the irrigation season, as expressed on the appropriate MVID right (for east-side changes) or claim (for west-side changes). The change authorization would carry the same priority date as the right or claim that was changed, and would prescribe a period of time during which the landowner would need to fully develop the irrigation system (well, pump, piping) and put the water to full beneficial use (irrigate the entire authorized acreage).

Comment

MVID-02-007-05

Additionally, numerous representations have been made in the PEA regarding certain agreements that the MVID and the DOE have made regarding future use needs and water rights of the MVID after the implementation of the proposed preferred alternative. It should be understood and disclosed that no such agreements exist. While certain of the MVID Directors may have made some representations to the DOE and others, MVID by-laws and RCWs do not give authority for the MVID Directors to alienate or bargain the water rights held by the District.

> PEA pg. 29 " With the information above in mind, WDOE and the MVID have agreed upon an appropriate per acre water allowance of 0.02 cfs/acre maximum instantaneous in the MVID."

Response: Although there are no signed agreements between the WDOE and the MVID, the District has signed an agreement to work in good faith with the WDOE and others to address issues of the District. At the beginning of the proposed rehabilitation process, one of the goals expressed by the Directors of the MVID for the proposed rehabilitation was to "Avert the possibility of a lawsuit with the Yakama Indian Nation" over wasteful water-use assertions, and related issues. The WDOE and the MVID Directors agreed that a reasonable instantaneous value of 0.02 cfs per acre would be defensible as **not** wasteful, should there be assertions of wasteful irrigation practices in the future. Addressing this goal with such an approach has always been one of the requirements of the proposed rehabilitation project, and was made known to the members of the MVID and other interested persons from the beginning of the project.

Before the rehabilitation occurs, a contract will be executed between the WDOE and the Methow Valley Irrigation District for the expenditure of funds, in exchange for trust water rights. One condition of the contract process is that: "evidence of the district's authority to represent the water right holders shall be submitted to and for the satisfaction of the Department" (RCW 90.42.030).

In response to your assertion that the "RCW's do not give authority for the MVID Directors to alienate or bargain the water rights held be the District," we cannot speak to assertions of alienation, but we refer you to Chapter 87.03 RCW, entitled "Irrigation Districts," generally regarding negotiations or bargaining associated with contracts or project funding. Specifically, you may wish to refer to Chapter 87.03.140 "Board's powers and duties generally-Condemnation procedure." We also refer you to chapter 90.42.030(6) (RCW), which states that "The state shall not contract with any person to acquire a water right served by an irrigation district without the approval of the board of directors of the irrigation district." It seems that,

contrary to your understanding of the statutes, the RCW's not only authorize, but require the state to work with the Board of Directors of an irrigation district to develop contracts under Chapter 90.42.

Although we cannot speak to the by-laws of the MVID, it has not been our experience that the MVID Board has alienated or bargained away the rights of the MVID, but that they have acted in good faith, representing the district through public processes, including the process associated with the National Environmental Policy Act.

Comment

MVID-02-007-10

The MVID currently holds water rights and water right certificates totaling 692 cfs, and has put to beneficial use historically more than 100 cfs. The proposed alternative would leave the district with approximately 17.6 cfs. There has been no disclosure as to the value of the water rights and water right claims the MVID would be giving up in any of the proposed alternative actions. How significant are these rights? Are these rights important to the DOE in the implementation of the Methow Basin Pilot Plan? What are the incentives for water conservation among irrigation districts? Are these proposed alternatives designed to destroy the MVID and take the MVID historic water rights? Are the MVID water rights at risk provided that the MVID use these rights beneficially?

Response: First, we would like to clarify the rights of the MVID. The MVID does not "hold water rights and water right certificates totaling 692 cfs." Rather, the MVID has on file with the WDOE water right Certificate 945 for irrigation of MVID lands east of the river from the Methow River, with a maximum instantaneous diversion of 150 cfs. The MVID also has on file with the WDOE several water right claims, which together assert or claim rights to the use of up to 542 cfs. These claims assert the vested right to the use of water from the Twisp River (500 cfs under claim 3935 and 30 cfs from the old East Side Diversion under claim 118275), from the Methow River (10 cfs from old West Side Diversion under claim 118276), and from Alder Creek (2 cfs under claim 118277).

Certificate Number 945 is a state-issued certificate of water right established under Chapter 90.03 RCW. However, Water Right Claims 3935, 118275, 118276, and 118277 are not water rights or certificates of water right, but are assertions that there is a vested right established prior to 1917, and recorded with the state per Chapter 90.14 RCW. The final determination of the validity and amount of water associated with a claim registered in accordance with RCW 90.14 ultimately lies with the Superior Court through the general adjudication process provided for by Sections 90.03.110 through 90.03.240 RCW. This process includes an investigation into whether or not the claimed amount of water was used prior to 1917, and whether that same amount of water has continuously been used. In the absence of an adjudication, in order to make decisions related to applications for permit or applications for change authorization, the WDOE is authorized to make administrative judgments as to the probable extent of the water right associated with a Water Right Claim.

You also suggest that the MVID would be left with 17.6 cfs under the preferred alternative. Actually, our estimates indicate that the district would hold approximately 18.6 cfs under the proposed reorganization, among those remaining within the district, with an additional 27 cfs being transferred to members excluded from the district. In total, approximately 45.6 cfs instantaneous, 9,104 acre-feet per year would remain with the MVID or former members of the MVID for irrigation.

It is beyond the scope of this NEPA process and the proposed reorganization to calculate a monetary value for a water right or claim. The significance of a right is not expressed in a monetary value, but in the beneficial use to which it has been applied on a piece of land. Therefore, the significance of MVID rights and claims is in the ability of the MVID to serve all of its assessment paying patrons, which does not occur at this time. It is the intent of this proposed project to enable the MVID to serve all assessment-paying patrons their full entitlement, and to allow those members wishing to leave the district to change a portion of the appropriate MVID right or claim which applies to their property to an independent source of water, under their own control, with the seniority established under the appropriate MVID right or claim.

You ask if MVID rights (or claims) are important to the WDOE in the implementation of the Methow Basin Pilot Plan. The answer is no. Implementation of the Methow Basin Pilot Plan (Basin Plan) can be accomplished with or without implementation of the proposed rehabilitation of the MVID. Furthermore, any benefits realized by programs proposed by the Basin Plan or related planning documents (e.g. Ground Water Advisory Committee Plan) would remain with the citizens of the Methow Valley. The proposed water bank would be managed by Okanogan County to provide water to those citizens of the Methow Valley wishing to provide running water to their families, or wishing to establish irrigation or expand on existing irrigation. Any benefits to in-stream flow of the Twisp and Methow rivers would remain in the Twisp and Methow rivers. None of this water or these benefits would in any way directly benefit the WDOE.

There is one alternative discussed in the EA that does consider the complete dissolution of the MVID, which would, in effect, “destroy” the district as an entity. Please note that this is not the preferred alternative as identified in the EA. Please also note that it is not a goal of the MVID, WDOE, or the BPA to “destroy,” decommission, dissolve, or in any way terminate the MVID. Rather, a goal expressed in the Water Supply Facility Plan and this EA is to “Design an improved, reliable, efficient, low-maintenance system serving a district comprised of properties desiring the service.” It is necessary to realize this goal, and other goals expressed by the MVID directors such as “promote water conservation,” and “increase in-stream flows for fisheries,” for the MVID rights to remain without legal challenge. If the goals of the proposed rehabilitation project are not realized, it is likely that the MVID would face challenges regarding wasteful irrigation practices. Beneficial use of irrigation water is based on reasonable distribution methods; excess leakage or loss caused by an inefficient distribution system is not considered a beneficial use. The MVID might also be challenged that its irrigation and diversion practices are detrimental to steelhead, a species recently listed as endangered in the Methow Basin under the Federal Endangered Species Act.

Comment
MVID-02-020-04
The affect of the alternatives proposed is to destroy the Methow Valley Irrigation District. This would be accomplished either by dissolving the District entirely, or downsizing the district and implementing a system which would make the cost of water delivery impossible for members to justify for agricultural use.

Response: Any decision to dissolve the MVID would be made by a vote of the membership, according to State law. We agree that downsizing of the district would increase the costs to the remaining users. The key to success would be to provide a good, reliable source of irrigation water that would be attractive to many users. The more users, the lower the costs would be.

Please see also the response to comment MVID-02-020-01 (page 94).

Comment
MVID-02-008-06
The potential for legal problems to occur for water right transference issues between landowners may be significant.

Response: Your comment seems to suggest that there may be legal issues brought against an individual or the MVID as water rights are transferred from one landowner to another, or from one parcel to another. There is a process established in state law that specifies what type of transfers can be made, who has the authority to authorize them, the requirements of parties to publish their intent to transfer, and a process for disgruntled parties to appeal such decisions. For more information about processes to transfer water rights, you should contact both the MVID Board (for transfers within district boundaries) and the Department of Ecology's Central Regional Office (John Monahan: 509-457-7112).

Generally, the following applies: If a transfer of water right is made within the MVID boundaries, it is the responsibility of the MVID to approve and, if necessary, defend its decision. If transfers are proposed outside of MVID boundaries, it is necessary to obtain authorization from WDOE. After you obtain WDOE's approval, it is WDOE's responsibility to defend, on your behalf, such authorizations, should a disgruntled party appeal a decision.

Comment
MVID-02-009-02
Persons desiring drilled wells will have to go through a possibly lengthy process to transfer water rights from the ditch to a well. (EA pg. 7 and 28.) Please display the consequences of what a transfer request that is denied will have on individuals. Does the WA State DOE intend that these individuals contemplating such action hire a geohydrologist? Or other expensive specialists? Since the EA admits unknown effects on groundwater, (pgs. 28, 34, and 33) are individuals expected to do this inventory and research? Please display these effects in the EA.

Response: The WDOE does not anticipate that MVID members will need to hire a hydrogeologist or other specialist. The process for obtaining authorization for transfer of a point of diversion to a point of withdrawal is routine. (See response to comment MVID-02-007-03, page 78.) Individuals may be required by the WDOE to have a well driller conduct a pump test of the well to test availability and impairment questions. However, these are far from complex hydrogeologic research projects requiring expensive specialists. Rather, they are simple tests to make sure a proposed well will not interfere with the use of an adjacent well that may be owned by the same landowner for domestic use, or a neighbor for domestic or irrigation use. The compensation money provided to landowners leaving the MVID could be used to cover the costs of these tests.

If WDOE must deny a request because water is not available or because use would impair another's rights, either a Local Improvement District (LID) would need to be formed to serve several landowners from one well, or the MVID would need to continue service to the property. Regardless of the process, a member of the MVID would continue to benefit from the rights or claims established by the MVID.

Comment

MVID-02-016-13

I have concerns over the conversions of water rights from the DOE. I have anecdotes of irrigators converting from canals to wells who had to fight for years to get a change in point-of-diversion. It would be helpful to have in writing a guarantee from DOE that the conversion will result in a senior water right with the MVID priority date for the projected wells in Alternatives A and C.

Response: There can be no guarantee in writing from the WDOE through this National Environmental Policy Act process. Water right decisions are made on a case-by-case basis, and are driven by the water laws of the state of Washington. Once the NEPA process has been concluded, WDOE staff will meet with landowners on a one-on-one basis to discuss the landowners' needs and options.

The WDOE's Central Regional Office has established decisions within the Methow River Basin as a priority task during the 1997-1999 biennium. Furthermore, the WDOE has already committed extensive staff time to the proposed rehabilitation project. Provided that a landowner would be drilling a well (see response to MVID-02-007-03, page 78), the landowner would receive a change authorization with the same priority date as that held by the MVID. If a proposed well cannot be drilled or improved on the subject property because water is not available or would impair existing rights, either a Local Improvement District (LID) would need to be formed to serve several landowners from one well, or the MVID would need to continue service to the property. **Regardless of the process, a member of the MVID that has enjoyed the benefits of the MVID will continue to benefit from the priority date of the right or claim established by the MVID.**

Comment
MVID-02-019-29
Concerned about loss of surface water rights. (They are) far more dependable than groundwater wells and a lot cheaper. Gravity has been used for thousands of years. I don't think you can improve on it as a means for water delivery.

Response: Surface water rights would be "lost" only if they were converted to groundwater rights. Groundwater rights would not be authorized if they would not be at least as reliable as the surface water delivery to your property. Regarding your assertion that surface water, and particularly the gravity feed system, is more reliable, some MVID members have had problems reliably receiving water from the MVID as a result of problems with the gravity ditch and a surface water diversion that is located many miles from their property. While it is true that gravity systems are one of the oldest technologies, groundwater well-piped systems are recognized as far more efficient and cost-effective.

Comment
15. On water rights, how does Hillis decision affect them? I didn't think EA was real clear on water rights.

Response: One result of the Hillis case was the prioritization, by rule, of the water-right decision-making process. Under the Emergency Rule, the WDOE found that a priority of the state was to make decisions on change applications that were anticipated to have environmental benefits. As one of the goals of the proposed rehabilitation of the MVID is to improve in-stream flows for fish, there would be environmental benefits if the project proceeds. Furthermore, if the project proceeds as described in the preferred alternative (A), there would be added environmental benefits from the removal of diversion dams in the Methow and Twisp rivers. The annual repairs and structure rebuilding has required that construction equipment be operated within the river channel; this would no longer occur. Therefore, it is likely that WDOE would be able to expedite the water right changes proposed by the project as a result of the Hillis decision.

Comment
22. Want to leave MVID and drill own well, but can't (would lose water right).

Response: If the proposed rehabilitation were to proceed, and the MVID Board agrees to allow you to be excluded from the MVID, the WDOE would be able to transfer a portion of the water right held by the MVID to a well on your parcel of land. The well would need to be constructed into the water table connected with the river, and could not interfere with your neighbors rights, but you actually **can** maintain your water right if this is done correctly. Contact John Monahan at the Department of Ecology (509- /457-7112) for assistance with this process.

Comment
101. EA gives the impression that all 2400 acres will receive a valid water right.

Response: It is our understanding that there are 921 ha (2,276 ac.) within the MVID. The proposed rehabilitation is not intended to create any new water rights, but to allow those within the MVID to continue to benefit from the rights and claims held be the MVID. Under the proposed alternative (A), approximately 545 ha (1,346 ac.) would be excluded from the MVID, provided that they obtained authorization to change a portion of the MVID-held right or claims from the MVID to a well serving their property. The remaining approximate 376 ha (930 ac.) would continue to benefit from the services of the MVID, through wells to which would be transferred a corresponding portion of the right and claims held by the MVID. This is the concept that the Preliminary EA should have conveyed with respect to the proposed alternative.

Comment
120. Live on upper west-side; concerned about being left without <u>any</u> water (currently extra water user).

Response: If an extra water user on the upper west side has established a historical use of water under Claim Number 3935, then it is anticipated that the extra water user will continued to be served water by the MVID when the reorganization is complete. One of the goals of the proposed rehabilitation, as expressed by the Directors of the MVID, is that we "Not disrupt irrigation practices of the community."

Comment
121. Can I get a search done to see exactly what water rights/claims are on my property?

Response: Yes. Contact John Monahan at the Department of Ecology's Central Regional Office in Yakima Washington. Write him at 15 West Yakima Ave., Suite 200, Yakima WA 98902-3401 or call (509) 457-7112. Be prepared to describe your property according to Section, Township, and Range, to get the general location. Then you may need to provide additional information such as parcel number, tax number, and/or a metes and bounds description of your property.

Comment
122. Will water rights transferred to individuals for groundwater use be able to be exercised?

Response: Yes. The WDOE will make the determination about the transfer of water rights on a parcel-by-parcel basis, with the benefit of consultation with the MVID board. If the WDOE issues a change authorization, then that document grants an individual the right to exercise the water right or claim previously held by the MVID. The change authorization would carry the

same priority date as that held by the MVID, and would be issued specific to the groundwater source (well), with a specific quantity of water for a specific place of use.

Comment
126. Is it possible to transfer MVID surface water rights to a downstream point on the river? Property is riverfront location.

Response: WDOE would need to decide on such transfers on a case-by-case basis. The goal is to remove fish passage barriers from the river; therefore, we are not encouraging new diversions on the river. Contact John Monahan at (509) 457-7112 for more information.

Comment
131. Would like DOE to grant transfer of our MVID water right to a groundwater right to allow us to drill our own well.

Response: This would be possible through either Alternative A or C, as discussed in the EA. Details regarding the process to obtain authorization from the WDOE are provided in the response to comment MVID-02-007-03. Call John Monahan at (509) 457-7112 for assistance with this process. However, please note that, if Alternative B or D were selected, this change would not be possible.

The first step is to file an application to change a portion of the right held by the MVID to a well. When you call Mr. Monahan, please be prepared to provide him information regarding where the irrigated property is located (Section, Township, Range, quarter-quarter, metes-bounds description).

Comment
134. If we switch to a pumped groundwater system, can we switch back to the river again later?

Response: One of the goals of the proposed rehabilitation is to provide a reliable source of water to members of the MVID, or former members of the MVID (that are excluded). If a conversion is made to a reliable well, there should be no reason to change back to a surface water diversion unless a catastrophe were to occur. In such circumstances, the WDOE would authorize an emergency change back to a surface water supply until repairs could be made. However, one of the goals of this project is to eliminate surface water diversions from the Methow and Twisp rivers.

Comment
135. What do we do if we go over to a groundwater system and it fails? Would we have a right to take river water?

Response: As noted above, there would not be an automatic backup of river water written into your water right. However, were there to be catastrophic failure of the groundwater supply, you could obtain an emergency change authorization from the WDOE.

B. Liability

Comments

MVID-02-012-04

I have concerns about liability.

4. Liability is an issue - for example, on the (canal) break that happened yesterday.

24. Concerned about liabilities associated with the canal.

28. Some sections of ditch haven't been walked in years. It is a disaster waiting to happen.

52. Kids falling in ditch; the ditch is a hazard.

Response: Thank you for commenting. We agree that the open canal does pose liability issues. These concerns are one reason for proceeding with the project.

C. Barkley Ditch

Comment

MVID-02-001-01

How would the Barkley Ditch would be treated under Alternatives A and C? Specifically what repairs would be made to make the ditch useable for the Barkley users? I am concerned about the assumptions stated on page B-3 of the EA (assumptions for the cost estimate). 1) The ditch is much more than 9,300 ft. long. That was the original length, but when the canal was modified, 1/2 mile was added, down to the MVID's spill. So either the additional 1/2 mile also needs to be modified, or a new spill put in. 2) The ditch is more than 3 ft. wide, more like 4 feet. How will it be modified to make it smaller, if that is what is intended? The sides as well as the bottom need to be treated. Un-consolidated earth fill will not work for the sides of the canal. 3) Concerned that a 3 ft. wide ditch is not big enough to provide them with the amount of water they have been receiving.

97. Barkley not satisfied with 3-foot ditch proposal - not big enough. MVID agreement was to deliver to Barkley customers 12 cfs (at turnouts). Barkley not addressed in EA. Would like to see 6-foot wide and 3-foot high ditch - concrete lined. Open to anything that works but thinks there is no desire for pressure system.

MVID-02-001-02

Lining the canal with concrete, as discussed in Alternative B, would be acceptable to the Barkley users.

MVID-02-001-03
We are upset that no one, including the director of the MVID, has or is willing to talk to us on this issue. Several of the Barkley users are wanting to go to court right now to resolve it, but I am urging them to hold on until they have some clarification.

MVID-02-010-11
There is mention in terms of engineer cost estimates of the Barkley Ditch retrofits but no other disclosure of the effects of this action.

Response: The Barkley Irrigating Company, the MVID, and the project sponsors have met to discuss the issue of replacing the Barkley ditch if the MVID abandons their East canal. A project that would place the Barkley ditch into a pipeline is currently under discussion. Okanogan County is proposing to realign the Twisp-Winthrop Eastside road that follows the current MVID East canal alignment to Mill Spill. The County may also participate in replacing part of the Barkley ditch as they require additional rights-of-way to provide a safe alignment for the road. We anticipate that a solution to the Barkley needs will derive from the participation and cost-share from BPA, WDOE, and Okanogan County. The effects of the action would be very similar to those of Alternative A for the MVID project.

D. Other Legal Issues

Comments

MVID-02-007-15
Each of your proposed alternatives have taken a relatively simple solution and turned it into a major action with far reaching, and as yet, undisclosed consequences.

To use federal and state money to buy votes for a course of action designed to destroy a quasi-public utility, eliminate valuable agricultural uses, destroy significant riparian areas, habitats and wetlands, and participate in a taking of valuable water rights by the WDOE is not, in my opinion a responsible use of tax payers money and is probably illegal.

MVID-02-008-04
Compensation provided for individuals leaving the district is against state law.

100. Funding proposal doesn't meet Referendum 38 regulations. Ref. 38 doesn't allow for 100 percent grants. Ref. 38 requires local match. BPA's funding is against state constitution which requires public money spent for public projects, not private facilities such as wells.

Response: Thank you for commenting. In a letter to Mr. Tom Fitzsimmons, Director of the WDOE, dated August 22, 1997, the State Auditor reviewing the issue of compensation stated that state requirements do not apply, since BPA, not WDOE, would be funding the compensation. He also upheld the use of Referendum 38 planning grants for the MVID project.

Comment
MVID-02-008-07
The potential for legal problems for drilling new ground water irrigation wells impacting existing wells on adjacent parcels may be significant.

Response: Construction of new wells would have to be done in a way that prevents impairment of wells owned by others. The WDOE's regulatory process for issuing permits for new wells or for transferring points of diversion would require that sufficient studies be done to minimize the potential for conflict. Please see the response to MVID-02-007-03 (page 78) for a description of this process.

Comments
MVID-02-014-03
I have concerns about a loss of property rights.

MVID-02-019-33
Concerned about private property rights violations. We will go into this when it's needed.

Response: Thank you for commenting. Without more information, it is difficult for us to respond further. We interpret your concern about property rights to include water rights, as water rights are attached to the property under Washington water law. If water rights are your concern, please note that it is one of the goals of the agencies involved in this project to maintain and improve access to a reliable water supply for the benefit of all MVID members, thereby protecting these rights.

Comment
MVID-02-020-02

You had mentioned that the MVID had completed a SEPA Threshold Determination and decided that no significant impacts would occur as a result of this action. While it is true that a DNS was issued, the determination is currently pending judicial appeal. An agreement was reached to stay further action until the BPA has completed its environmental review. If it is felt that you have properly defined and disclosed the real impacts which will result from this action, the appeal will likely be withdrawn. However, if it is felt that your review lacks an independent agency judgment and is a parroting of partisan opinion, the SEPA appeal will be continued.

In both the review under NEPA and under SEPA, there has yet to be proper disclosure of the impacts particularly in the area of the destruction of wildlife habitats, wetlands, riparian areas, ground water, aquifer recharge, instream flows and fish habitats.

Response: We agree with the gist of your statements about the status of the SEPA appeal. BPA believes that the EA does properly disclose the potential impacts of the proposed MVID

project and alternatives. Consultation with various agencies has confirmed this (see consultation letters from agencies in Appendix J and comments from the U.S. Environmental Protection Agency in this comment/response appendix).

Comment

67. Concern about being told where to dig well on property.

Response: Your concern is noted. However, WDOE must insure that existing wells are not impaired by a new well, and, in order to transfer your point of diversion to your new well, WDOE must determine that the new well is in continuity with the river aquifer. WDOE staff will meet with you and discuss the location(s) for a well on your property that would best meet these conditions.

V. PUBLIC INVOLVEMENT/DECISIONMAKING

Comment

MVID-02-007-14

It is evident that this project is hugely political. Okanogan County has been apparently lobbied against comment on the PEA as well as the preceding SEPA review. The Washington State Fish and Wildlife has apparently instructed their biologists not to comment on the loss of riparian areas and habitats. The WDOE, whose responsibility is to protect the environment, along with yourselves, are claiming effects need not be disclosed if they are as a result of a non-jurisdictional action.

Response: There have been no attempts to suppress anyone's comments on this project. The Okanogan County Commissioners' Office did comment during the SEPA review in support of the project (MWG, Vol. II, Appendix H, first response letter). BPA, WDOE, and MVID have consulted with both Okanogan County and WDFW on the project over the past several years, and WDFW is contributing funding toward the project. We have consulted with WDOE and the Army Corps of Engineers regarding wetland jurisdiction, and they have concurred with us that the areas of water-dependent vegetation along the canals do not meet the criteria to be designated as wetlands (except in a few places where the wetlands existed prior to the canal). Effects of the project on these areas are addressed in Sections 3.4 **Vegetation** and 3.5 **Wildlife.**

Comment

MVID-02-010-17

It is frustrating to be the focus of a grand scheme imposed from the outside. To characterize this project as being a 'local' decision is insulting. The present system needs improvement, yet all the assistance offered is for a drastic replacement of the open ditch. The value of the present system has been greatly diminished, this does not even get into the specifics of higher value of water rights held collectively, versus distribution in small bits to individuals.

Response: We disagree that this project is a "grand scheme imposed from the outside" with no local involvement. The elected MVID board of directors has been directly involved since the inception of this project, and WDOE and BPA have worked extensively with them and other MVID members. The compensation package was proposed by an MVID member. We believe the replacement of the existing canal system is necessary because of its deteriorating condition. We are concerned that piecemeal replacement of portions of the system will result in continuing requests from the MVID for emergency funding, and believe that it is not fair to continue to subsidize the MVID at the expense of the taxpayers.

WDOE is committed to helping the MVID serve water to patrons that want the service (thereby maintaining the higher value of "water rights held collectively"). However, we also recognize the rights of individuals, and are prepared to assist them with transferring a portion of the MVID right to their property, if this is their desire. It is the decision of the landowner and the MVID on this matter.

Comment
MVID-02-010-18
I would also like to review any proposed 'finding of no significant impact' that may result from the EA.

Response: The Finding of No Significant Impact is attached to this final EA, which has been sent to everyone on our mailing list for this project.

Comment
MVID-02-011-01
Thank you for the opportunity to review and comment on the Preliminary Environmental Assessment (EA) for the Methow Valley Irrigation District (MVID) Project. The Bonneville Power Administration (BPA) has diligently solicited comments, questions, and concerns of Ecology and others on the proposed MVID Project and the Preliminary EA. Ecology commends the BPA for its thoroughness in seeking and incorporating the comments, questions, and concerns of responsible and interested parties. Again, thank you for the opportunity to comment, and please inform us of your decision at your earliest convenience.

Response: Thank you for commenting.

Comment
MVID-02-014-01
I don't feel that any of the alternatives fit the situation. They have little or no input from the patrons who actually use the ditch.

Response: Thank you for commenting. We believe the alternatives addressed in the EA represent the range of feasible alternatives. They are based on information received from MVID members and community members during the scoping process for the EA. Public meetings were held to solicit comments and respond to questions in October and December, 1996, and an information sheet was sent to all MVID members and other members of the public inviting them to propose alternatives to be addressed in the EA.

Comment
MVID-02-016-14
Finally, this sure looks like a done deal.

Response: Thank you for commenting. At this point we do not know which alternative BPA or the MVID will ultimately select, so we don't think it is a done deal.

Comment
MVID-02-018-04
I think a lack of involvement is because people don't want to show their lack of knowledge on water issues.

Response: Thank you for commenting. We've tried to make the EA as clear as possible so that people can read it to learn about the water issues and other issues involved in this project. We also publicized and held a workshop in December 1996 to answer people's questions about well-drilling and their water rights.

Comment
MVID-02-019-05
You know, maybe you should try doing something up front for a change, like sitting down with us and working out a proposal we can all live with. Stop wasting State and Federal money with all your games.

Response: Many attempts have been made to work with the MVID members, including the Canal Associates, on a proposal. We met with the Canal Associates on several occasions, including during scoping and up to the issuance of the preliminary EA. We carefully considered the alternatives proposed. We hired an independent consulting firm, CH2M HILL, to review the Montgomery Water Group's report, the IFIM study, and the Canal Associates' proposals. Our consultants have determined that the Montgomery Water Group's report and the IFIM study are

valid. We met with the Canal Associates explained why we do not think their proposals are feasible alternatives. Please see the discussion in Section 2.2 of the EA and Appendix C.

Comment
MVID-02-019-14
I'm going to end this because I don't think you really want to hear what I have to say, or what anyone else has to say. I believe you have your own agenda and nothing else matters, not fish, not wildlife, not the environment. You want our Water Rights and that's the bottom line. You'll try to buy our directors and many of our members with your monetary carrot, leaving the rest of us with high water costs or no water at all. I don't know if you've noticed, but in doing this you've been walking all over your integrity and our property rights.

Response: We have held several public meetings and workshops, published two *For Your Information* sheets, and met with members of the Canal Associates several times, all in an effort to listen to and respond to your concerns and issues. This **Response to Comments** document is nearly 100 pages long, because we thought it was important to respond individually to each comment. We have solicited and responded to issues and suggestions because we believe that the project will be better for it. BPA has no interest in obtaining your water rights—we want all MVID members to be served equitably and reliably with their needed amounts of water, and we believe that can be done and still allow more water to remain in the river for fish. We do not believe that it is "buying" anyone to compensate people for not receiving water over the years that they have had to pay assessments into the MVID and for drilling new wells or upgrading existing wells if they are excluded from the MVID.

Comment
MVID-02-020-01

It should be understood that *(named person)*, myself, and others opposed to this plan are not just a few disgruntled members, but are for the most part, the entire group of members who would be left in the district after the proposed reorganization. The decisions driving this plan are being made by the DOE and two MVID Directors who themselves will be excluded from the District, compensated some Fifty Thousand Dollars and have no future obligations or liabilities to the District.

Response: This project is driven by a need for the MVID to reduce its water diversions from the Twisp and Methow rivers, or face a lawsuit over wasteful water practices. The MVID can afford neither to upgrade its water delivery system, nor to pay the legal costs associated with a complex litigation. The proposed project, which requires no MVID funding, will remove diversion structures from the rivers, provide the MVID with an efficient irrigation water delivery system, increase fish habitat, and promote water conservation. The MVID directors are elected by the MVID membership; we believe that, as such, they represent the majority of the membership's interests. If they elect to leave the MVID, they would be compensated according to the formula given in Table 2-2 of the EA, along with any other members who leave. The

money would compensate those who leave for the many years they have paid into the MVID and not received water, and for the costs of transferring their water right from the MVID to an existing or new well.

Comment
MVID-02-020-03

Your letter indicates that the MVID reorganization plan is independent of the Methow Basin Pilot plan and that the total cost of that plan is around $600,000.00. There might be some confusion in that the DOE has spent $600,000.00 on the MVID reorganization plan. Washington State Senator Bob Morton has estimated the DOE's expense on the Pilot Plan as being closer to $8,000,000.00. Whether the MVID reorganization plan is or is not part of the Methow Basin Plan, reducing the MVID water rights from 692 cfs to 17.6 cfs could only be viewed as a taking by the DOE.

Response: The Department of Ecology has contracted to spend a maximum of $552,404 on the MVID Water Supply Facility Plan, and subsequent detailed engineering plans and specifications. Approximately $180,000 has been spent to date. Various state agencies have expended funds in the Methow Basin, as part of the Methow Basin Pilot Plan. That Plan is separate from the MVID project under discussion here.

The state can fund water conservation projects under RCW 90.42. However, the law requires the state to obtain public benefits in return. One of the public benefits of this proposed project is an amount of conserved water. State law requires this conserved water to be deposited in the trust water rights program. (See, generally, RCW 90.42.)

Comment
MVID-02-021-01

The Environmental Protection Agency has reviewed the Methow Valley Irrigation District Project Preliminary Environmental Assessment (Pre-EA) in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. We appreciate your patience while we make every attempt to understand the various issues, perspectives, and environmental implications of this project.

Our environmental review staff and hydrogeologist have both reviewed the Pre-EA, the comments and letters sent by citizens and members of the Methow Valley Irrigation District (MVID), and have discussed the issues and information at length with representatives of federal and state agencies, Indian tribes, and consultants involved with this project. As a result, we have the following comments:

Response: Thank you for your review of the project and for commenting. Your specific comments are responded to individually in the responses to MVID-02-021-02 through 05.

Comment
8. WDOE has been consistent in what they've said from the beginning; that's good.

Response: Thank you for commenting.

Comment
19. When would decision occur?

46. When in the process are the exclusion requests submitted?

137. Want to know how it will be decided. Will water users that aren't members of MVID be able to continue to get water?

Response: BPA has determined, as documented in the Finding of No Significant Impact and EA, that an EIS is not required and that we would fund either Alternative A or C, depending upon the wishes of the MVID and WDOE. The next step will be for the MVID to accept petitions for exclusion from its members and make a final decision as to whether to go forward with Alternative A, as originally approved by the Board of Directors, or to disband the MVID, as described under Alternative C. This decision may take several months.

Please see the responses to comments MVID-02-006-09 and 120 (pages 57 and 86) regarding whether water users that aren't members of the MVID will be able to continue to get water.

Comment
20. Anxious to see canal issue resolved.

Response: Thank you for commenting. We know it has seemed like a long process, but we feel that it is important to make sure everyone understands the issues and that the alternatives are thoroughly explored before any decision is made.

Comment
47. If there is an objection, it will have to go to a vote of members.

84. Think someone should do a poll.

Response: Both a survey and an advisory vote have been taken of the MVID members on this project. In June of 1995, a survey was mailed to all members of the MVID. The results are published in Vol. II, Appendix C of the MVID Water Supply Facility Plan (MWG, 1996). In November 1995, all MVID members were sent a ballot measure and asked to vote on whether or

not the MVID board of directors should pursue the actions described in Alternative A. The results of the ballot, which had a return rate of 216 of 352 members, were as follows: 168 in favor, 48 against, and 3 undecided.

The MVID Board of Directors may also decide to take another vote of the membership before a final decision is made.

Comment

75. All politics and real estate jockeying.

Response: Thank you for commenting.

Comment

85. Doesn't want to push BPA out of the valley. We do want their help to protect the fish.

93. And again, I don't want to push BPA out.

Response: Thank you for commenting. BPA has a commitment to mitigate for fish where we can and where it is appropriate.

Comment

87. Concerned that the alternatives are so long term in their implication - a political decision of today has irreversible impact.

89. The decision is "a lot of decision" for the individual members [commenter has reservations about whether the district members know enough to make such a big decision].

Response: Thank you for commenting. We are trying to give people as much information as possible through this EA so that the best possible decision can be made for now and for the future.

VI. CANAL SYSTEM

Comment

MVID-02-006-10

Lastly, I can not in my wildest endeavors imagine that men using horses and wagons over 80 years ago were ingenious enough to construct the irrigation ditch and have it serve the public so well all these years- - - and that in 1997 with all our so-called "technical know-how" two United States Government agencies are unable to come up with a solution to fix it without destroying it and a way of life along with it.

Response: Thank you for commenting. The agencies have worked extensively with the MVID over the past several years to arrive at a mutually agreeable solution to the problems that have been identified. We believe that the EA presents a reasonable range of alternatives for addressing these problems.

Comment

MVID-02-008-09

Alternative B is very costly and may have significant problems in this area due to ground heaving which will cause the concrete lining to crack and disintegrate.

106. Concrete lining will heave during frost.

107. Much of the area is permeable, and wouldn't require a drainage system to prevent frost heave.

Response: One of the reasons that Alternative B is so costly is because it includes all proper site preparation work, including the installation of a drainage system below the concrete lining to provide protection against frost heave and other problems. Rebar would also be installed to prevent the concrete from cracking. With these provisions in the design, Alternative B should not have any intrinsic problems related to weather. The concrete lining proposed for this alternative would meet the standards for public projects of agencies such as the Bureau of Reclamation and WDOE. These standards are intended to ensure that the project has a useful lifespan that justifies the public investment.

Comment

MVID-02-012-02

I have concerns about the horrible condition of the existing canals.

1. Yesterday's canal/road failure due to original engineering problems - it was not engineered correctly when the wood flume was replaced.

10. It wastes a lot of water to take it 30 miles (15 per side).

27. Water was a month late this year - management problem.

114. Canal has not been maintained for 20-years.

117. Canal system as outdated as horses for transportation - not efficient.

141. Need to keep up ditches - maintenance has been neglected too long.

Response: Thank you for commenting. These are some of the reasons why the MVID, WDOE, and BPA are proposing changes to the MVID system.

Comment
42. Thinks pipe would be vulnerable to rock slide just like ditch.

Response: A properly designed and covered pipeline would be less vulnerable to rock slides and debris than the existing open canal. In very severe terrain, it is possible that the pipeline could be damaged by an unusual event. The system proposed in Alternative A avoids some of the most difficult terrain along the original canal routes, because the initial reaches between the diversions and the first irrigated lands would be abandoned.

Comment
108. The canal has a 50 ft. easement along length of canal (30' on down-hill side; 20' on uphill side).

Response: Thank you for commenting. The canal easements and rights-of-way vary, depending on location and underlying land ownership.

Comment
128. May have to rely on pumped system in long-term anyway.

132. Some water users that may leave MVID have domestic wells that can be rehabilitated to provide irrigation services. Some have current capacity with little or no improvements.

Response: Thank you for commenting. We agree. From speaking to people at the workshops last December, we believe that a majority of the MVID members who may leave the district already do have wells.

Comment
129. It's difficult to get adjacent landowners together to maintain shared facilities.

Response: We agree that this could be an issue if individuals cannot access groundwater on their property. However, the WDOE has committed to helping landowners form Local Improvement Districts (LIDs) in situations where they cannot access water on their own property and where the MVID does not anticipate being able to deliver water to them under the reorganized district. The LIDs would have agreements regarding operation and maintenance of the shared facilities.

Comment

130. On my property, have 6-inch pipe to deliver water from MVID canal; expensive and troublesome to maintain; concerned it may break down entirely.

Response: Thank you for commenting. We have noted your concern about the difficulty of maintaining pipelines. Alternative A proposes to install a pipeline that would have a lifespan of over 50 years. The maintenance history of similar pipeline installed under similar situations has shown it to be relatively trouble-free. The irrigation delivery system beyond the turnout at the canal is the responsibility of the individual landowner.

Comment

139. (The canal is) good for water (snowmelt) runoff; canal intercepts water and keeps it from washing out roads and fields.

Response: Although the canal has served as a drainage way and a barrier to flood flow, this is not its intended function and it does not replace the need for proper flood control measures by others. Flood control is not an identified responsibility of the MVID.

VII. MISCELLANEOUS

Comment

MVID-02-014-09

I think LIDs (local improvement districts) cause neighbors to hate each other.

Response: Thank you for commenting. The LIDs formed under this project will have operations and maintenance agreements, which should help to minimize disagreements among the members.

Comment

MVID-02-019-37

Concerned about restriction of information. This has been going on since *(2 names)* have become directors.

Response: Thank you for commenting. BPA has attempted to provide the MVID members full and accurate information through this environmental document and the public meetings and workshops we have held.

Comment
34. The MVID directors are costing us money. The proposal is driven by politics.

Response: Thank you for commenting.

Comment
51. John Monahan still has to follow up with *(2 names)* on split assignments to divide parcel.

Response: The permits have been drafted by John Monahan and are being reviewed by WDOE's permit management staff. These permits, called superceding permits, would split the existing water right into two equal parts for the separate parcels. Note that the water rights covered by these permits are not part of the MVID right, and this issue is separate from the proposed project.

Comment
64. Concern about maps display - want to make sure we know they are patrons of MVID and they anticipate needing a well.

Response: Thank you for commenting. The maps were corrected.

This page intentionally left blank.

APPENDIX I

DRAFT MITIGATION ACTION PLAN

APPENDIX I

DRAFT MITIGATION ACTION PLAN

1. Mitigation for Impacts on Wetlands

1A. Secure jurisdictional determination from U.S. Corps of Engineers (Corps) and Okanogan County concerning authority over areas of hydrophytic riparian vegetation resulting from seepage from irrigation canals.

Responsible Person(s)/Agency: N. Weintraub/BPA
Status: Determination requested from County on 2/29/97 and from Corps on 9/29/97.
Schedule: Determination completed by County on 3/5/97 and by Corps on 12/4/97.
Contingencies/Next Steps: None. Neither agency claimed jurisdiction.

1B. Survey areas/sites proposed for new construction or well-drilling for presence of wetlands to avoid construction in wetlands where practicable.

Responsible Person(s)/Agency: WDOE; N. Weintraub/(BPA)
Status: No action to date.
Schedule: Begin as soon as sites are identified.
Contingencies/Next Steps: Study alternative sites for facilities if proposed construction in wetlands is identified.

1C. If Alternative A or C is accepted and construction or well-drilling in wetlands can not be avoided through Task 1B, assure that aquatic resource permits are secured and commit to any mitigation required under that permitting process to mitigate impacts on wetlands.

Responsible Person(s)/Agency: WDOE; N. Weintraub/(BPA)
Status: No action to date.
Schedule: Begin following wetland determination.
Contingencies/Next Steps: None at this time.

1D. Assess proposed plans for MVID groundwater pumping to assure there are no projected impacts on wetlands. For those sites where groundwater pumping is projected to alter the hydrology of wetlands, groundwater/surface water monitoring should be commenced prior to the imitiation of pumping.

Responsible Person(s)/Agency: WDOE; N. Weintraub/(BPA)
Status: No action to date.
Schedule: As soon as well locations and amounts of water withdrawal are identified.
Contingencies/Next Steps: Study alternative sites for facilities and/or amounts or rates of groundwater withdrawal if proposed MVID groundwater pumping is projected to have adverse effects on wetlands.

1E. Assure that facilities to be constructed by local landowners, including new wells, undergo regulator processes by Federal and County agencies having jurisdiction over wetlands in order to assure wetlands protection.

Responsible Person(s)/Agency: WDOE; N. Weintraub/BPA
Status: No action to date.
Schedule: Proceed as new well locations are identified.
Contingencies/Next Steps: None at this time.

1F. Avoid disturbance of wetlands during construction and well-drilling activities whenever possible, and, if disturbance can not be avoided, minimize the area of disturbance to the extent practicable, and backfill excavated areas and restore land to its previous condition wherever possible.

Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: As design is completed through construction period.
Contingencies/Next Steps: See 1B above. If it is determined to proceed with construction or well-drilling within a wetland, design and follow site specific mitigation measures to minimize the area of disturbance and/or the impacts on the wetland. Include in contractor specifications or contract language.

1G. Ensure that the project will result in no net loss of wetlands using information from wetland delineation surveys at the facility sites and developing mitigation measures, if necessary, during final design.

Responsible Person(s)/Agency: WDOE; N. Weintraub/BPA
Status: No action to date.
Schedule: During final design.
Contingencies/Next Steps: If net loss of wetlands would occur, implement additional mitigation.

2. <u>Mitigation for Impacts on or related to Floodplains and Shorelines</u>

2A. Survey areas/sites proposed for new construction or well-drilling to determine if sites are in floodplains or shoreline areas to avoid construction in floodplains or shoreline areas where practicable. Do in conjunction with Task 1B when possible.

Responsible Person(s)/Agency: WDOE; N. Weintraub/BPA
Status: No action to date.
Schedule: As soon as sites are identified.
Contingencies/Next Steps: Study alternative sites for facilities if proposed construction in floodplains or shoreline areas is identified.

2B. Assure through contact with the Federal Emergency Management Agency (FEMA) and County authorities that any new construction or well-drilling meets applicable State, County and FEMA regulations pertinent to floodplains. Assure County floodplain development permits are obtained for facilities when appropriate. Design and construct facilities, if built in a floodplain, to withstand flooding.

Responsible Person(s)/Agency: WDOE; N. Weintraub/BPA
Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: None at this time.

2C. Monitor return of more natural and beneficial habitat and floodplain functions resulting from removal or upgrades of diversions, intakes, and fish screens.

Responsible Person(s)/Agency: WDOE; D. Byrnes/BPA
Status: No action to date.
Schedule: 1 and 5 years after work is complete.
Contingencies/Next Steps: Consider additional mitigation efforts if floodplain functions are disrupted as a result of project actions.

2D. Consult with appropriate State and local agencies to determine the best placement of structure(s) if they must be located within shoreline areas, to assure consistency with Okanogan County's Shoreline Master Plan.

Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: Study alternative sites if structure locations are not consistent with Master Plan

2E. Prepare a restoration and monitoring plan before floodplains and shoreline areas are disturbed. When construction or land disturbance occurs in floodplain and shoreline areas, assure that disturbed land is restored as closely as possible to pre-project contours and is replanted with appropriate native and local plants, according the restoration and monitoring plan.

Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: Include plan in construction specifications and monitor to ensure implementation.

2F. Design and implement erosion control measures within the 60 m. shoreline and floodplain areas. Check consistency with the Okanogan County Shoreline Master Plan and the draft Multi-Objective Methow River Corridor Plan.

Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: During design phase and construction.
Contingencies/Next Steps: Include erosion control measures in construction specifications and monitor to ensure implementation.

3. <u>Mitigation for Impacts on Vegetation, Wildlife and Wildlife Habitat, Endangered and Threatened Species</u>

3A. Complete any necessary Endangered Species Act consultation with the U.S. Fish And Wildlife Service (USFWS)and the National Marine Fisheries Service (NMFS) prior to approving funding for work on the proposed project.

Responsible Person(s)/Agency: N. Weintraub/BPA
Status: Biological assessments of impacts of the proposed project on steelhead and bull trout were submitted to USFWS and NMFS on 10/6/97.
Schedule: Reply received from USFWS on 10/29/97; reply received from NMFS on 12/19/97.
Contingencies/Next Steps: Conference with NMFS re: proposed listing of Spring chinook. Submit biological assessment and consult with USFWS when and if bull trout are listed under the Endangered Species Act before project completion. Consider additional mitigation and/or not funding project if unfavorable findings are made by USFWS and/or NMFS relative to impact on Spring chinook and/or Bull trout.

3B. If Alternative C is accepted, or if substantial changes are made to Alternative A, initiate review with the Northwest Power Planning Council for consistency with the Council's Columbia River Basin Fish and Wildlife Plan.

Responsible Person(s)/Agency: D. Byrnes/BPA
Status: No action to date.
Schedule: As soon as final plan is adopted by MVID.
Contingencies/Next Steps: If modifications to Alternative A or if Alternative C is found to be inconsistent with the Council's Plan, consider further modifications to Alternative A or modifications to Alternative C, as appropriate, to assure consistency with the Plan or consider implementing another Alternative.

3C. MVID members may elect to use their water rights to water vegetation providing wildlife habitat previously fed by canal seepage. Monitor whether such watering is being undertaken by MVID members and assess success in maintaining vegetation for wildlife habitat.
Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: 1 and 5 years after implementation.
Contingencies/Next Steps: Consider other means of mitigation if voluntary watering does not maintain desired vegetation.

3D. Monitor effects of rewatering of historic wetlands and wildlife habitat areas along the rivers resulting from removal of or reductions in diversions.

Responsible Person(s)/Agency: WDFW; D. Byrnes/BPA
Status: No action to date.
Schedule: 1 and 5 years after diversions are ended.
Contingencies/Next Steps: Consider additional mitigation efforts if net loss of wetlands occurs and expected rewatering of historic wetlands does not occur.

3E. Ensure conformance to Okanogan County mitigation measures to protect bald eagle and harlequin duck habitat areas from removal or reconstruction of diversion dams, intake structures, and fish screens.

Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: Monitor facility removal and/or construction activities to assure compliance with County mitigation measures.

3F. If Alternative A is selected, avoid impacts to bald eagle and harlequin duck habitat areas from construction of well fields, pump houses, and reservoirs if at all possible, and ensure conformance to Okanogan County mitigation measures if avoidance is not possible.

Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: Identify and avoid bald eagle and harlequin duck habitat areas when possible. Habitat identification should be done concurrent with Task 1B and 2A where feasible. If avoidance is not possible, monitor construction and/or drilling activities, and post construction and/or drilling activities to assure compliance with County mitigation measures.

3G. If Alternative A or C is accepted, monitor success of mitigation of adverse effects on riparian areas along the canal by passive restoration of riparian areas along the Methow and Twisp Rivers resulting from increased flows and restoration of a more natural hydrological regime.

Responsible Person(s)/Agency: WDFW; D. Byrnes/BPA
Status: No action to date.
Schedule: 1 and 5 years after implementation.
Contingencies/Next Steps: Consider additional mitigation if expected restoration does not occur.

3H. If Alternative A or C is accepted, assure weed control and revegetation activities related to grading and construction conform to the weed control programs and policies of the Okanogan County Noxious Weed Control Board to help prevent spread of noxious weeds.

Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: During design and construction phase.
Contingencies/Next Steps: Include any necessary measures in construction specifications and monitor implementation.

4. Mitigation for Impacts on Irrigation

4A. Assure commitment of Washington Department of Ecology to working with MVID members and patrons to ensure that all who are entitled will have adequate access to water for irrigation.

Responsible Person(s)/Agency: D. Byrnes/BPA
Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: Consider additional mitigation if entitled people are not able to obtain access to water..

5. Mitigation for Impacts on Cultural Resources

5A. Since the MVID canal system has been recommended as eligible for inclusion on the National Register of Historic Places, prepare and implement a Memorandum of Understanding (MOU) with the Washington State Historic Preservation Officer (SHPO) to prepare a Historic American Engineering Record (HAER) to mitigate for adverse impacts on the MVID canal system if Alternatives A or C are to be implemented. The MOU would also address cultural resources that might be found as a result of Task 5B also.

Responsible Person(s)/Agency: N. Weintraub/BPA
Status: SHPO has been consulted and contents of MOU have been discussed.
Schedule: Finalize MOU and complete HAER prior to construction.
Contingencies/Next Steps: MOU will contain contingency clauses..

5B. If Alternative A is selected, survey sites for new facilities, or areas that would be disturbed by construction, to insure that other cultural resources, including tribal traditional use areas are not adversely impacted.

Responsible Person(s)/Agency: N. Weintraub/BPA
Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: If cultural resources, including tribal traditional use areas, are discovered at a site through a cultural resource survey, consider construction of the facilities at another site. Alternatively, undertake appropriate site-specific cultural resource mitigation such as artifact recovery, documentation, etc. If sites potentially eligible for the National Register were found in the vicinity of any planned construction activity, efforts would be made to avoid affecting the sites, to the extent possible. If not possible, consultation with the SHPO and affected Tribes would be initiated. A Memorandum of Understanding would be drafted that would detail any additional testing that would be undertaken, and the treatment of any cultural materials that might be found, either during testing or construction. WDOE will review draft MOU.

5C. If Alternative A is selected, conduct consultation with affected Tribes if groundwater wells and associated facilities require small plots of land in or near traditional use areas, such as fishing sites and gathering areas for basket weaving.

Responsible Person(s)/Agency: N. Weintraub/BPA
Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: None at this time.

6. <u>Mitigation Related to Geologically Hazardous Areas</u>

6A. Contact Okanogan County to determine applicability of regulations pertaining to geological hazardous areas relative sections of the existing canal and proposed project activities and facilities which may be in erosion hazard and landslide hazard areas.

Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: During design phase.

Contingencies/Next Steps: Implement any applicable regulations during design and construction

7. Mitigation for Water Quality

7A. Review facility design plans to determine the applicability of storm water discharge permits for construction activities disturbing 2 or more hectares of land.

Responsible Person(s)/Agency: WDOE; N. Weintraub/BPA
Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: If applicable, notify EPA of use of Federal permit and comply with conditions.

7B. Review and secure permits through the U.S. Army Corps of Engineers Section 404 process as necessary prior to site development.

Responsible Person(s)/Agency: WDOE; N. Weintraub/BPA
Status: Preliminary determination has been completed.
Schedule: During design phase.
Contingencies/Next Steps: Design facilities to avoid wetlands where possible, based on Corps of Engineer's suggestions. Obtain permits as necessary and adhere to conditions.

7C. If Alternative A or C is accepted, ensure compliance to WDFW Hydraulic Project Approval and water quality permit issued by WDOE for construction activities, permits which will likely include an erosion control plan and a Spill Prevention, Containment, and Countermeasures Plan to minimize potential for impact on surface and ground water quality, and specify windows of time for in-stream work to protect fish.

Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: Include adherence to or implementation of conditions in construction specifications and monitor implementation.

8. Mitigation for Impacts on Public Lands

8A. Consult with the Washington Department of Fish and Wildlife (WDFW) and the U.S. Bureau of Land Management regarding necessary changes to easement agreements relative to crossing of the existing MVID canal of about 3.2 km of WDFW land, and 0.8 km of Federal land.

Responsible Person(s)/Agency: MVID Board of Directors

Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: Amend easement agreements as necessary.

9. Mitigation Relative to Wild and Scenic Rivers

9A. Coordinate construction work in the Twisp and Methow Rivers at the diversions and any other in-stream work with the appropriate public entities to preserve the values under which these rivers were determined to be eligible for inclusion in the Washington State Scenic Rivers Program, and, in the case of the Twisp River, its designation as a River of Statewide Significance and recommendation for inclusion in the National Wild and Scenic Rivers System.

Responsible Person(s)/Agency: WDOE; N. Weintraub/BPA
Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: Implement any required conditions.

10. Mitigation for Impacts on Air Quality

10A. Mitigate fugitive dust caused by construction activities by water sprinkling.

Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: During construction.
Contingencies/Next Steps: Include in construction specifications and monitor implementation.

11. Mitigation to Protect Fish and Fish Habitat (See also Task 7C.)

11A. If Alternative A or C is accepted, ensure that locations of any new wells are reviewed and approved by the WDOE and Okanogan County (under the Shorelines and Critical Areas Ordinance) to assure compliance with applicable environmental laws and regulations, thus protecting fisheries habitat. (Also see Tasks 1B and 2A.)

Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: If initial sites would not be in compliance, study and consider alternative sites.

12. Mitigation to Protect Soils

12A. If Alternatives A or C are accepted, best management practices, including use of sediment barriers (silt fences, straw bales, erosion control blankets) and similar measures would be used, as needed, to control erosion during and after construction.

Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: During construction.
Contingencies/Next Steps: Include language in construction specifications and monitor implementation.

13. Mitigation Relative to Public Safety

13A. If Alternative A is selected, consult with local fire districts concerning need to leave access to irrigation water for fire suppression.

Responsible Person(s)/Agency: WDOE
Status: No action to date.
Schedule: During design phase.
Contingencies/Next Steps: Include in design and construction specifications if fire districts justify need and it is reasonable to do so.

APPENDIX J

AGENCY CONSULTATION LETTERS

Bonneville Power Administration

PO Box 3621 Portland, Oregon 97208-3621

DOE/BP-3027 DECEMBER 1997 700