WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

A Case Study Evaluating A Change to the Surface Water Quality Standards from "Class-based" to "Use-based" within the Columbia Basin Project Area

October 1999
Publication No. 99-27
Printed on Recycled Paper

A Case Study Evaluating A Change to the Surface Water Quality Standards from "Class-based" to "Use-based" within the Columbia Basin Project Area

Prepared by:

Dewey Weaver
(360) 407-6443

Washington State Department of Ecology
Water Quality Program
PO Box 47696
Olympia, WA 98504-7696

October 1999
Publication No. 99-27
Printed on Recycled Paper

For additional copies of this document, contact:

Department of Ecology
Publications Distribution Center
PO Box 47600
Olympia, WA 98504-7600

Telephone: (360) 407-7472

Table of Contents

List of Figures

List of Tables

Acknowledgements

I would like to recognize the following individuals who provided assistance with this report:

Alison Beckett for her fine work on the maps

Mark Hicks, Kirk Cook, Steve Saunders, Jim Jacobson, Don Nichols, Bill Moore, Donna, Lynch, Poppy Carre, and Melodie Selby of the Department of Ecology's Water Quality Program for their internal review of the report.

Columbia Basin Irrigation District Managers Keith Franklin, Dick Erickson, and Shannon McDaniel and the Bureau of Reclamation's Ed Kemp for their efforts to help me understand their districts and the Columbia Basin Project and to the District Managers for their review of the external draft.

External reviewers, Marcia Lagerloef (EPA Region 10), Denise Baker (U.S. Fish and Wildlife), Rachel Thomas (National Marine Fisheries Service), and Tracy Lloyd and Jeff Korth of Washington Department of Fish and Wildlife, Ephrata Office.

Abstract

This study examines the effects of changing the organization of the surface water quality standards from the current "class-based" system to a "use based" system within the Columbia Basin Project.

Several shortcomings of the current class-based standards were identified. For water bodies within the Project there is inconsistent classification (essentially identical waters are classified differently), incorrect assignment of uses that do not exist for a water body, and incorrect assignment of uses and criteria that may be either unattainable or not protective of existing uses.

The use-based approach allows uses and criteria to be assigned based on their actual presence or attainability. This approach is more flexible than the current class-based system because existing and attainable uses and criteria assigned to a given water body may be blended from one or more of the existing classes, resulting in more accurate surface water quality standards.

1. Purpose and Scope of Case Study

The purpose of this case study is to examine the effects of changing the surface water quality standards (Chapter 173-201A Washington Administrative Code) from the current "class-based" system to a "use-based" system within the Columbia Basin Project (Project) area. Information contained in this report is intended to aid Ecology and other interested parties in deciding whether or not to implement a use-based standards approach statewide.

2. Description of Columbia Basin Project Area

General

The Columbia Basin Project is a multiple purpose development of greater than 4000 sq. miles - approximately 6% of the total land area of Washington State. The Project is generally bounded on the north by Banks Lake, on the west and south by the Columbia River, and on the east by a line drawn from Odessa southward to Kahlotus (Figure 1). The climate in the Project area is semiarid to arid with annual precipitation of about 6-10 inches. Irrigated and dryland agriculture, food processing, and livestock production are the chief economic activities.

Water

Prior to the beginning of Project construction in the 1930's, the area south of the Grand Coulee had only two natural stream courses, Crab and Rocky Ford Creeks. All other watercourses were dry except during storm runoff or snowmelt events (U.S. Bureau of Reclamation, 1976). Excluding streams and rivers, there were approximately 15,000 acres of surface waters in the Project area before project construction and approximately 133,000 acres of surface waters after construction. Similarly, before construction there were about 35 lakes within the Project area and now there are more than 140 lakes, ponds, and reservoirs (Embry and Block, 1995).

Before Project completion, ground water was generally about 150 to 500 feet below the surface, depending on elevation. Today the water table has been raised tens to hundreds of feet, creating or increasing base flow to many of the streams, drains, and wasteways throughout the project area (Williamson, Munn, et al., 1998).

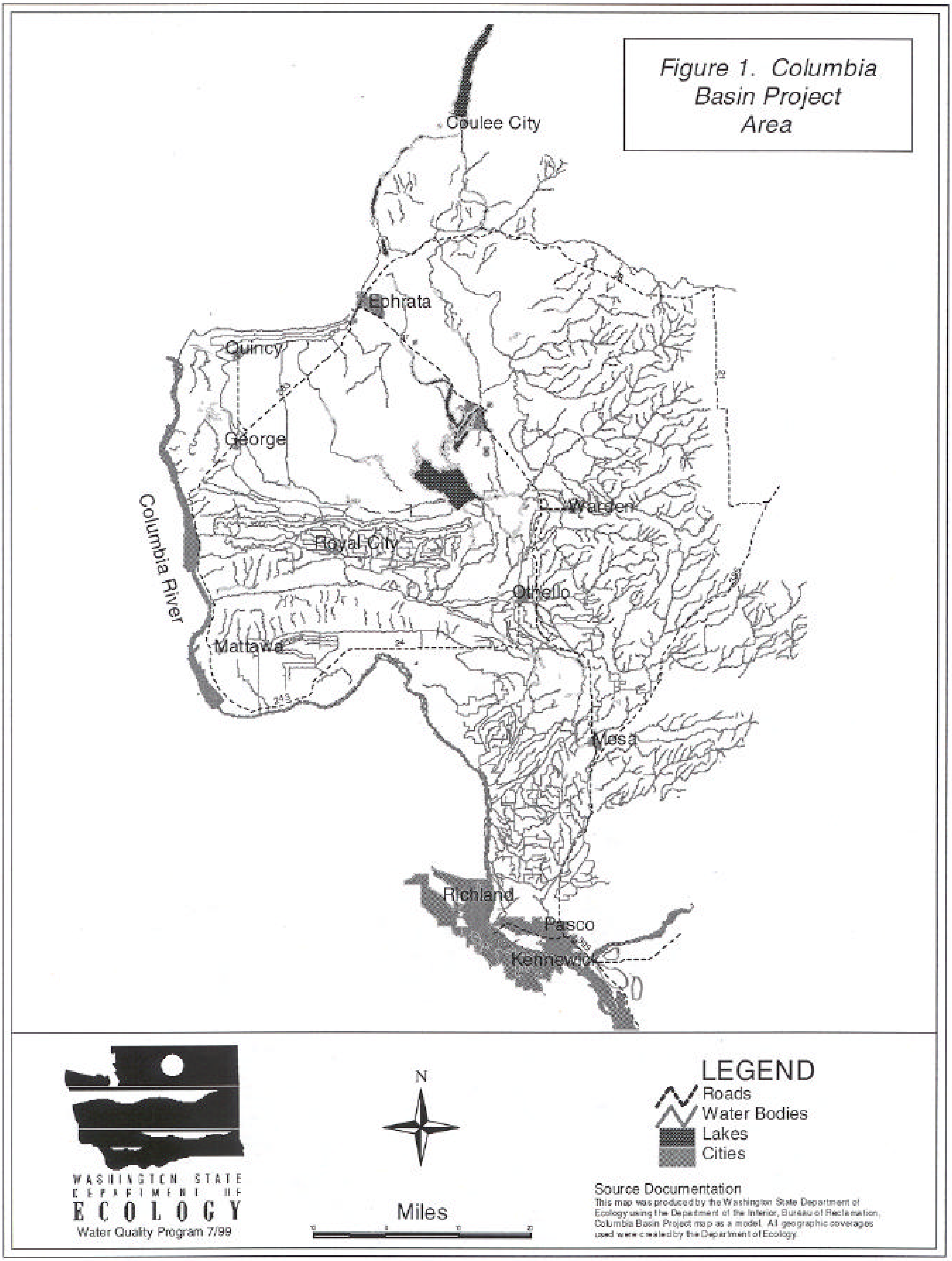

Figure 1. Columbia Basin Project Area

Wildlife and Fisheries

The irrigation project has both eliminated and improved wildlife habitat. Much of the native shrub-steppe habitat was eliminated by conversion to agriculture, or degraded by grazing. However, the increased volume of surface water improved the habitat value of some of the remaining shrub-steppe habitat, and greatly increased the acreage of wetlands and the populations of those species found in or near wetlands. Substantial land in the Project is managed for wildlife. About 53,400 acres are managed as National Wildlife Refuge land and more than 170,000 acres are owned or managed by the Washington Department of Wildlife (Embrey and Block, 1995).

Waterfowl use of the Columbia Basin has increased dramatically because of increased aquatic habitat and food supply from crop residues created by irrigation (Foster, et.al., 1984).

Twenty-eight game fish species and 13 non-game fish species are known to be present in the Project area. Four species of anadromous fish use reaches of the Columbia River both upstream and downstream of the Project area. Fall chinook salmon spawn in the Hanford Reach of the Columbia River. Occasionally, fall chinook inhabit the lower reaches of Crab Creek (Embrey and Block, 1995). The Bureau of Reclamation has documented salmon spawning in Red Rock Coulee near Royal City and in Sand Hollow Creek (Sand Hollow Wasteway, RB4C Wasteway) near Beverly. In addition, there are several unconfirmed reports of steelhead in Red Rock Coulee (Wenatchee World, 3-28-99).

Recreation

The increased amount of surface water - due to irrigation - greatly increased recreational use in the Project area compared with pre-irrigation levels. Fishing and hunting are the principal recreational activities in the Project area. Five state parks provide picnicking, swimming, boat launching, and camping facilities. Over 30 facilities on state or federal land provide access for fishing, hunting, boating, and birdwatching (Embrey and Block, 1995).

Irrigation Facilities

Project irrigation facilities were designed to deliver water to 1.1 million acres of irrigable land within the counties of Grant, Lincoln, Adams, Franklin, and Walla Walla (see Figure 2 from Embrey and Block, 1995). A significant portion of the Project along its eastern margin remains undeveloped. The irrigated acreage in 1996 totaled 622,053 acres. In the period of 1969 to 1996, the irrigated acreage in the Project increased from 480,600 to 622,053 acres. The average annual volume of water diverted from the Columbia River during the period of 1969 to 1996 is 2.4 million acre-feet or approximately 3% of the average annual river flow of 77 million acre feet as measured at Grand Coulee Dam (Montgomery Water Group, 1997).

Irrigation water is pumped from Franklin D. Roosevelt Lake behind Grand Coulee Dam into Banks Lake, an equalizing and storage reservoir. From Banks Lake the water flows generally southward through the Main Canal system which includes the Main Canal, the Bacon Siphon, the Bacon Tunnel, and Billy Clapp Lake. The Main Canal then continues southward to the bifurcation works where it divides to supply water to the West Canal and East Low Canal. These two canals are a major segment of the system, providing water to a large portion of the western and eastern areas of the Project. O'Sullivan Dam in the central part of the Project area creates Potholes Reservoir. The water source for this reservoir is irrigation return flows and natural runoff from a 4000 sq. mile watershed area supplemented as needed by water supplied from the Main Canal system. The Potholes Canal system runs southward from Potholes Reservoir to serve the southern part of the Project (U.S. Bureau of Reclamation, 1976). Project wide, there are 333 miles of main canals and 1993 miles of laterals (smaller branch canals) supplying irrigation water, and 3498 miles of drains and wasteways carrying return flow water from farms and irrigation system operations (U.S. Bureau of Reclamation, 1983).

Canals and laterals deliver irrigation water to farms and generally flow only during the irrigation season, from about mid-March to mid-October. Drains and wasteways carry water from farms. During the irrigation season, ground water increases and the upper soil strata become saturated. This ground water flows into a network of surface and buried drains. As a result, water flows in most drains year-round (Foster, et al., 1984).

Management of Project

After the construction of Grand Coulee Dam the Bureau of Reclamation had responsibility for the Columbia Basin Project until 1969 when the operation and maintenance responsibilities for a majority of the irrigation and drainage systems of the Project were transferred to three irrigation districts. These were the Quincy-Columbia Basin Irrigation District (Quincy District), the East-Columbia Basin Irrigation District (East District), and the South-Columbia Basin Irrigation District (South District).

The Bureau of Reclamation has retained control of certain "reserved works" which generally are facilities serving more than a single irrigation district. Reserved works include Grand Coulee facilities, Banks Lake, the Main Canal facilities including Billy Clapp Lake, the Potholes Reservoir, and the headworks to the West, East Low, and Potholes Canals (Montgomery Water Group, 1997).

Agricultural and Irrigation District Chemical Use

Insecticides, herbicides, fungicides (pesticides), and fertilizers are used throughout the Project area on farmland, in the irrigation system, and for mosquito control projects. In Grant County during 1982, approximately 1,100 tons of herbicides and 670 tons of insecticides were applied to farmland, and in general, herbicide application is about 10 lbs./acre and insecticide application is about 12 lbs./acre (Embry and Block, 1995). During 1987, in Grant County, approximately 28,000 tons of nitrogen and 8,400 tons of phosphorus were applied to agricultural land. Nitrogen was applied at about 30 lbs./acre and phosphorus at about 10 lbs./acre.

Herbicides are used on the canals, laterals, drains, and wasteways of the irrigation system to maintain flow velocity and capacity of the waterways. Commonly used herbicides include 2,4-D, copper sulfate, acrolein, and xylene. Application practices vary somewhat among the three irrigation districts. All districts typically apply 2,4-D to control terrestrial vegetation along canal and drain banks 1-2 times/year, during the growing season. All districts also apply copper sulfate to control filamentous green algae during the growing season. Copper sulfate may be applied every two weeks – generally to the

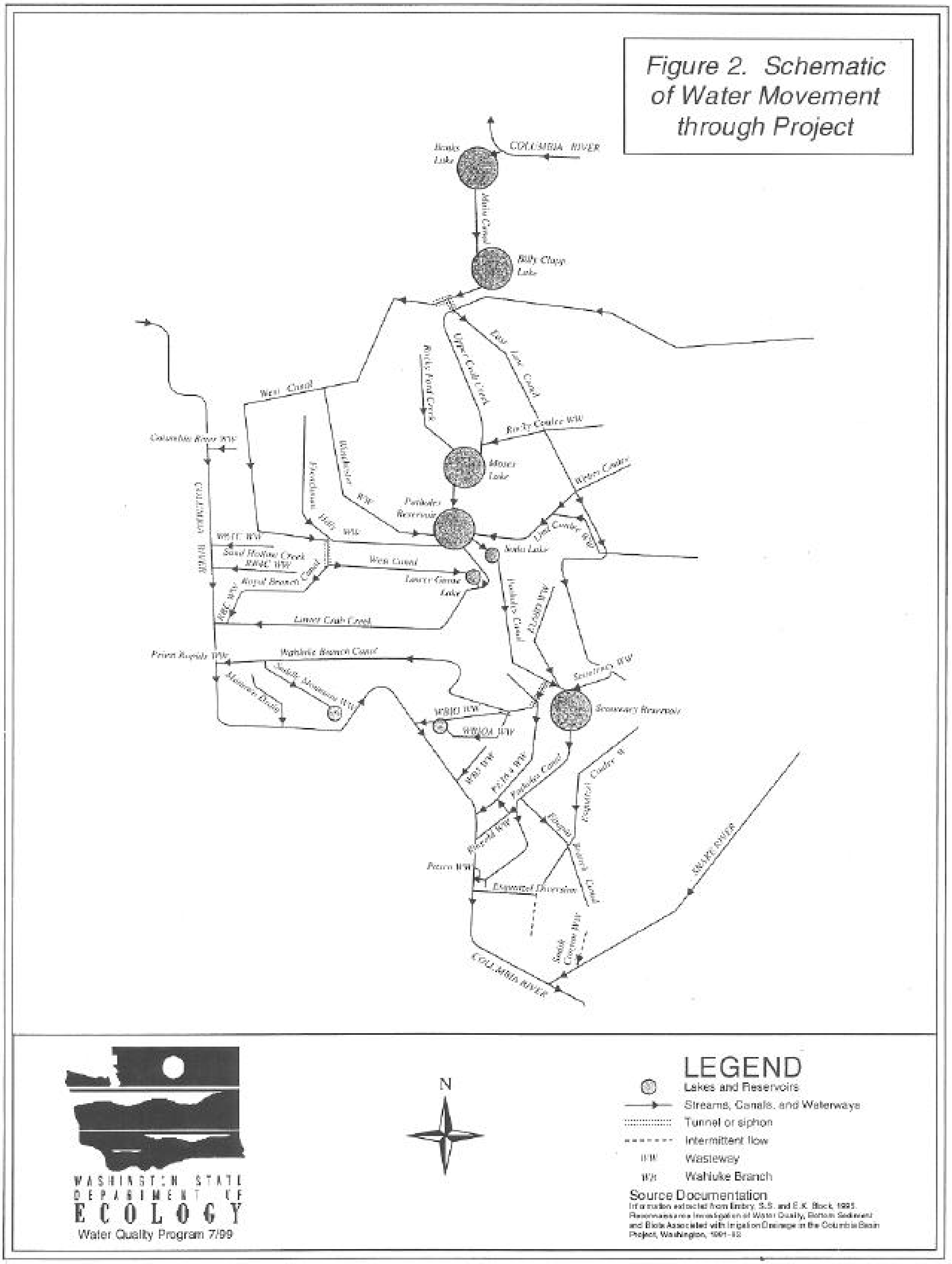

Figure 2. Schematic of Water Movement through Project

laterals. All districts use acrolein to control in-water vegetation. The Quincy District generally uses acrolein in faster moving water of canals, laterals, and drains and typically as often as 5 times/year. The East District presently uses acrolein only in laterals and not in the East Low Canal. The South District uses acrolein only in canals and laterals. In the Quincy and East Districts, xylene - used to control in-water vegetation - is typically applied to drains (often slower moving water) 1-2 times/year. As with acrolein, the South District uses xylene only in canals and laterals.

Salmonids Listed Under the Endangered Species Act in the Project Area
The waterways within the Project are not known to harbor significant numbers of salmonids from stocks listed under the Endangered Species Act, although there are reports of salmon and steelhead in three waterways (Crab Creek, Sand Hollow Creek [Sand Hollow Wasteway, RB4C Wasteway], and Red Rock Coulee) as described above. There are however, listed stocks of salmon and steelhead that spawn, rear, and migrate within the Columbia River and its tributaries adjacent to the Project area. These include upper Columbia River Spring chinook and steelhead listed as endangered, and Bull trout listed as threatened.

3. Current Class-Based vs. Potential Use-Based Approaches to Surface Water Quality Standards

Water quality standards define the water quality goals of a water body by designating the uses to be made of the water and by setting criteria necessary to protect those uses. States adopt water quality standards to protect public health or welfare, enhance the quality of water, and serve the purposes of the Clean Water Act. "Serve the purposes of the Clean Water Act" means that water quality standards should, wherever attainable, provide water quality for the protection and propagation of fish, shellfish, and wildlife and for recreation in and on the water and take into consideration their use and value of public water supplies, propagation of fish, shellfish, and wildlife, recreation in and on the water, and agricultural, industrial, and other purposes including navigation (40 CFR 131.2).

Current Class-Based Approach

The existing class-based organization of the state of Washington Surface Water Quality Standards (standards) assigns each water body in the state to one of five classes: Class AA, Class A, Class B, Class C (marine only), and Lake Class. In general, each of the classes represents a different level of protection for uses, ranging from most protective (Class AA) to least protective (Class B, for freshwater). Each class has a specific list of characteristic uses that must be protected and a specific list of water quality criteria that must be met to protect these uses. Uses may include wildlife habitat, recreation, agricultural water supply, etc. Criteria to protect these uses may include dissolved oxygen, temperature, turbidity, bacteria, toxicity, and others.

Potential Use-Based Approach

An alternative use-based organization of the standards eliminates the classes and instead provides for the assignment of individual, designated uses to each water body independently. These assigned or designated uses are intended to reflect actual existing and attainable uses for a given water body. Such uses could be any combination of the uses from one or more of the current classes or any other designated uses added to the surface water quality standards regulation by rulemaking. Specific criteria protecting each use are assigned as they are in a class-based system. Whether or not the criteria protecting a particular use change for different water bodies will depend on the form of use-based system adopted (if adopted at all).

Ecology's Reasons for Exploring the Use-Based Approach

Ecology is considering proposing the use-based approach in order to allow more flexibility when assigning uses to a water body. The current class-based system assigns all the same uses and essentially all the same criteria to all water bodies of the same class in the following hierarchy:

Water body ➞ Class ➞ Use ➞ Criteria

The current standards were organized into a class-based system in order to assign a set of default uses and attendant criteria to water bodies in lieu of determining actual uses and criteria. The statewide scope of the standards simply precluded the individual determination on the presence of specific uses in each water body (i.e. there were not enough resources available for Ecology to catalog uses and criteria for all of the state's surface waters). A significant problem with the existing class-based approach is that some of the default designated uses and criteria assigned by a class to specific water bodies do not reflect actual existing uses – they may be too stringent, not stringent enough, or the use may not exist at all. Nevertheless, all the criteria of a particular class must be met even though all of the uses of that class may not be present. The current standards have attempted to correct this problem in part by allowing certain water bodies to have "special condition" criteria that reflect actual conditions. For example, the default temperature criterion for Class A water bodies is less than or equal to 18 degrees C. The special condition temperature criterion for the Class A Columbia River from river mile 309 to river mile 397 is less than or equal to 20 degrees C. The current standards do not however, have "special condition" uses analogous to these "special condition" criteria.

The current class-based system also has narrative "General Characteristic" statements accompanying each class. The statements are meant to guide the assignment of a class to a water body. Class AA is most restrictive stating that "water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses." Class A is less restrictive requiring only that waters must "meet or exceed requirements for all or substantially all uses." Class B is least restrictive requiring that "water quality of this class shall meet or exceed the requirements for most uses." The statements allow, to varying degrees, some uses to not be attained. These statements are useful in a class-based organization because they add some needed flexibility to a system that assigns uses on a default basis rather than an actual basis. A use-based system could do away with these "general characteristic" statements altogether.

By comparison the alternative use-based system is simpler and more flexible. Uses and criteria can be assigned (designated) to water bodies on the basis of their existence and attainability alone. The hierarchy under a use-based scenario would be:

Water body ➞ Use ➞ Criteria

Consideration of the use-based approach is particularly relevant now because Ecology has adopted a watershed approach to water quality management. Under this approach, water quality within a given watershed is systematically managed according to a repeating, five-year schedule. During each five-year period, water quality investigations are planned and carried out and other water quality-related actions such as permit writing are completed. This management structure can more easily accommodate both the initial systematic cataloging of existing and attainable uses and criteria for water bodies within a watershed, and the subsequent modification of uses and criteria as necessary.

However, even with the watershed management approach in place the task of assigning proper uses and criteria to all of the state's water bodies is formidable. One likely implementation strategy starts with the dropping of all class designations but the retention of all uses and criteria currently listed in the standards for each water body. The assignment of actual existing and attainable uses and criteria ("cataloging") would follow as resources allow and necessity demands.

"Uses" in Federal Law and Regulation

Federal Regulation (40 CFR 131.2) distinguishes existing uses from designated uses. *Existing uses* are "those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards." EPA guidance further defines existing uses to include those uses that could occur if the water quality is suitable but do not exist at the time (EPA, 1985). *Designated uses* are "those uses specified in water quality standards for each water body or segment whether or not they are being attained."

Use designations in a state's water quality standards must be consistent with Sections 101(a)(2) and 303 (c)(2) of the Clean Water Act (CWA). Section 101(a)(2) is the "fishable/swimable" goal of the Act and states, "it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection of fish, shellfish, and wildlife and provides for recreation in and on the water…". Section 303(c)(2) requires each state, in the course of reviewing its standards, to submit revised or new standards to EPA and "such standards shall be such as to protect the public health or welfare, enhance the quality of water and serve the purposes of this Act. Such standards shall be established taking into consideration their use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and…navigation." This section also requires each state to adopt criteria for certain toxic pollutants that could interfere with designated uses.

Uses are considered attainable under 40 CFR 131.10(d) if they can be achieved, at a minimum, by the imposition of effluent limits (point sources) and cost-effective and reasonable best management practices (non-point sources).

When designating uses of a water body (and the appropriate criteria for those uses), the state must take into consideration the water quality standards of downstream waters and must "ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters" (40 CFR 131.10(b). This topic is discussed in more detail in "Protection of Downstream Uses" later in the case study.

States may remove a designated use that is *not* an existing use if the state can demonstrate that attaining the designated use is not feasible because, among other reasons (from 40 CFR 131.10):

1. Naturally occurring pollutant concentrations prevent the attainment of the use.

2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use.

3. Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than leave in place.

4. Dams, diversions, or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in attainment of the use.

5. Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality preclude attainment of aquatic life protection uses.

States *may not* remove designated uses if:

1. They are existing uses (unless a use requiring more stringent criteria is added).

2. Such uses will be attained by implementing effluent limits (point sources) or cost effective and reasonable best management practices (nonpoint sources).

Where a state's water quality standards specify designated uses and water quality criteria that are less stringent than those presently being attained in a water body, the state must revise its standards to ensure protection of the uses actually being attained.

Use Attainability Analysis

According to Federal regulation, a state must conduct a "use attainability analysis" (UAA) under certain circumstances. A UAA is defined in regulation as "a structured scientific assessment of the factors affecting the attainment of the use, which may include physical, chemical, biological, and economic factors." UAAs are meant to ensure the highest attainable use is designated for a water body. A UAA must be conducted when any of the following actions occur.

1. The state designates or has designated uses that do not include the "fishable and swimmable" uses in Section 101(a)(2) of the Clean Water Act. Fishable and swimmable uses in the Clean Water Act include the protection and propagation of fish, shellfish, wildlife, and recreation in and on the water.

   a. Current state standards specify fishable and swimmable uses as follows:

      - Salmonid migration, rearing, spawning, and harvesting
      - Other fish migration, rearing, spawning, and harvesting
      - Clam, oyster, and mussel rearing, spawning, and harvesting
      - Crustaceans and other shellfish rearing, spawning, and harvesting
      - Wildlife habitat
      - Recreation

   b. Uses that are <u>not</u> "fishable and swimmable" in the state standards include:

      - Water supply (domestic, industrial, agricultural)
      - Stock watering
      - Commerce and Navigation

2. The state wishes to remove a designated "fishable and swimmable" use that is specified in Section 101(a)(2) of the CWA).
3. The state wishes to adopt subcategories of "fishable and swimmable" uses specified in Section 101 (a)(2) that require less stringent criteria.

The state is otherwise not required to conduct a use attainability analysis whenever designating uses that include those specified in Section 101(a)(2) of the CWA.

Other "Use" Discussion Points

Federal regulation does not provide a precise definition of "use" (i.e., when or when not a use is attained). A use such as "agricultural water supply" may be obvious but other uses such as "salmonid migration, rearing, spawning, and harvesting" or "crustacean rearing" are often a matter of judgement. For example, does the presence of a single trout in waters that otherwise only support warm water fishes constitute a use? For waters of the state, the determination of "use" is left to the judgement of the state (Department of Ecology) as authorized by the Clean Water Act.

Federal regulation is also silent on the explicit procedures to be used in assigning use priorities for water bodies with two or more uses that are attainable and existing but still at odds. For example, an irrigation drain containing stocked trout and other unstocked fish may have several uses (e.g., agricultural water supply, salmonid rearing and harvesting, other fish rearing, spawning, migration, and recreation). When an irrigation district, in the course of applying a toxic herbicide to kill nuisance aquatic weeds, incidentally kills the stocked trout and other fish and aquatic life, one use is being protected at the expense of other uses. Federal regulations and the Clean Water Act provide no allowance for this to occur. Federal regulation does however, offer one implicit priority setting tool – the use attainability analysis (UAA). As described above, "fishable and swimmable" uses do not require the extra effort of a UAA in order to be designated as uses in standards (unlike water supply, stock watering, and other such uses). However, fishable and swimmable uses do require this extra effort to be removed as uses, again in contrast to water supply, stock watering, etc. Arguably this requirement implicitly establishes a higher value or priority for fishable and swimmable uses as described in the Clean Water Act.

Finally, Federal regulation is very clear about not designating waste assimilation as a use. 40 CFR 131.10 states "in no case shall a State adopt waste transport or waste assimilation as a designated use for any waters of the United States." Presumably, "waste assimilation or transport" includes wastewater discharges from industrial and municipal point sources as well as nonpoint sources.

Protection of Downstream Uses

40 CFR 131.10(b) requires the state to "take into consideration the water quality standards of downstream waters and ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters." For example, if new uses and criteria were designated to a particular water body, these uses and criteria must also assure that downstream uses and criteria are protected.

Within the Project, this requirement is especially important where uses change significantly between adjoining water bodies. This is not a problem when, for example, under the current class-based standards both Frenchman Hills Wasteway (Class AA) and Potholes Reservoir (Lake Class) require protection for primary contact recreation, e.g., swimming. The fecal coliform criteria supporting *primary* contact recreation is the same for Class AA and Lake Class, i.e., "not to exceed a geometric mean value of 50 colonies/100 mL and not have more than 10 percent of all sample obtained for calculating the geometric mean value exceeding 100 colonies/100 mL." However, there is a potential problem when assigned uses (and their attendant criteria) change under a use-based standards approach. Under this approach, the Frenchman Hills Wasteway would likely be downgraded to a secondary contact recreation use because this is the existing and arguably attainable use and the Pothole's Reservoir would keep its primary contact designation. The fecal coliform criteria supporting *secondary* contact recreation may be found in the current Class B standards as levels "not to exceed a geometric mean value of 200 colonies/100 mL, and not more than 10 percent of all samples obtained for calculating the geometric mean value exceeding 400 colonies/100 mL." Current guidance from the standards (WAC 173-201A-060) requires that "at the boundary between waters of different classifications, the water quality criteria for the higher classification shall prevail." This requirement effectively drives the existing and attainable secondary contact recreation use and criteria of Frenchman Hills Wasteway (at least near the boundary area) upward to the higher primary contact recreation use and criteria of Potholes Reservoir.

Another example may be found where drains and wasteways of the Project flow into the various reservoirs within the Project or the Columbia River. A herbicide applied to drains flowing to one of these larger water bodies could potentially threaten salmon, other fish, and other aquatic species found in those downstream water bodies. In effect, downstream uses such as domestic water supply, salmonid and other fish migration/rearing/spawning/harvesting, wildlife habitat, and recreation could be threatened. The current standards require that "toxic substances shall not be introduced above natural background levels in waters of the state which have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic toxicity to the most sensitive biota dependent upon those waters, or adversely affect public health, as determined by the Department" (WAC 173-201A-040).

Clearly, the application of a herbicide to an irrigation drain will have adverse effects on some of the uses of that drain. However, these effects may be accommodated by the standards as "short term-modifications." The standards allow "short-term modifications" for specific water bodies on a short-term basis when necessary to accommodate essential activities, respond to emergencies, or to otherwise protect the public interest. For this example of applying herbicides to irrigation canals and drains, the guidance provided by the water quality standards and federal regulation suggest that downstream uses in reservoirs, the Columbia River, and those portions of canals and drains downstream of the treatment area must be protected, notwithstanding a short-term modification for the treatment area.

It is noteworthy to mention two procedural changes that the South-Columbia Basin Irrigation District has implemented in recent years to help protect downstream uses. First, they have reduced their use of the toxic in-water herbicide xylene. Current maximum usage is approximately 400 gallons/year compared with previous yearly usage totals of 7,000-8,000 gallons/year. Second, they treat only canals with the in-water herbicides acrolein and xylene. In-water weed growth in the drains and wasteways of this district are controlled mechanically.

In addition, the East-Columbia Basin Irrigation District is experimenting with grass carp for aquatic weed control. This is a cooperative effort with technical support from South-

Columbia Basin and US Bureau of Reclamation agronomists and partial funding from the US Bureau of Reclamation. Currently the grass carp are being used in one lateral system and one drain system with plans to introduce them into another drain system in late 1999 or 2000.

4. Current Class-based Uses and Criteria for the Whole Columbia Basin Project

Classes, Uses, and Criteria in Current Water Quality Standards

Tables 4 –1 - 4 -3 describe the uses and criteria for the various freshwater classes in the current standards. **Bolded** text in the Class A and B tables highlight differences from the uses and criteria found in the Class AA table. As noted earlier, once a water body is assigned to a particular class, all the uses of that class must be protected and all the criteria protecting these uses must be met.

Table 4-1. Class AA Uses and Criteria - Extraordinary. Water quality of this class shall markedly and uniformly exceed the requirements of all or substantially all uses.

Uses	Freshwater Criteria
Water supply (domestic, industrial, agricultural) Stock watering Salmonid migration, rearing, spawning, and harvesting Other fish migration, rearing, spawning, and harvesting Freshwater clam and mussel rearing, spawning, and harvesting Crustaceans and other shellfish rearing, spawning, and harvesting Wildlife habitat Recreation (primary contact recreation, sport fishing, boating, aesthetic enjoyment) Commerce and navigation	Fecal coliform organism levels shall both not exceed a geometric mean of 50 colonies/100 ml and not have more than 10% of all samples obtained for calculating the geometric mean value exceeding 100 colonies/ml. Dissolved oxygen shall exceed 9.5 mg/L. Total dissolved gas shall not exceed 110% of saturation at any point of sample collection. Temperature shall not exceed 16.0 degrees C due to human activities. When natural conditions exceed 16.0 degrees C, no temperature increases will be allowed which will raise the receiving water temperature greater than 0.3 degrees C. Incremental temperature increases resulting from point source activities shall not, at any time, exceed t=23/(T+5). Incremental temperature increases resulting from nonpoint source activities shall not exceed 2.8 degrees C. ("t" represents the maximum permissible temperature increase measured at a mixing zone boundary; and "T" represents the background temperature as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge.) pH shall be within the range of 6.5 to 8.5 with a human-caused variation with the above range of less than 0.2 units. Turbidity shall not exceed 5 NTU over the background turbidity when the background turbidity is 50 NTU or less, or have more than a 10% increase in turbidity when the background turbidity is more than 50 NTU. Toxic, radioactive, or deleterious material concentrations shall be below those which have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic conditions to the most sensitive biota dependent upon those waters, or adversely affect public health, as determined by the department. Aesthetic values shall not be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste.

Table 4-2. Class A Uses and Criteria - Excellent. Water quality of this class shall meet or exceed the requirements of all or substantially all uses.

Uses	Freshwater Criteria
Water supply (domestic, industrial, agricultural) Stock watering Salmonid migration, rearing, spawning, and harvesting Other fish migration, rearing, spawning, and harvesting Freshwater clam and mussel rearing, spawning, and harvesting Crustaceans and other shellfish rearing, spawning, and harvesting Wildlife habitat Recreation (primary contact recreation, sport fishing, boating, aesthetic enjoyment) Commerce and navigation	Fecal coliform organism levels shall both not exceed a geometric mean of **100** colonies/100 ml and not have more than 10% of all samples obtained for calculating the geometric mean value exceeding **200** colonies/ml. Dissolved oxygen shall exceed **8.0** mg/L. Total dissolved gas shall not exceed 110% of saturation at any point of sample collection. Temperature shall not exceed **18.0** degrees C due to human activities. When natural conditions exceed **18.0** degrees C, no temperature increases will be allowed which will raise the receiving water temperature greater than 0.3 degrees C. Incremental temperature increases resulting from point source activities shall not, at any time, exceed t=**28/(T+7)**. Incremental temperature increases resulting from nonpoint source activities shall not exceed 2.8 degrees C. ("t" represents the maximum permissible temperature increase measured at a mixing zone boundary; and "T" represents the background temperature as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge.) pH shall be within the range of 6.5 to 8.5 with a human-caused variation with the above range of less than **0.5** units. Turbidity shall not exceed 5 NTU over the background turbidity when the background turbidity is 50 NTU or less, or have more than a 10% increase in turbidity when the background turbidity is more than 50 NTU. Toxic, radioactive, or deleterious material concentrations shall be below those which have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic conditions to the most sensitive biota dependent upon those waters, or adversely affect public health, as determined by the department. Aesthetic values shall not be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste.

Table 4-3. Class B Uses and Criteria - Good. Water quality of this class shall meet or exceed the requirements for most uses.

Uses	Freshwater Criteria
Water supply (industrial and agricultural [**not domestic**]) Stock watering Salmonid migration, rearing, and harvesting (**not spawning**) Other fish migration, rearing, spawning, and harvesting Freshwater clam and mussel rearing and spawning (**not harvesting**) Crustaceans and other shellfish rearing, spawning, and harvesting Wildlife habitat Recreation **(secondary [not primary]** contact recreation, sport fishing, boating, aesthetic enjoyment) Commerce and navigation	Fecal coliform organism levels shall both not exceed a geometric mean of **200** colonies/100 ml and not have more than 10% of all samples obtained for calculating the geometric mean value exceeding **400** colonies/ml. Dissolved oxygen shall exceed **6.5** mg/L. Total dissolved gas shall not exceed 110% of saturation at any point of sample collection. Temperature shall not exceed **21.0** degrees C due to human activities. When natural conditions exceed **21.0** degrees C, no temperature increases will be allowed which will raise the receiving water temperature greater than 0.3 degrees C. Incremental temperature increases resulting from point source activities shall not, at any time, exceed t=**34/(T+9)**. Incremental temperature increases resulting from nonpoint source activities shall not exceed 2.8 degrees C. ("t" represents the maximum permissible temperature increase measured at a mixing zone boundary; and "T" represents the background temperature as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge.) pH shall be within the range of 6.5 to 8.5 with a human-caused variation with the above range of less than **0.5** units. Turbidity shall not exceed **10** NTU over the background turbidity when the background turbidity is 50 NTU or less, or have more than a **20**% increase in turbidity when the background turbidity is more than 50 NTU. Toxic, radioactive, or deleterious material concentrations shall be below those which have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic conditions to the most sensitive biota dependent upon those waters, or adversely affect public health, as determined by the department. **Aesthetic values shall not be reduced by dissolved, suspended, floating, or submerged matter not attributed to natural causes, so as to affect water use or taint the flesh of edible species.**

Table 4-4. Lake Class Uses and Criteria - Water quality of this class shall meet or exceed the requirements of all or substantially all uses.

Uses	Criteria
Water supply (domestic, industrial, agricultural) Stock watering Salmonid migration, rearing, spawning, and harvesting Other fish migration, rearing, spawning, and harvesting Clam and mussel rearing, spawning, and harvesting Crayfish rearing, spawning, and harvesting Wildlife habitat Recreation (primary contact recreation, sport fishing, boating, aesthetic enjoyment) Commerce and navigation	Fecal coliform organism levels shall both not exceed a geometric mean of 50 colonies/100 ml and not have more than 10% of all samples obtained for calculating the geometric mean value exceeding 100 colonies/ml. Dissolved oxygen – no measurable decrease from natural conditions. Total dissolved gas shall not exceed 110% of saturation at any point of sample collection. Temperature – no measurable change from natural conditions. pH – no measurable change from natural conditions. Turbidity shall not exceed 5 NTU over the background conditions. Toxic, radioactive, or deleterious material concentrations shall be below those which have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic conditions to the most sensitive biota dependent upon those waters, or adversely affect public health, as determined by the department. Aesthetic values shall not be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste.

Current Specific Class Designations for Project Waters

The standards list specific classifications for many of the state's fresh surface waters in WAC 173-201A-130. The following waters within the Project area are so classified in the current standards:

Table 4-5. Specific Classifications

Water Body	Class
Crab Creek and tributaries	Class B
Columbia River from WA-OR border (river mile 309.3) to Grand Coulee Dam (river mile 596.6). Special condition from WA-OR border (river mile 309.3) to Priest Rapids Dam (river mile 397.1). Temperature shall not exceed 20 degrees C due to human activities. When natural conditions exceed 20.0 degrees C no temperature increase will be allowed which will raise the receiving water temperature by >0.3 degrees C nor shall such temperature increases, at any time, exceed $t=34/(T+9)$. Also a special condition related to dissolved gas and fish passage.	Class A
Snake River from mouth to WA-OR-Idaho border (river mile 176.1). Special condition below Clearwater River (river mile 139.3). As with Columbia River above.	Class A

Current General Class Designations for Project Waters

The standards also describe, in WAC 173-201A-120, the following general classifications:

1. All surface waters lying within national parks, national forests, and/or wilderness areas are classified as Class AA or Lake Class.

2. All lakes and their feeder streams within the state are classified Lake Class and Class AA respectively, except for those feeder streams specifically classified otherwise.

3. All reservoirs with a mean detention time of greater than 15 days are classified Lake Class.

4. All reservoirs with a mean detention time of 15 days or less are classified the same as the river section in which they are located.

5. All reservoirs that are established on preexisting lakes are classified as Lake Class.

6. All unclassified surface waters that are tributaries to Class AA waters are classified as Class AA. All other unclassified surface waters within the State are hereby classified Class A.

The following major irrigation <u>supply</u> waters within the Project are assigned a class in the current standards according to the general classifications listed above.

Table 4-6. Class Designations of Irrigation Supply Waters

Water Body	Controlling Authority	Class
Feeder Canal (Columbia River to Banks Lake)	Bureau of Reclamation (BoR)	AA
Banks Lake	BoR	Lake
Main Canal	BoR	AA
Billy Clapp Lake	BoR	Lake
Main Canal Bifurcation Works	BoR	AA
West Canal from Bifurcation to Lower Goose Lake	Quincy-Col. Basin Irrigation District (Q)	AA
Royal Branch Canal	Q	B
Lower Goose Lake	Q	Lake
East Low Canal from Bifurcation to end near Scooteney Reservoir	East-Col. Basin Irrigation District (E)	AA
Rocky Ford Creek	Natural	AA
Moses Lake	Natural	Lake
Potholes Reservoir	BoR	Lake
Potholes Canal from Potholes Reservoir to Soda Lake	BoR	AA
Soda Lake	BoR	Lake
Potholes Canal from Soda Lake to Scooteney Reservoir	South-Col. Basin Irrigation District (S)	AA
Wahluke Branch Canal	S	A
Scooteney Reservoir	S	Lake
Potholes Canal from Scooteney Reservoir to end	S	A
Eltopia Branch Canal	S	AA

The following major irrigation return flow water bodies within the Project are assigned a class in the current standards according to the general classifications listed above.

Table 4-7. Class Designations of Irrigation Return Flow Waters

Water Body	Controlling Authority	Class
Winchester Wasteway	Q	AA
W645 Drain	Q	AA
Frenchman Hills Wasteway	Q	AA
Columbia River WW	Q	A
W61C Wasteway	Q	A
Sand Hollow Creek (Sand Hollow WW, RB4C WW)	Q	A
Royal Branch Canal Wasteway	Q	B
Lower Crab Creek	Q	B
Rocky Coulee Wasteway	E	B
Weber Wasteway	E	AA
Lind Coulee Wasteway	E	AA
EL68D Wasteway	E	AA
Scooteney Wasteway	E	AA
Esquatzel Coulee Wasteway	S	A
Esquatzel Diversion	S	A
Smith Canyon Wasteway (to Snake River)	S	A
38.9 B5 Wasteway Pond	S	A
Eltopia Branch Wasteway 2 Pond	S	Lake
Pasco Wasteway	S	A
Ringold Wasteway	S	A
PE16.4 Wasteway	S	A
Wahluke Branch 5 Wasteway	S	A
Wahluke Branch 10A Wasteway	S	A
Wahluke Branch 10 Wasteway	S	A
Wahluke Branch 10 Wasteway Lake	S	A
Saddle Mountain Wasteway	S	AA
Saddle Mountain Lake	S	Lake
Mattawa Drain	S	A
Priest Rapids Wasteway	S	A

Considerations for Lakes and Reservoirs within the Project

For this case study, lakes and reservoirs within the Project are classified according to the definitions in the water quality standards. Determining whether or not a water body is classified as Lake Class is significant because, under the general classifications of the standards, feeder streams to lakes are classified as Class AA unless specifically classified otherwise. Similarly, all unclassified surface waters that are tributaries to Class AA waters are classified Class AA. Reservoirs with a mean detention time of 15 days or less are classified the same as the river section in which they are located. Reservoirs with a mean detention time of greater than 15 days are classified Lake Class. "Mean detention time" is defined in the standards as the time obtained by dividing a reservoir's mean annual minimum total storage by the thirty-day ten-year low-flow from the reservoir. Because of the intermittent nature of irrigation supply flows i.e., approximately seven months on and five months off, the "thirty-day ten-year low-flow" is zero for some waters within the Project. When zero flow is entered as the denominator in the formula, "Detention Time = Volume/Flow," the detention time approaches infinity and is therefore greater than 15 days. On this basis, reservoirs within the Project that are dependent solely on irrigation flows and have no outflow during the non-irrigation season are classified as lakes. These include Banks Lake, Billy Clapp Lake, Scooteney Reservoir, Saddle Mt. Wasteway Lake, and the Eltopia Branch Wasteway 2 Ponds that flow into the Smith Canyon Wasteway.

Potholes Reservoir is fed by irrigation return flow year-round. Its detention time during the irrigation season is approximately 66 days (511,700 acre ft./ 7,734 acre ft./day). Flows during the non-irrigation season are much less and the storage volume is approximately the same, therefore the detention time is some undetermined figure greater than 66 days. Because 66 days > 15 days Potholes Reservoir is classified as a lake.

Two smaller reservoirs within the Project receive irrigation return flows year-round - Wahluke Branch 10 Wasteway Lake, and 38.9 B5 Wasteway Pond. Wahluke Branch 10 Wasteway Lake has an estimated volume of 500 acre ft. and a non-irrigation season flow of approximately 60 acre ft./day yielding a detention time of approximately 8 days. Therefore this reservoir is not lake class and is classified as a Class A tributary to the Class A Columbia River. The 38.9 B5 Wasteway Pond has an estimated volume of 75 acre ft. with a non-irrigation season flow of approximately 30 acre ft./day, yielding a detention time of approximately 2.5 days. Therefore this reservoir is not classified as a lake but, from the standards "the same as the river section in which it is located," Class A.

Moses Lake, Soda Lake, and Lower Goose Lake are classified as lakes based on the general classification in the standards that states "all reservoirs established on preexisting lakes are classified as Lake Class."

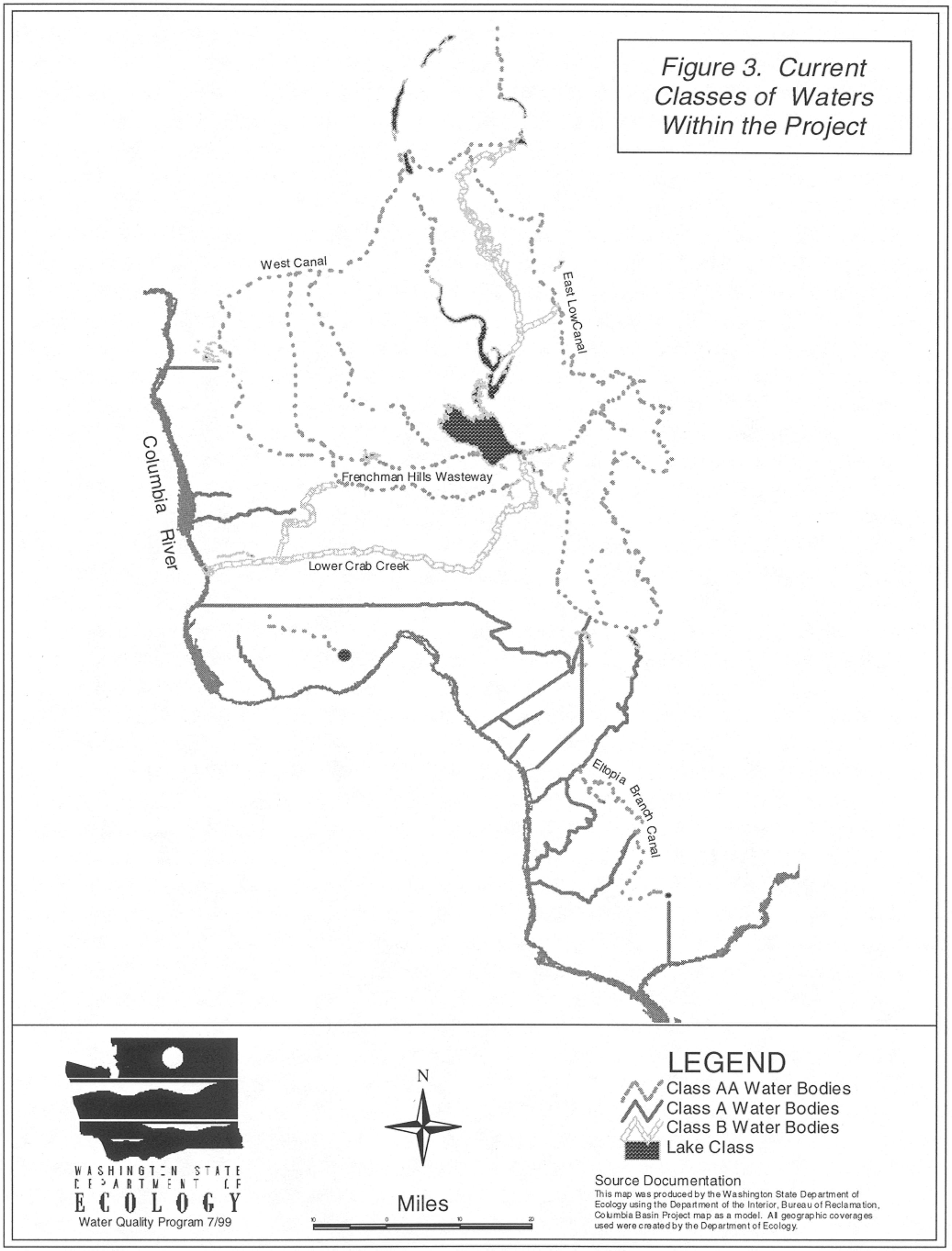

Figure 3. Current Classes of Waters Within the Project

303(d) Listed Water Bodies Associated with the Project

Section 303(d) of the Clean Water Act requires Washington State to identify and list, every two years, the lakes, rivers, and marine waters that are impaired i.e. do not meet water quality standards. This is called the "303(d) List" and it is used by the state to set environmental priorities for action and to chart water quality trends.

In many surface waters, standard technology-based pollution controls are not sufficient to meet water quality standards. In these cases, the federal Clean Water Act requires states to establish further limits on the amount of pollutants that can enter the water to meet water quality standards. These limits are known as "Total Maximum Daily Loads" (TMDLs). TMDLs are used to control the discharge of pollutants to surface waters at a level necessary to protect the beneficial uses of the receiving waters. The TMDL development effort may include further water quality monitoring, analysis of the response of the water body to different levels of pollutants, analysis of various alternative pollution control strategies, and involvement of affected individuals or organizations in the selection and implementation of controls.

Within the Project area there are a number of water bodies on the latest, 1998, 303(d) list. Table 4-8, below, and Figure 4 summarize these water bodies and the listed parameters by irrigation district. Most listed water bodies within the Project are listed for the parameters of temperature, dissolved oxygen, and pH. Some water bodies are also listed for the presence of toxic substances. These include: Crab Creek (PCB-1254, PCB-1260, and 4,4'-DDE in edible fish tissue), and Potholes Reservoir (Dieldrin in edible fish tissue from largemouth bass near Lind Coulee and Dieldrin in edible fish tissue from lake whitefish collected near mouth of Frenchman Hills Wasteway).

Table 4-8. 303(d) listed Water Bodies and Parameters within the Columbia Basin Project Area

Water Body	Description	Controlling Authority	Parameter(s)
Crab Creek	3 segments, below Potholes Res.	Natural	Temp., pH, PCB-1254, PCB-1260, 4,4' DDE
Rocky Ford Creek	2 segments	Natural	Temp., Dissolved Oxygen
Crab Creek Lateral	2 segments, below Potholes Res.	Quincy	Temp.
Frenchman Hills Wasteway	1 segment	Quincy	Temp., pH
Red Rock Coulee	1 segment	Quincy	Temp., pH, Dissolved Oxygen
Sand Hollow Creek (Sand Hollow WW, RB4C WW)	1 segment	Quincy	Temp., pH
W645W Wasteway	1 segment	Quincy	Temp., Dissolved Oxygen
West Canal	1 segment	Quincy	Temp.
Winchester Wasteway	1 segment	Quincy	Temp., pH
Potholes Canal	1 segment, @ USBR station CBP010	South	Temp., Dissolved Oxygen
Scooteney Wasteway	1 segment	East	Temp., pH, Dissolved Oxygen
Lind Coulee	1 segment	East	Temp., pH, Dissolved Oxygen
Eltopia Branch Canal	1 segment	South	Temp.
Esquatzel Coulee	4 segments	South	Temp., pH, Dissolved Oxygen

Mattawa Wasteway	1 segment	South	Temp.
Mattawa Drain	1 segment	South	Temp.
PE 16.4 Wasteway	1 segment	South	Temp.
WB 5 Wasteway #1	1 segment	South	Temp.
Potholes Canal	1 segment	South	Temp., Dissolved Oxygen
Main Canal	1 segment	BoR	Temp., Dissolved Oxygen
Potholes Reservoir	NA	BoR	Dieldrin

In addition, numerous segments of the Columbia River in the area of the Project are listed for a wide variety of parameters. These parameters include: total dissolved gas, temperature, pH, fecal coliform, toxicity demonstrated by sediment bioassays and water column bioassay, arsenic, Dieldrin, PCB-1248, PCB-1254, PCB-1260, and 4,4'-DDE. Similarly, segments of the lower Snake River are listed for total dissolved gas, dissolved oxygen, and temperature.

The anti-degradation policy in the current standards (WAC 173-201A-070) addresses the discharge to an impaired water body as follows: "Existing beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurious to existing beneficial uses shall be allowed." In effect, if a segment of the Columbia River is listed as impaired for a parameter (e.g. temperature, fecal coliform, etc.), then any discharge (including irrigation return flows) which would further lower the quality of that water body segment for that parameter is not allowed.

A Discussion of Temperature, pH, and Dissolved Oxygen Criteria as Applied to Project Waters

Within the Project area, temperature, pH, and dissolved oxygen criteria are the most commonly violated parameters on the current 303(d) list. Each is discussed below in more detail.

Temperature

High water temperatures (>16° C for Class AA, >18° C for Class A, and > 21° C for Class B) generally do not affect uses such as agricultural water supply or stock watering. However, high temperatures can adversely affect other uses such as salmonid or other fish migration, rearing, and spawning. Standards temperature criteria are commonly exceeded in water bodies within the Project and in the adjacent Columbia and Snake Rivers as described in Table 4-8. The likelihood of recording an exceedance of the temperature criteria is dependent on three factors: 1) the actual temperature, 2) the existence of monitoring data, and 3) the class and criteria of the water body i.e., the criteria increases as the class designation changes from Class AA to Class B. In a recent draft report investigating the W645 drainage system south of Quincy, monthly temperature data since 1994 on a tributary drain DW 237 exceeded the Class AA, A, and B criteria on about 30%, 21%, and 4% of the sampling dates, respectively (Montgomery Watson, 1999). Further downstream, in the Frenchman Hills Wasteway before it enters the Potholes Reservoir, a number of temperature excursions were recorded between 1990 and 1995 causing it to be listed on the 1998 303(d) list as well.

The temperature criterion for the Columbia River upstream of Grand Coulee Dam (the main source of Project irrigation water) is commonly exceeded causing it to be listed on the 1998 303(d) list as well. Among others, there were six excursions beyond the criterion (AA) value of 16° C out of 36 samples (17%) between 9/91 and 9/96 at Ecology ambient monitoring station 61A070 at Northport, near the Canadian border. The dams likely exacerbate these temperature excursions. According to a draft EPA report *"Columbia River Temperature Assessment: Simulation Methods"* (Yearsley, 1999), "the likelihood that both duration and magnitude with which water temperatures exceed the benchmark (20 C) in the Columbia and Snake River main stems is greater with dams in place than with dams removed."

Similarly, in the Main Canal near the head end of the Project between Banks Lake and Billy Clapp Lake, there were 6 temperature excursions beyond the criterion at USBR station CBP033 between 1990 and 1995.

pH

pH is an important water quality parameter because it can affect the solubility and toxicity of different compounds, especially metals (Embry and Block, 1995). The allowable range for pH criteria in the water quality standards is 6.5-8.5 for Class AA, A, and B. Class AA allows a human-caused variation within this range of less than 0.2 units. Classes A and B allow a 0.5 variation. The standards criteria range of 6.5-8.5 is applied statewide even though the natural pH of waters in Eastern Washington is often higher than the pH of Western Washington waters. The state of Oregon recently modified their standards to reflect a similar cross-state difference.

The 1998 303(d) list includes water bodies that have exceeded pH criteria water from each of the three irrigation districts (Table 4-8) and the Columbia River in the area of the Project. In addition, data provided by the irrigation districts indicate many sample sites where the pH exceeds the upper limit of 8.5.

Dissolved Oxygen

Dissolved oxygen criteria in the standards for Class AA, A, and B waters are greater than 9.5 mg/L, 8.0 mg/L, and 6.5 mg/L, respectively. A number of water bodies within the Project fail to meet these criteria as described in Table 4-8.

In the recent draft report investigating the W645 drain system in the Quincy-Columbia Basin Irrigation District, monthly water samples since 1994 in one of the drains (DW237) (upstream of the Quincy Industrial Park discharge) violated Class AA, A, and B criteria approximately 40%, 15% and 2% of the sampling dates, respectively. Similar but slightly higher results were found at two sampling stations further downstream in the W645W drain (downstream of the Quincy Industrial Park discharge). Here dissolved oxygen failed to meet Class AA, A, and B criteria an average of 51%, 17%, and 5% of the time, respectively (Montgomery Watson, 1999).

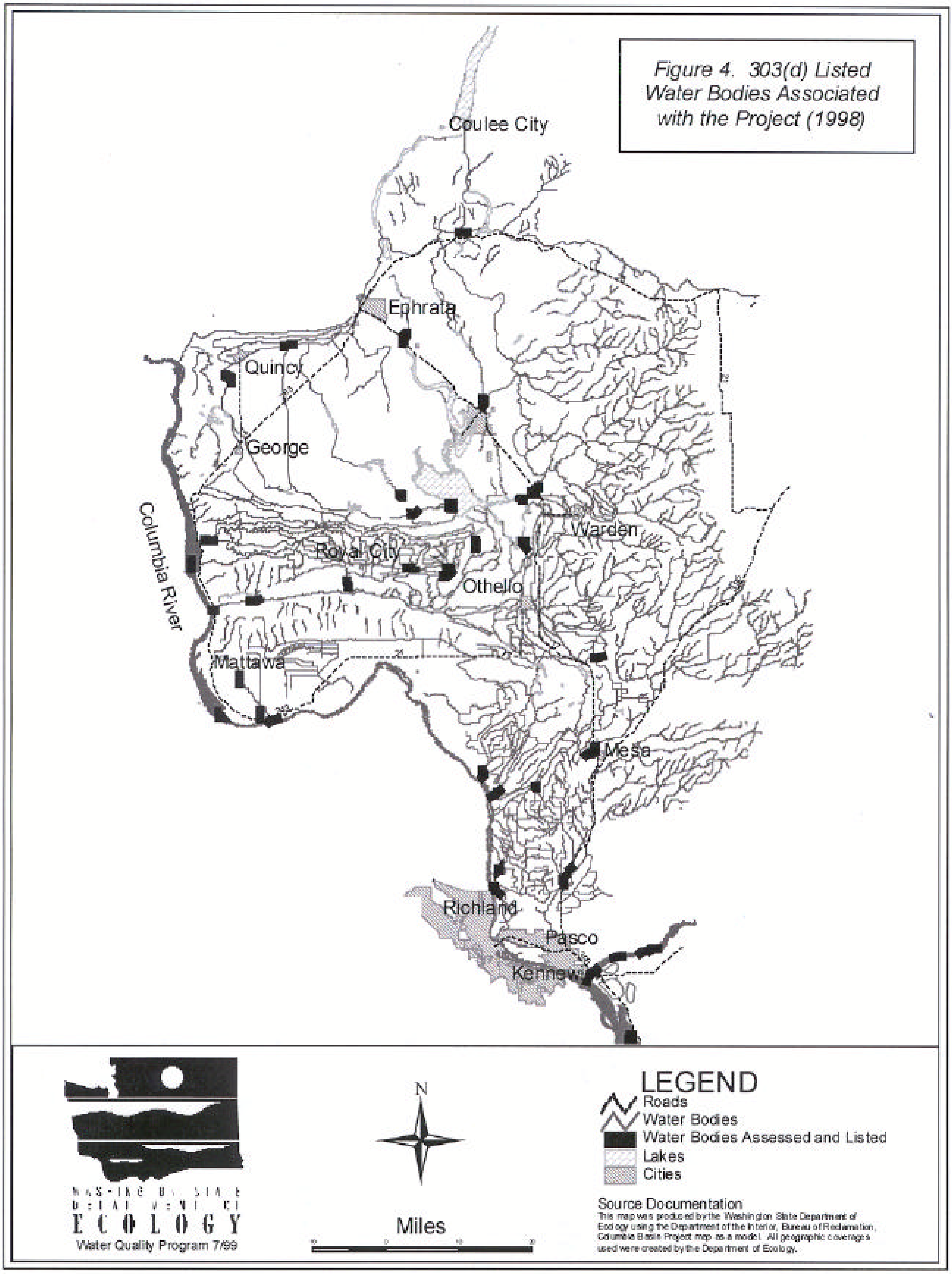
Figure 4. 303(d) Listed
Water Bodies Associated
with the Project (1998)
Coulee City
Ephrata
Quincy
George
Columbia River
Warden
Royal City
Othello
Mattawa
Mesa
Richland
Pasco
Kennewick
ECOLOGY
Water Quality Program 7/99
N
Miles
LEGEND
Roads
Water Bodies
Water Bodies Assessed and Listed
Lakes
Cities
Source Documentation
This map was produced by the Washington State Department of Ecology using the Department of the Interior, Bureau of Reclamation, Columbia Basin Project map as a model. All geographic coverages used were created by the Department of Ecology.

5. Individual Irrigation Blocks and Frenchman Hills Wasteway

This section of the report examines several areas of the Project in more detail. Irrigation blocks 42 (East Columbia Basin Irrigation District), 15 and 16 (South Columbia Basin Irrigation District), and the Frenchman Hills Wasteway drainage system (Quincy-Columbia Basin Irrigation District) were chosen for closer examination (Figure 5). Each area has its own unique characteristics and is at the same time representative of other areas of the Project.

For clarity, assigned uses for each of the study areas (Tables 5-2, 5-3, 5-4, and 5-5) are coded with a use number and narrative description if necessary, according to Table 5-1 below.

Table 5-1. Uses Found in the Current Surface Water Quality Standards

Class AA	Class A	Lake	Class B
1. Water supply (domestic, industrial, agricultural)	1. Water supply (domestic, industrial, agricultural)	1. Water supply (domestic, industrial, agricultural)	1. Water supply (industrial and agricultural [**not domestic**])
2. Stock watering	2. Stock watering	2. Stock watering	2. Stock watering
3. Salmonid migration, rearing, spawning, and harvesting	3. Salmonid migration, rearing, spawning, and harvesting	3. Salmonid migration, rearing, spawning, and harvesting	3. Salmonid migration, rearing, and harvesting (**not spawning**)
4. Other fish migration, rearing, spawning, and harvesting	4. Other fish migration, rearing, spawning, and harvesting	4. Other fish migration, rearing, spawning, and harvesting	4. Other fish migration, rearing, spawning, and harvesting
5. Clam and mussel rearing, spawning, and harvesting	5. Clam and mussel rearing, spawning, and harvesting	5. Clam, and mussel rearing, spawning, and harvesting	5. Clam and mussel rearing and spawning (**not harvesting**)
6. Crustaceans and other shellfish rearing, spawning, and harvesting	6. Crustaceans and other shellfish rearing, spawning, and harvesting	6**. Crayfish** rearing, spawning, and harvesting	6. Crustaceans and other shellfish rearing, spawning, and harvesting
7. Wildlife habitat	7. Wildlife habitat	7. Wildlife habitat	7. Wildlife habitat
8. Recreation (primary contact recreation, sport fishing, boating, aesthetic enjoyment)	8. Recreation (primary contact recreation, sport fishing, boating, aesthetic enjoyment)	8. Recreation (primary contact recreation, sport fishing, boating, aesthetic enjoyment)	8. Recreation **(secondary [not primary]** contact recreation, sport fishing, boating, aesthetic enjoyment)
9. Commerce and navigation	9. Commerce and navigation	9. Commerce and navigation	9. Commerce and navigation

Tables 5-2 through 5-5 list the principal water bodies within each study area. For each water body the current class designation, uses associated with that class, and actual existing uses are described. For the purposes of this study a "water body" is a distinct body of water of indeterminate size which has a unique set of uses. A named stream, canal, drain, or other watercourse may contain one or more associated water bodies as long as each one is different from its upstream and downstream neighboring water body (i.e. has different uses assigned). A goal of this study is to assign actual uses to as many water bodies as possible for the purposes of comparison only, but time constraints do not allow every water body in each study area to be cataloged.

General Information about Irrigation Blocks

Irrigation Districts within the Project are subdivided into irrigation blocks. Each irrigation block is served by one or more complete lateral systems and generally constitutes a land area delineating a drainage subbasin area. Block boundaries generally consist of topographic features and/or major Project works. A block is further defined as an area to which the initial or first year of delivery of irrigation water was available at substantially the same time. Blocks vary in size from 643 acres to more than 27,000 acres with the average size about 10,000 acres (U.S. Bureau of Reclamation, 1976).

Irrigation Block 42

General Description

Block 42 is located in the East Columbia Basin Irrigation District beginning about 2 miles southeast of Moses Lake and extending about 6 miles southward to Potholes Reservoir and Lind Coulee. The block extends generally eastward from land adjacent to Potholes Reservoir about 6-8 miles to the border of Block 43 (see Figures 5 and 6). Water was delivered to this block in 1953 and in 1975 it had 20,882 irrigable acres and 272 full-time farm units (U.S. Bureau of Reclamation, 1976).

Characteristics of Block 42 include:

- Combination of gravity and pumped delivery of water.
- Good mix of soil types, crops, and irrigation types.
- Most drains are dry in winter.
- Lands border this irrigation block onto which municipal (city of Moses Lake) and industrial (Basic American Foods) permitted wastewaters are applied.
- There are several known industrial discharges to the RCD Wasteway. Advance Silicon Materials, Inc. has a waste discharge permit to discharge cooling water. EKA Chemicals and KDK, Inc. are not yet permitted for their discharges of reverse osmosis bypass water. In addition, the City of Moses Lake occasionally discharges chlorinated, potable water from their water tower. As mentioned earlier, waste transport or waste assimilation are not protected uses under the state water quality standards and are therefore not listed in Table 5-2.
- Borders and drains to Lind Coulee on the south, which drains into Lind Coulee Arm of Potholes Reservoir.

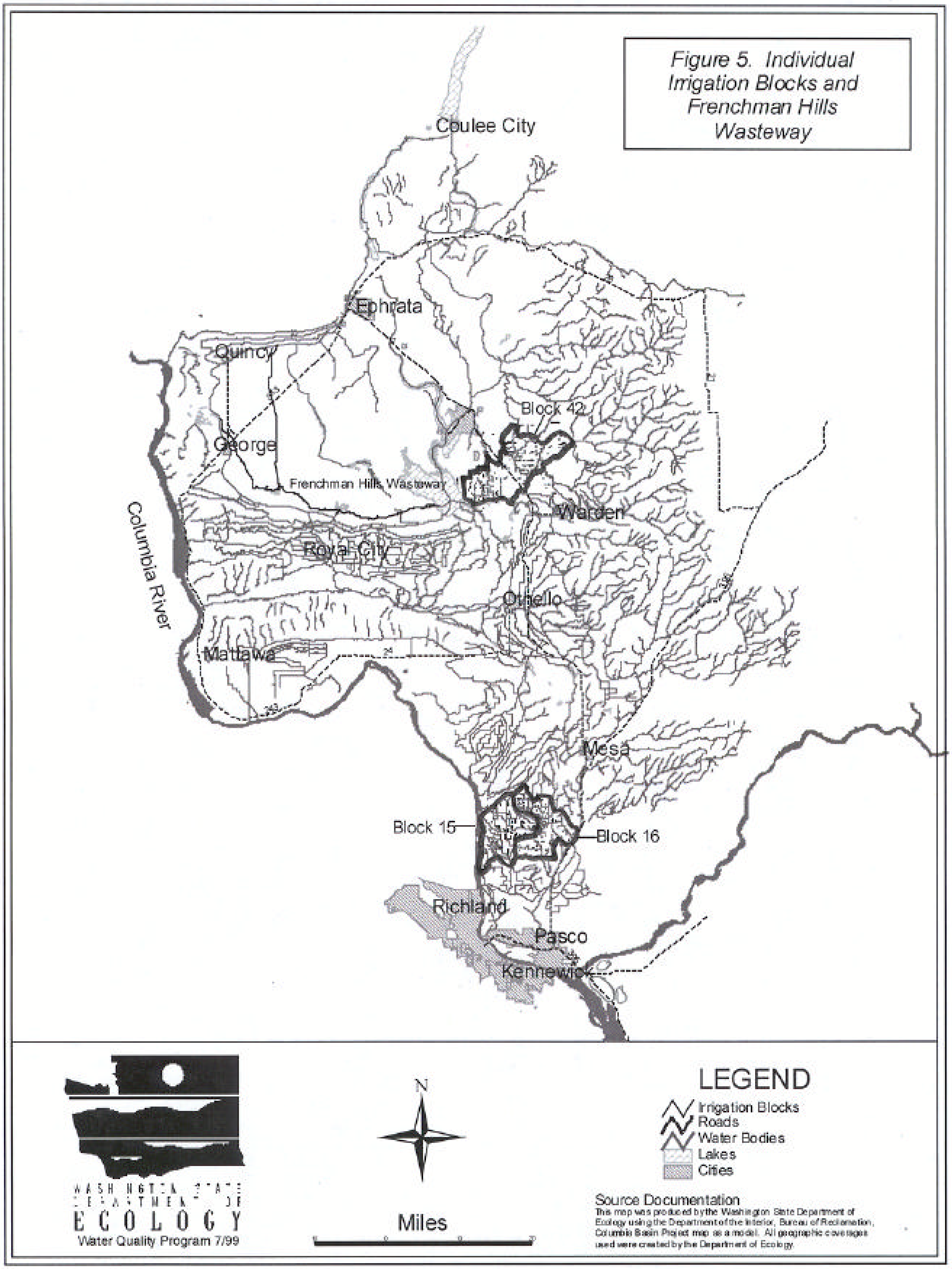
Figure 5. Individual Irrigation Blocks and Frenchman Hills Wasteway
Coulee City
Ephrata
Quincy
George
Frenchman Hills Wasteway
Block 42
Warden
Royal City
Othello
Columbia River
Mattawa
Mesa
Block 15
Block 16
Richland
Pasco
Kennewick
LEGEND
Irrigation Blocks
Roads
Water Bodies
Lakes
Cities
Source Documentation
This map was produced by the Washington State Department of Ecology using the Department of the Interior, Bureau of Reclamation, Columbia Basin Project map as a model. All geographic coverages used were created by the Department of Ecology.
WASHINGTON STATE DEPARTMENT OF ECOLOGY
Water Quality Program 7/99
N
Miles

Table 5-2. Uses Associated with Significant Water Bodies of Block 42

Water Body	Description	Class and Uses in Current WQ Standards (from Table 5-1)	*Existing Uses (from Table 5-1)
East Low Canal	Skirts Block 42 northern and eastern boundaries. Intermittent flow March 15–Oct 15 (irrigation season flow).	A.1 – 9	1 (industrial and ag. only, not domestic), 2, 7, ***
EL 29 Lateral	Irrigation season flow	A.1 – 9	"
EL 31 Lateral	Irrigation season flow	A.1 – 9	"
EL 33 Lateral	Irrigation season flow	A.1 – 9	"
EL 36.3 Lateral	Irrigation season flow	A.1 – 9	"
EL 36.9 Lateral	Irrigation season flow	A.1 – 9	"
EL 38 Lateral	Irrigation season flow	A.1 – 9	"
Lind Coulee Wasteway	Empties into Potholes Reservoir. Year-round flow.	AA .1 – 9	1 (industrial and ag. only, not domestic), 2, **3 (salmonid migration, rearing, harvesting, not spawning), 4, 7, 8 (secondary contact, etc.)
Weber Wasteway	Abandoned in early days of irrigation project due to concrete lining failures. Maintained in usable condition for emergency canal evacuation. Year-round flow.	AA.1 – 9	"
RCD Wasteway	Largest flow in block. Year-round flow.	AA.1 – 9	"
EL 29 LWW	Year-round flow.	AA.1 – 9	"
EL 31 WW	Second largest drain system in block. Year-round flow.	AA.1 - 9	"
Potholes Reservoir	Lake	Lake Class. 1 - 9	1 (industrial and ag. only, not domestic), 2, 3 (salmonid migration, rearing, harvesting, not spawning), 4, 5, 6, 7, 8 (primary contact, etc.), 9

*****Where the actual use from Table 5-1 is different between classes (e.g., recreation) the use number is augmented with a description of the use.

******Use "#3, Salmonid migration, rearing, harvesting, not spawning" has been added to Lind Coulee Wasteway based on results reported in "Water Quality in the Central Columbia Plateau," USGS Circular 1144, 1998. This use was also added to EL31 WW based on personal observation and to the other drains and wasteways of Block 42 by inference. Upstream migration of fish from Potholes Reservoir into the EL29, EL31, Weber, and RCD wasteways is blocked by irrigation structures in all cases relatively near their confluence with the reservoir. However, downstream migration of trout (and presumably other fish species) from the supply canal system into some or all of these drain/wasteway systems does occur.

*****Another existing use for irrigation supply waters (not identified in the current standards) is non-recreation secondary contact with the water by farm workers, irrigation system workers, etc. Criteria to support this use would likely be fecal coliform or E. coli.

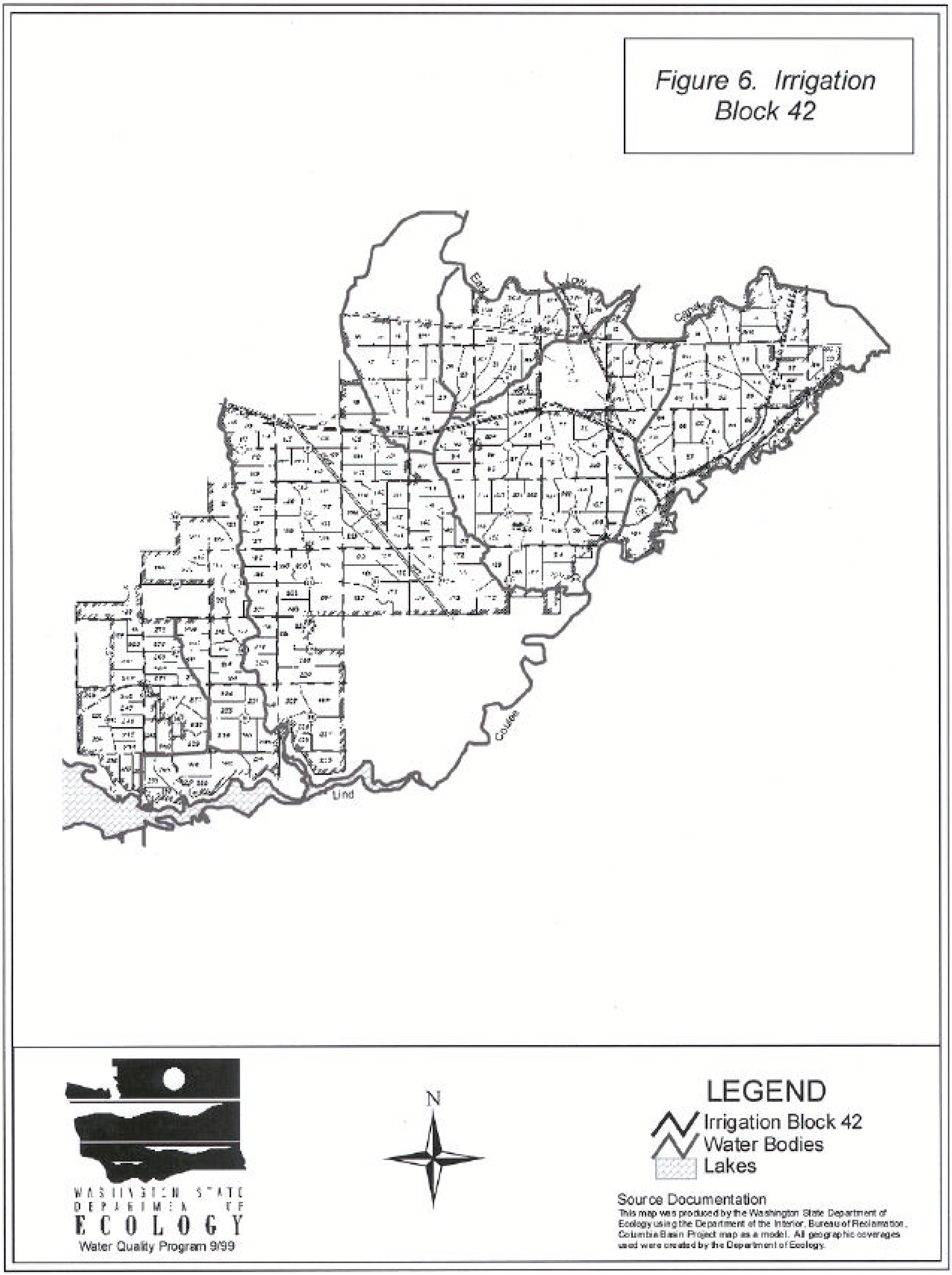
Figure 6. Irrigation Block 42
Lind
Coulee
N
WASHINGTON STATE DEPARTMENT OF ECOLOGY
Water Quality Program 9/99
LEGEND
Irrigation Block 42
Water Bodies
Lakes
Source Documentation
This map was produced by the Washington State Department of Ecology using the Department of the Interior, Bureau of Reclamation, Columbia Basin Project map as a model. All geographic coverages used were created by the Department of Ecology.

Irrigation Block 15

General Description

Block 15 is located in the South Columbia Basin Irrigation District. It is bounded by the Columbia River to the west, and the Potholes East Canal (and beyond to Block 16) to the east and south (see Figures 5 and 7). Water was delivered to this block in 1954 and in 1975 it had 15,799 irrigable acres and 174 full-time farm units (U.S. Bureau of Reclamation, 1976).

Characteristics of Block 15 include:

- Irrigation water delivery relies entirely on pumping (primary and secondary relift) – no gravity delivery. As such, the irrigation system dries up in the fall/winter period.
- The easterly portion of the block drains to the East and water returns into the Potholes Canal.
- There are numerous small seeps and springs of water along the block's border with the Columbia River.

Table 5-3. Uses Associated with Significant Water Bodies of Block 15

Water Body	Description	Class and Uses in Current WQ Standards (from Table 5-1)	*Existing Uses (from Table 5-1)
Potholes Canal	Main delivery canal. Runs only during irrigation season.	A.1 – 9	1 (industrial and ag. only, not domestic), 2, 7, **
PE 47 Lateral	Pumped from Potholes Canal. Large system with several additional pumping plants. Dry during non-irrigation system.	A.1 – 9	"
PE 51 Lateral	"	"	"
PE 56 Lateral	"	"	"
PE 60 Lateral	"	"	"
PE 64 Lateral	"	"	"
PE 65 Lateral	"	"	"
Ringold Wasteway	Flows north into Block 19 via the Ringold Wasteway Alternate and returns to the Columbia River via the 16.4 Wasteway. Maximum flow approx. 125 CFS and average flow approx. 15 CFS. Year-round flow.	"	1 (industrial and ag. only, not domestic), 2, 3 (salmonid migration, rearing, harvesting, not spawning), 4, 7, 8 (secondary contact, etc.)
PE 47 Wasteway	Flows back into Potholes Canal. Flow only during irrigation season.	"	"
PE 47J Wasteway	Flows into Columbia River. Flows year-round. Generally low flows. No barriers to fish passage. Abandoned by the Project prior to district takeover. Seepage and runoff flows only.	"	"
PE 47Q2	Drains into Block 16. Year-round	"	"

	flow.		
PE 65 Wasteway	Not used by the irrigation district. Seepage and runoff only flow into Columbia River. Flows year-round. Generally low flows. No barriers to fish passage.	"	"
Pasco Wasteway	Flows into Columbia River at southern boundary of block. Flows year-round. Flow enters about 20 vertical ft. above Col. R.	"	"

*****Where the actual use from Table 5-1 is different between classes (e.g., recreation) the use number is augmented with a description of the use.

******Another existing use for irrigation supply waters (not identified in the current standards) is non-recreation secondary contact with the water by farm workers, irrigation system workers, etc. Criteria to support this use would likely be fecal coliform or E. coli.

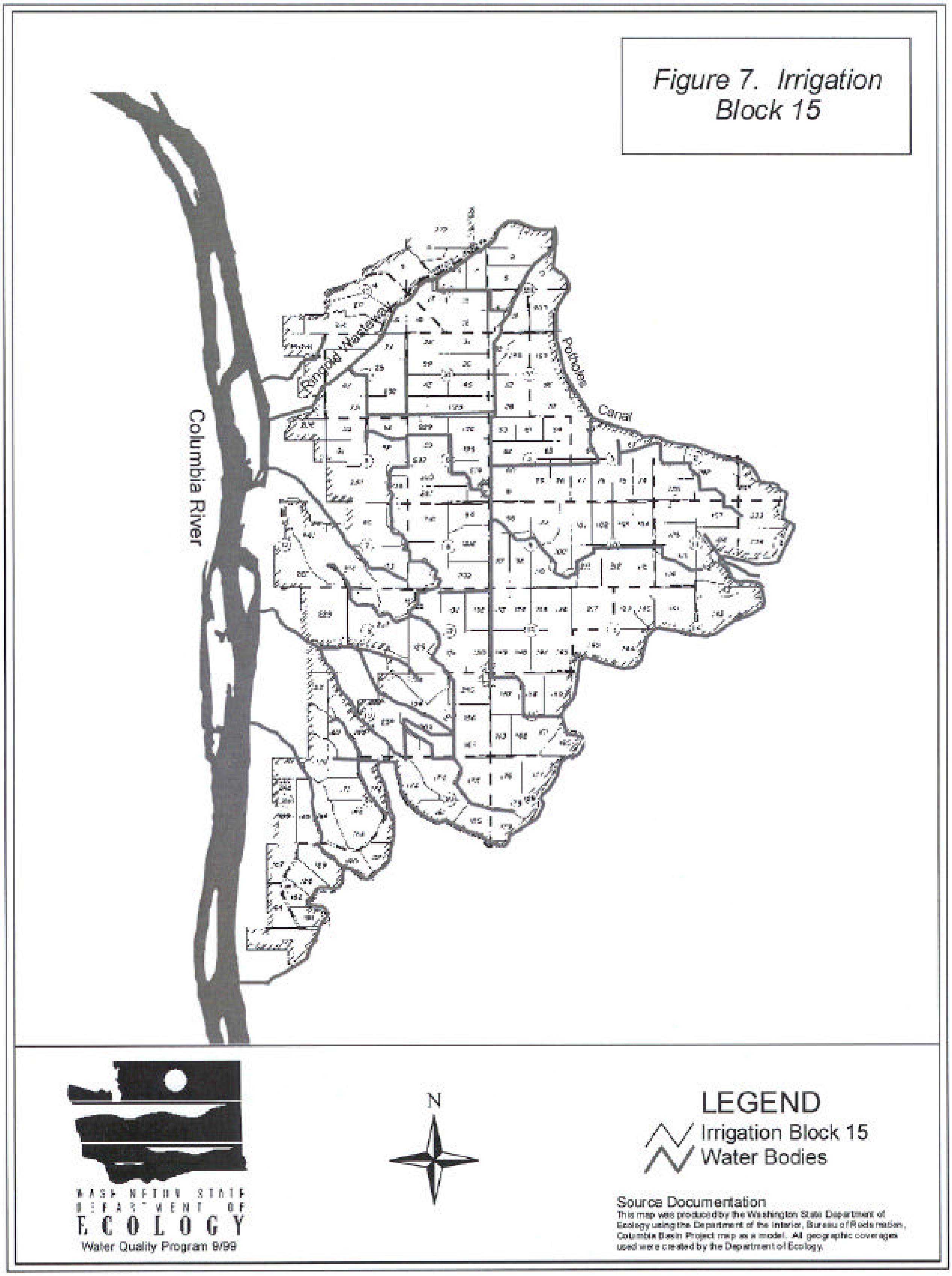

Figure 7. Irrigation Block 15

Irrigation Block 16

General Description

Block 16 is located in the South-Columbia Basin Irrigation District. It is bounded on the north and northwest by the Potholes East Canal (and beyond, by Block 15), on the southwest by the Columbia River, on the south and southeast by the Esquatzel Diversion Canal, and on the east by Block 161 and Esquatzel Coulee (see Figures 5 and 8). Water was delivered to this block in 1955 and in 1975 it had 27,377 irrigable acres and 223 full-time farm units (U.S. Bureau of Reclamation, 1976).

Characteristics of Block 16 include:

- Potholes Canal returns to Columbia River here
- There are numerous small seeps returning to the Columbia River
- Block is mainly supplied by gravity
- Largest block in the South Irrigation District
- Esquatzel Coulee is a seasonal flood channel
- Range of soils
- Extensive drains (some perennial)

Table 5-4. Uses Associated with Significant Water Bodies of Block 16

Water Body	Description	Class and Uses in Current WQ Standards (from Table 5-1)	*Existing Uses (from Table 5-1)
Potholes Canal	Main delivery canal. Flows only during the irrigation season.	A.1 – 9	1 (industrial and ag. only, not domestic), 2, 7, **
PE 52 Lateral	Irrigation season flow only.	A. 1 – 9	“
PE 55 Lateral	“	A.1 – 9	“
PE 59 Lateral	“	A. 1 – 9	“
PE 59.4 Lateral	“	A.1 – 9	“
PE 66 Lateral	“	A. 1 – 9	“
Eltopia Branch Canal	Main delivery canal. Flows only during the irrigation season. Classified AA because it flows into Eltopia Branch Wasteway 2 Ponds which are classified Lake Class	AA. 1 – 9	“
EB 1 Lateral	Irrigation season flow only.	AA. 1 – 9	“
EB 2 Lateral	“	AA. 1 – 9	“
EB 4 Lateral	“	AA. 1 – 9	“
EB 7 Lateral	“	AA. 1 – 9	“
EB 8 Lateral	“	AA. 1 – 9	“
Esquatzel Diversion Canal	Main delivery canal. Year-round flows. Return flows and runoff from irrigated and non-irrigated lands.	A. 1 – 9	“
EB 8 Wasteway	Drains to Esquatzel Coulee Wasteway. Irrigation season flow only.	A. 1 – 9	“
PE 38.9 B5 Wasteway	Year-round flow. Drains extensive area in the heart of Block 16 and	A. 1 – 9	1 (industrial and ag. only, not domestic),

	terminates in the 38.9 B5 Pond		2, 3 (salmonid migration, rearing, harvesting, not spawning), 4, 7, 8 (secondary contact, etc.)
PE 38.9 B5 Pond	Pond of approx. 7.5 acres and 10 ft. deep. Recreation access for fishing and hunting. (Pond is not classified a lake)	A. 1 – 9	1 (industrial and ag. only, not domestic), 2, 4, 6, 7, 8 (primary contact, etc.)
PE 59 Wasteway	Year-round flows. Drains southward to Esquatzel Diversion Canal.	A. 1 – 9	1 (industrial and ag. only, not domestic), 2, 3 (salmonid migration, rearing, harvesting, not spawning), 4, 7, 8 (secondary contact, etc.)
PE 59.4 Wasteway	Year-round flows. Drains to Esquatzel Diversion Canal	A. 1 – 9	1 (industrial and ag. only, not domestic), 2, 3 (salmonid migration, rearing, harvesting, not spawning), 4, 7, 8 (secondary contact, etc.)
DPE 64.3 Drain	Year-round flows. Drains to PE 59.4 Wasteway.	A. 1 – 9	1 (industrial and ag. only, not domestic), 2, 3 (salmonid migration, rearing, harvesting, not spawning), 4, 7, 8 (secondary contact, etc.)
Esquatzel Coulee	Esquatzel Coulee changes to Esquatzel Diversion Canal and discharges year round to the Columbia River. No fish migration from Col. River because discharge point in summer is approx. 40 ft. above the river.	A. 1 – 9	1 (industrial and ag. only, not domestic), 2, 3 (salmonid migration, rearing, harvesting, not spawning), 4, 7, 8 (secondary contact, etc.)

*****Where the actual use from Table 5-1 is different between classes (e.g., recreation) the use number is augmented with a description of the use.

******Another existing use for irrigation supply waters (not identified in the current standards) is non-recreation secondary contact with the water by farm workers, irrigation system workers, etc. Criteria to support this use would likely be fecal coliform or E. coli.

Figure 8. Irrigation Block 16

WASHINGTON STATE DEPARTMENT OF ECOLOGY
Water Quality Program 7/99

N

LEGEND
Irrigation Block 16
Water Bodies

Source Documentation
This map was produced by the Washington State Department of Ecology using the Department of the Interior, Bureau of Reclamation, Columbia Basin Project map as a model. All geographic coverages used were created by the Department of Ecology.

Frenchman Hills Wasteway and W645 Drain System

General Description

Frenchman Hills Wasteway starts near the inlet to the Frenchman Hills Tunnel and outlets into the Potholes Reservoir. It is about 15 miles long and in a natural channel. The W645 drain flows into Frenchman's Wasteway from the north and carries with it agricultural return flows from farms and industrial wastewater from industry in the Quincy area of the Quincy-Columbia Basin Irrigation District (see Figures 5 and 9).

Characteristics of Frenchman Hill's Wasteway and W645 Drain include:

- Year-round, gravity flow
- Some industrial wastewater mixed with irrigation water
- Extensive wildlife habitat
- Extensive recreation
- Hydraulically connected to Potholes Reservoir

Table 5-5. Uses Associated with Frenchman Hills Wasteway and Associated Water Bodies

Water Body	Description	Class and Uses in Current WQ Standards (from Table 5-1)	*Existing Uses (from Table 5-1)
DW 237 Drain	Drains from southwest of Quincy eastward to W645W Drain. Captures irrigation return water and industrial wastewater from Quincy Industrial Park.	AA. 1 – 9	1 (industrial and ag. only, not domestic), 2, 4, 7
W645W Drain	Captures flows from DW 237 and other ditches and flows westward from West Canal approximately 6 miles to confluence with W645 Drain	AA. 1 – 9	1 (industrial and ag. only, not domestic), 2, 3 (salmonid migration, rearing, harvesting, not spawning), 4, 7, 8 (secondary contact, etc.)
W645 Drain	Major drain flowing approx. 18 miles southward from just east of Quincy to Frenchman Hills Wasteway near Frenchman Hills Tunnel	AA. 1 – 9	1 (industrial and ag. only, not domestic), 2, 3 (salmonid migration, rearing, harvesting, not spawning), 4, 7, 8 (secondary contact, etc.)
DW239 Drain	Drains most or all of Block 78 into W645 Drain. Approximately 10 miles long. First fish-impassable barrier is approximately 3 miles upstream of confluence with W645 Drain.	AA. 1 – 9	1 (industrial and ag. only, not domestic), 2, 3 (salmonid migration, rearing, harvesting, not spawning), 4, 7, 8 (secondary contact, etc.)
Frenchman Hills Wasteway	Flows from Frenchman Hills Tunnel Wasteway generally eastward	AA. 1 – 9	1 (industrial and ag. only, not domestic),

	approximately 15 miles to Potholes Reservoir		2, 3 (salmonid migration, rearing, harvesting, not spawning), 4, 7, 8 (secondary contact, etc.)
Potholes Reservoir	Large reservoir	Lake Class	1 (industrial and ag. only, not domestic), 2, 3 (salmonid migration, rearing, harvesting, not spawning), 4, 5, 6, 7, 8 (primary contact, etc.), 9

*Where the actual use from Table 5-1 is different between classes (e.g., recreation) the use number is augmented with a description of the use.

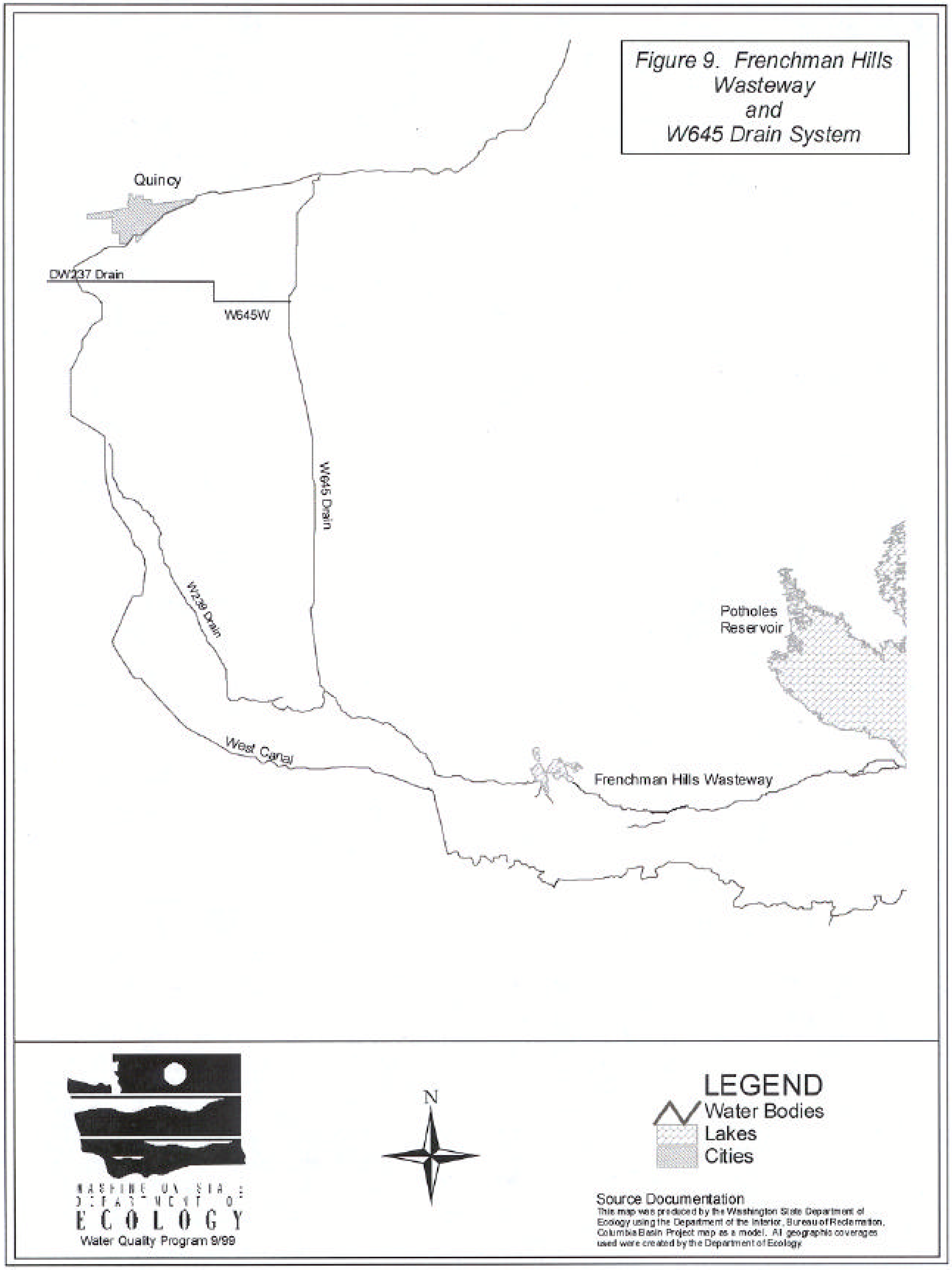

Figure 9. Frenchman Hills Wasteway and W645 Drain System
Quincy
DW237 Drain
W645W
W645 Drain
W239 Drain
Potholes Reservoir
West Canal
Frenchman Hills Wasteway
WASHINGTON STATE DEPARTMENT OF ECOLOGY
Water Quality Program 9/99
N
LEGEND
Water Bodies
Lakes
Cities
Source Documentation
This map was produced by the Washington State Department of Ecology using the Department of the Interior, Bureau of Reclamation, Columbia Basin Project map as a model. All geographic coverages used were created by the Department of Ecology.

6. Discussion of Use-Based Standards as Applied Project-wide

Based on the exercise in Section 5 of assigning existing uses to various water bodies within irrigation blocks 42, 15 and 16, and the Frenchman Hills Wasteway/W645 drain system, the following patterns of uses emerged as broadly applicable to most Project waters.

- *Canals/laterals and drains/wasteways that flow only during the irrigation season* - Because of their intermittent flow, these waterways tend to have only three existing uses (codes 1, 2, and 7 from Table 5-1): 1. Water Supply (agricultural and industrial only, not domestic), 2. Stock Watering, and 7. Wildlife Habitat. Any salmonid or other fish migration, rearing, harvesting or spawning in canals or laterals is accidental. Recreation is generally discouraged or prohibited. As noted earlier, there is non-recreation secondary contact with irrigation water and the criteria to support this use (e.g. current class B fecal coliform criteria) would merit consideration when developing use-based standards. Despite the intermittent flow, wildlife, particularly waterfowl, use these waterways for nesting, food supply, and other habitat requirements.

- *Drains/wasteways that flow year round* – The majority of Project drains and wasteways flow year round and therefore typically have the following uses: 1. Water Supply (agricultural and industrial only, not domestic), 2. Stock Watering, 3. Salmonid migration, rearing, and harvesting, (**not spawning**), 4. Other fish migration, rearing, spawning, and harvesting, 6. Crustaceans and other shellfish rearing, spawning, and harvesting, 7. Wildlife Habitat, and 8. Recreation (**secondary** contact recreation, sport fishing, boating, aesthetic enjoyment).

  Salmonids, principally rainbow trout, are introduced into many drains throughout the Project. In the East-Columbia Irrigation District (and likely the others as well), where salmonids are commonly found in the canal systems as well as the drains, they are believed to have migrated through the system from Banks Lake. This is possible because, to ensure delivery of an adequate amount of water to the farms, there is usually some amount of excess water delivered which is "wasted" directly to the drain system, bypassing the farms. The occurrence of downstream migrants is significant because, in this case study, barriers to upstream migration were identified for some irrigation blocks and, in the absence of stocking, uses such as salmonid rearing and harvesting and recreation were thought to be absent due to the presence of the barrier. A fishable, unstocked population of trout upstream of an impassable barrier suggests a use that must be protected. This may be the case for example, with the EL 31 Wasteway of the East-Columbia Irrigation District, where an impassable fish barrier is located just upstream of its confluence with the Lind Coulee arm of Potholes Reservoir. During the preparation of this case study, recreational sport fishing for trout was observed in both the EL 31 Wasteway and the W645 drain system of the Quincy-Columbia Irrigation District.

  Crustaceans from the Orders Amphipoda and Decapoda are known to occur in flowing waters of the Columbia Basin (Foster, et. al., 1984). The existence of crayfish rearing, spawning, and harvest uses have not been confirmed but are included above because they are probably attainable for most drains/wasteways of the Project.

Finally, a subset of this category could be created that would characterize "small" year-round drains. These would support fewer uses than the drains/wasteways category described above. Typical uses for these waterways would be: 1. Water Supply (agricultural and industrial only, not domestic), 2. Stock Watering, 4. Other fish migration, rearing, spawning, and harvesting, and 7. Wildlife Habitat.

- *Lakes, Ponds, and Reservoirs* – Those water bodies that meet the definition of "lake" in the standards typically have the following uses: 1. Water Supply (industrial and agricultural), 2. Stock Watering, 3. Salmonid migration, rearing, and harvesting, 4. Other fish migration, rearing, spawning, and harvesting, 5. Clam, Mussel rearing, spawning and harvesting, 6. **Crayfish** rearing, spawning, and harvesting, 7. Wildlife Habitat, and 8. Recreation (**primary** contact, sport fishing, boating, aesthetic enjoyment).

  With the possible exception of Potholes Reservoir, use "9. Commerce and Navigation" is probably not an existing or attainable use for waters of the Project. A large, year-round resort on Potholes Reservoir is dependent upon existence and maintenance of the reservoir for its livelihood ("commerce").

- *Natural Streams* – Before the delivery of irrigation water to the Project, Crab Creek and Rocky Ford Creek were the only perennial streams within the Project area. Existing uses for these streams include: 1. Water Supply (agricultural and industrial only, not domestic), 2. Stock Watering, 3. Salmonid migration, rearing, harvesting, and spawning, 4. Other fish migration, rearing, spawning, and harvesting, 6. Crustaceans and other shellfish rearing, spawning, and harvesting, 7. Wildlife Habitat, and 8. Recreation (**secondary** contact recreation, sport fishing, boating, aesthetic enjoyment).

  Salmonid migration, rearing, harvesting, and spawning is listed as an existing use because there is a private trout hatchery and trout fishery on Rocky Ford Creek and self-sustaining populations of rainbow trout in upper Crab Creek (Williamson, Munn, et al., 1998).

7. Adding a Separate Class for Constructed Conveyances

Many waters of the Project have difficulty meeting the uses and criteria from all the various classes (including Class B). This is so for two principal reasons. First, Project waterways, built before the state water quality classification system was developed, were designed primarily for irrigation water distribution rather than for other uses such as wildlife habitat, recreation, fish migration, etc. Second, the current "one-size-fits all" nature of each class does not have the appropriate mixes of attainable uses and criteria that apply to many of the Project waters.

Should the standards reorganization to a use-based system and subsequent "recataloging" of uses and criteria for the various waters of the state not occur, it is useful to consider another option. Another class of waters could be added to the standards that includes uses and criteria that are more amenable to the character of waterways within the Project, say, a class for "constructed conveyances."

This new class would likely contain many of the same uses described in Section 6, although subcategories of particular uses such as "other fish migration, rearing, spawning, and harvesting" may be desirable. For example, such a sub-category could establish a "warm water fishery" use along with applicable temperature, dissolved oxygen, and other criteria to support that use.

However, if a new constructed conveyance class was created wherein wildlife use is the only remaining category to capture the use by biota (invertebrates and waterfowl), there would need to be a determination of what will constitute criteria to fully support this use (conventional parameters [dissolved oxygen, temperature, and pH], toxic contaminants, and ammonia). While the conventional parameters for this use might be attainable, the other contaminant categories may not be attainable. In this example, simply creating a new set of uses may not alleviate potential compliance problems for these waters, particularly with respect to toxic contaminants.

Any effort to add a new class to the standards would require a use-attainability analysis because some fishable and swimmable uses surely would be eliminated. A use attainability analysis would also be required if less stringent subcategories of "fishable and swimmable" uses were considered for adoption into the standards.

Furthermore, there are other water bodies around the state, constructed before and after promulgation of water quality standards, that may or may not qualify as constructed conveyances. For example, certain "natural" streams such as Mill Creek near Walla Walla have been concrete lined (i.e. constructed) for flood control reasons and may have different existing uses (e.g. salmonid spawning) that are not common in the Columbia Basin Project. Such other water bodies would have to be considered and included in any analysis of the feasibility of adding a new constructed conveyance classification.

Finally, the uses and criteria associated with a new constructed conveyance classification would have to be developed with public involvement and this would occur ultimately as part of the regular updating process of the water quality standards.

8. Conclusions

This case study has identified several shortcomings of the current class-based standards as applied to the waters of the Columbia Basin Project. These include:

- *Inconsistency of classification* – Essentially identical types of water bodies within the Project are classified differently and therefore are assigned different uses and criteria. This may occur because they happen to flow into a lake (even though there is often an impassable barrier just upstream from the lake). Or it may occur when they are not specifically classified and so receive the default Class A, or they are not specifically classified and are tributary to a Class AA water and so receive the default Class AA classification.

- *"One size fits all"* – A water body assigned to a particular class gets all the uses and must meet all the criteria associated with that class, even if some of the uses don't exist for that waterbody.

- *Designated Uses and Criteria may or may not be attainable* - The uses and criteria assigned with a particular class may be unattainable or they may not be protective of existing uses.

The Clean Water Act requires states to develop water quality standards that protect public health or welfare and enhance the quality of water. The Clean Water Act also requires that water quality standards be met. For waters that do not meet standards there are regulatory mechanisms to encourage compliance including 303(d) listing, TMDLs, limits in wastewater permits, best management practices, and enforcement.

At the same time, the Clean Water Act and supporting regulation recognize that certain uses, and the criteria to protect those uses, may not be appropriate. The process set up to change uses is the use attainability analysis (UAA). As described in Section 3 of this case study, a UAA is required when designating non-fishable/swimmable uses, removing fishable/swimmable uses, or adopting subcategories of fishable/swimmable uses that require less stringent criteria. A UAA is not required when designating more protective fishable/swimmable uses. The UAA process is state resource dependent and to date there have been no UAA's submitted to EPA by Washington State.

The current class-based system treats all water bodies belonging to the same class (AA, A, etc.) as if they have the same collection of uses and attendant criteria. In practice, the criteria do change somewhat (special conditions) but the uses associated with a given class do not change, even though there are many examples around the state where existing uses do not match the assigned default uses based on class. The chief reason for this incongruity is that there were a large number of water bodies that required existing and attainable uses to be assigned, and dividing the water bodies into classes leveraged the limited resources available to complete this work.

In contrast, the use-based approach allows uses associated with water body types or specific water bodies to be assigned based on their actual presence or attainability. Therefore, a given water body could be characterized with uses and criteria gleaned from one or more of the existing classes of uses and criteria and any other actual or attainable use and criteria added to the standards.

Clearly, a use-based system is more flexible. In terms of environmental protection, this has the potential to be either a strength or weakness. There is a risk of replacing unrealistically high expectations (as uses and criteria) with uses and criteria that are more realistic and attainable but less protective in the long run. In other words, the act of lowering the bar from an unrealistic height to a more realistic height carries with it the risk of lowering the bar too far. The Clean Water Act itself has the "unrealistic" goal of completely eliminating the discharge of pollutants into navigable waters (zero discharge) and to drive toward this goal lawmakers incorporated tools such as antibacksliding and antidegradation. This said, there are significant advantages to having realistic standards. Water quality standards are the foundation of water quality management and as such, are critical in the development of wastewater permits, best management practices, total maximum daily loads (TMDLs), and other water use-related actions. Realistic standards also enhance the credibility of the state as the regulatory authority and allow the regulated community to set achievable goals to attain uses.

This case study discussed the option of adding a new constructed conveyance class to the existing standards (Section 7). This approach could improve the accuracy of the standards for Project waters but would require a use attainability analysis to implement. Also, its general applicability to other constructed conveyance water bodies around the state would have to be determined. Perhaps most importantly, the effort required to add another class to the existing standards could forestall the statewide implementation of a use-based approach to the standards.

Finally, this case study has identified actual uses for selected irrigation blocks and a drain system within the Project (Section 5) and applied these results Project-wide (Section 6). This cataloging of actual identified uses demonstrates how they differ markedly from the class-based uses assigned under the current standards. If the state were to adopt a use-based approach to the standards for implementation statewide, a key question would be - How will existing and attainable uses and attendant criteria be assigned to the many water bodies around the state? One likely strategy, discussed in Section 2, starts with the dropping of all class designations but the retention of all uses and criteria currently listed in the standards for each water body. Then, as necessity dictates and resources allow, the assignment of existing and attainable uses and criteria would follow, perhaps systematically, as part of the current five-year watershed management cycle.

Literature Cited

1. E. Block, "Aquatic Biota Within the Central Columbia Plateau NAWQA Study Unit: A Review of Existing Information," *U. S. Geological Survey*, 1993.

2. S.S. Embry, and E.K. Block, "Reconnaissance Investigation of Water Quality, Bottom Sediment, and Biota Associated with Irrigation Drainage in the Columbia Basin Project, Washington, 1991-92," *Water Resources Investigations Report, U.S. Geological Survey*, 95-4007, 1995.

3. R. Featherstone, "Hunting for Fish Habitat," *Wenatchee World*, 1999.

4. J.H. Foster, W.E. Tillett, W.L. Myers, and J.C. Hoag, "Columbia Basin Wildlife/Irrigation Development Study," *U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, and Washington State Dept. of Game*, 1984.

5. "Water Supply, Use and Efficiency Report – Columbia Basin Project," Montgomery Water Group, Inc, 1997.

6. Montgomery Watson, "Predraft Executive Summary of Quincy Use Attainability Study," Montgomery Watson, Inc., 1999.

7. "Final Environmental Impact Statement, Columbia Basin Project, Washington," Volume 1, U. S. Bureau of Reclamation, 1976.

8. "Columbia Basin Project. Washington: Adams, Douglas, Franklin, Grant, Lincoln, and Walla Walla Counties" U.S. Bureau of Reclamation, 1983.

9. "Questions and Answers on: Antidegradation," U.S. Environmental Protection Agency, 1985.

10. A.K. Williamson, M.D. Munn, S.R. Ryker, R.J. Wagner, J.C. Ebbert, and A.M. Vanderpool, "Water Quality in the Central Columbia Plateau, Washington and Idaho, 1992-95," U.S. Geological Survey 1144, U.S. Geological Survey, 1998.

11. J. Yearsley, "Review Draft: "Columbia River Temperature Assessment: Simulation Methods," U.S. Environmental Protection Agency, 1999.

Appendix

Response to Comments on the External Draft
of
"A Case Study Evaluating A Change to the Surface Water Quality Standards
From 'Class-based' to 'Use-based' within the Columbia Basin Project Area"

Comment Source	Comment	Response
South-Columbia Basin Irrigation District	1. Ten comments correcting inaccurate descriptions of water bodies within irrigation blocks	All corrections made to the document.
East-Columbia Basin Irrigation District	2. Figure 1 map does not show irrigation blocks 2&3 east of Pasco and south of the Snake River. (Page 3)	Agree. Maps will be corrected.
"	3. Figure 2 doesn't show PE 16.4 M12 Wasteway. (Page 7)	This schematic is not meant to show detail but rather the major waterways and general direction of water flow through the Project. Because it was borrowed from the cited publication, I would modify it only to correct significant errors and the absent 16.4 M12 Wasteway does not meet this test.
"	4. The East District does use acrolein (currently only in laterals and not in East Low Canal). (Page 6)	Change report language to reflect this.
"	5. The suggested implementation scenario from class –based to use-based in which current uses and criteria are initially "cross-walked" over and then changed over time to more accurately reflect actual and attainable uses is a disincentive to change and may open the door for resistance to changing current uses. (Page	The most likely scenario for changing from class-based to use-based standards remains as described in the report. Cataloging existing and attainable uses for all the state's water bodies is a significant undertaking and may best be achieved in manageable pieces (say as part of the 5-yr. watershed cycle) rather than all at once.

	10)	
"	6. Does the use of an aquatic herbicide in a drain that also contains fish mean that such herbicides can't be used in such drains (even though in the vast majority of such cases the presence of fish is accidental or random?) And how will a use attainability analysis (UAA) resolve this conflict? (Page 13)	Federal regulations and the Clean Water Act provide no allowance for one use, e.g. agricultural water supply, to be protected at the expense of other uses such as fish rearing, crustacean rearing, wildlife habitat, etc. Instead, as discussed in the report, the federal requirement to complete a UAA to remove fishable/swimmable uses or to designate other uses in the absence of fishable/swimmable uses implicitly establishes a higher value or priority for fishable/swimmable uses as compared with others uses such as agricultural water supply. Current state water quality standards require that "toxic substances shall not be introduced above natural background levels in waters of the state which have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic toxicity to the most sensitive biota dependent upon those waters, or adversely affect public health, as determined by the Department." (WAC 173-201A-040). State water quality standards do allow a "short-term modification" for a specific water body on a short-term basis when necessary to accommodate essential activities, respond to emergencies, or to otherwise protect the public interest. From the standards "Such activities must be conditioned, timed, and restricted (i.e. hours or days rather than weeks or months) in a manner that will minimize water quality degradation to existing and characteristic uses. In no case will any degradation of water quality be allowed if this degradation significantly interferes with or becomes injurious to characteristic

		water uses or causes long-term harm to the environment." Furthermore, federal regulation and the state water quality standards require that downstream uses must be protected notwithstanding a short-term modification for the treatment area. In summary, a short-term modification is required for the application of herbicides to waterways of the Project and this short-term modification cannot allow degradation that significantly interferes with or becomes injurious to characteristic water uses, causes long-term environmental harm, or harms uses downstream.
"	7. Does the prohibition against waste assimilation as a designated use mean that NPDES permit municipal and industrial discharges to Project waterways is prohibited? Or does it mean such discharges are not prohibited but must be compatible with the designated uses of the Project waterway being discharged to? (Page 13)	It means that waste assimilation is not a designated use that can be listed and protected as part of the state's water quality standards. The water quality standards do not prohibit NPDES and State permitted wastewater discharges to Project waterways.
"	8. The concept of the "higher classification prevailing" is one of the most problematic issues for the Project. Your examples on page 13 and 14 illustrate why that is such a problem but don't really answer, or give any comfort, how this will be resolved. How and where do the lines get drawn between differing uses and criteria at the boundaries of waters of different classes? Are mixing zones factors here? (Pages 13 and 14)	The report provides a discussion of this issue and describes the current guidance found in the state's water quality standards. Ecology is bound to follow its standards regulation. Federal regulation implementing the Clean Water Act requires that: "For water with multiple use designations the criteria shall support the most sensitive use." [40 CFR 131.11(a)] Mixing zones allow water quality standards to be exceeded. As described in WAC 173-201A-100, there are many conditions that must be met before a mixing zone is allowed. For example, the size of the

		mixing zone and the concentrations of pollutants must be minimized. Also, the size of the mixing zone and associated effluent limits must be established in discharge permits, general permits, or orders, as appropriate. The Department has never established a formal mixing zone at the boundary between waters of two different classes. However, we do informally recognize that some mixing may be necessary in the immediate vicinity of such junctions. The objective that must be met is that downstream water quality standards must be met. Ecology is considering adding specific language as part of the potential change to use-based standards that further discusses expectations in these boundary waters.
"	9. The East District is experimenting with the grass carp for aquatic weed control. This fits in with the discussion of mechanical weed control. (Page 14)	Agree. Language will be added to the report.
"	10. Wouldn't it be appropriate to explain that most of the Project waterways have been classified by the default mechanism and not the result of any comprehensive evaluation? Shouldn't most of the canals, laterals, drains, and wasteways be classified class B? Why should any of the constructed facilities be class AA? (Pages 19 and 20)	Most of the waterways of the state were assigned a particular class and therefore received all of the uses of that class by default. This is explained in the report in Section 3. The assignment must be based primarily on the protection of existing uses, and does not rely on a comparison with water quality data. Section 8 of the report describes the inconsistency of classification found in the Project. As discussed in Section 4, some monitoring data suggests that Class B criteria for temperature and dissolved oxygen are typically exceeded less frequently than Class AA or Class A

		criteria. Nevertheless, the exceedence rates of Class B criteria in these data were 4% and 5% for temperature and dissolved oxygen, respectively. This suggests that even a Class B classification for Project waters may not be adequate. Also, to my knowledge, there is no study of Project waters designed to objectively determine those uses and criteria that are reasonably attainable for Project waters.
"	11. The formula method of defining what is and is not lake class is probably a good argument in favor of a switch to use-based standards. Regardless of how the reservoirs listed in this discussion are classified and regardless of the standards that will apply, we shouldn't lose sight of the fact that people have been recreating on and in them for many years and they support abundant wildlife and fish. (Page 21)	Agree.
"	12. Potholes Canal controlling authority should be the South District. For Scootenay WW and PE 16.4 WW the controlling authority should be East and South District. Is Potholes Lake, Potholes Reservoir? (Pages 23 and 24)	Corrections made to document.
"	13. There is very little that can be done to lower either temperature or pH considering the background levels. Direct attention to problems like sediment, animal wastes, fertilizers, and pesticides. (Things that can be improved and things that farmers can be convinced to cooperate with.) (Pages 24 and 25)	General comment. It makes sense to put resources where they'll do the most good.
"	14. Irrigation blocks are not common to all irrigation	Agree. Revised text.

	districts and may be unique to the Project. (Page 28)	
"	15. For Weber WW, RCD WW, EL29 WW and EL 31 WW uses 3, 4, 7, and 8 are accidental, incidental, and mostly outside the irrigation season. Somehow these uses need to be made subordinate to use 1 and seasonality of those subordinate uses needs to be recognized. For the East Low Canal and the laterals, use 7 is incidental and needs to be made subordinate to use 1. For Lind Coulee WW uses 3,4,7, and 8 are present mostly outside the irrigation season. This seasonality needs to be recognized to be compatible with use 1. (Page 30)	Uses 3 (salmonids), 4 (other fish), 7 (wildlife habitat), and 8 (recreation) are found in many if not most of the year-round drains and wasteways of the Project. Of these uses, #3 is the most uncertain. Although historically several species of trout have been purposely stocked into various wasteways and drains of the Project, they are not likely to be self-sustaining populations and so their presence in many Project drains and wasteways is most likely due to the failure of upstream and downstream fish barriers. Other fishes constituting use #4 are much more likely to have established self-sustaining populations. While these uses depend on the delivery of irrigation water for their existence they exist nonetheless. And because they exist these uses must be protected under the Clean Water Act. As discussed in the report and in the response to comment #6, fishable and swimmable uses are given implicit, special protection under the Clean Water Act and other uses, such as agricultural water supply, are subordinate. Also in this regard, Federal regulation implementing the Clean Water Act requires that, "For waters with multiple use designations the criteria shall support the most sensitive use." [40 CFR 131.11 (a)] Finally, while many uses are seasonal in nature (spawning, migration, irrigation water delivery) this says little about their importance or their need for protection under the Clean Water Act. However, states may adopt seasonal uses as an alternative to reclassifying a water body or

		segment thereof to uses requiring less stringent water quality criteria. If seasonal uses are adopted, water quality criteria should be adjusted to reflect the seasonal uses; however, such criteria shall not preclude the attainment and maintenance of a more protective use in another season. [40 CFR 131.10(f))]
"	16. The fish in the EL 31 WW (and other similar facilities) are incidental, accidental, and seasonal in nature. Should they be protected at the expense of the primary water supply function? (Page 40)	If the presence of fish constitutes an existing or attainable use, that use must be protected along with the other existing uses (such as agricultural water supply, stock watering, etc.). At a minimum, uses are deemed attainable if they can be achieved by the imposition of effluent limits and cost effective and reasonable best management practices. [40 CFR131.10(d)]
"	17. While adding a separate class for constructed conveyances may not be easy, the possibility of doing that should be kept in mind as an alternative. Such an undertaking could fit well with a process to set up cross-state distinctions for temperature and pH. (Page 42)	It is discussed as a possibility in the report.
"	18. Has Ecology not done a Use Attainability Analysis (UAA) to date because it chooses not to? Or because it's too expensive/burdensome? Can the "regulated community" provide part of the resources the State would need to undertake such a UAA? Should there be a UAA done for the Project to be submitted to EPA? (Page 43)	Ecology (like many other states) has not done a UAA to date. The reason for this is speculative but generally, the perceived benefits of conducting a UAA have not outweighed the resource investment. While federal regulation requires the state to conduct the UAA it is possible that the regulated community could fund the UAA. It is beyond the scope of this report to recommend that a UAA be conducted for Project waters, but considering the large size of the Project and the relative uniformity of its waters it

		could be a candidate for a UAA.
Quincy-Columbia Basin Irrigation District	19. Do not quote a 3-28-99 Wenatchee World article stating that there are several unconfirmed reports of steelhead in Red Rock Coulee. (Page 4)	There is always some potential for error from any source of information. This article quoted scientists working for the US Bureau of Reclamation and the part of the article discussing steelhead in Red Rock Coulee was a direct quote from the project leader. There is no reason to suspect that the information is erroneous.
"	20. "Sand Hollow Creek" should be changed to read "Sand Hollow Wasteway" or the "RB4C Wasteway". (Page 4)	My references suggest all three names are used. To avoid confusion I'll include all three names when referring to this water body.
	21. The use of acrolein should be verified in all three irrigation districts. (Page 6)	Acrolein is used in all three Project irrigation districts. The report has been changed to reflect this.
"	22. Change "several" to "three" on page 6 of the report. (Page 6)	Agree. Report language changed.
"	23. I disagree with the implementation strategy mentioned in the second sentence. If the current class standard uses are retained until funding and time are available, the door is left open for unnecessary 303(d) listings where the current criteria is unrealistic and unattainable. If use-based standards are to be implemented then an all out effort for initial cataloging needs to take place from the start. (Page 10)	See response to Comment #5.
"	24. The use attainability analysis section is very confusing. (Page 11)	This section was added to the report to help clarify the description of UAA's found in federal regulation that I found to be somewhat confusing [40 CFR 131.3(g) and 131.10(j)]. I will review this section and attempt to make it less confusing.
"	25. The discussion on page 14 insinuates aquatic herbicide uses in drains and canals where downstream uses need to be	See response to Comment #6. With regard to the protection of uses, year-round waterbodies such as drains

	protected must stop. If this were to occur, the operational and structural integrity of the conveyance facility would be jeopardized. I'm not clear if the "short-term modification" would allow for aquatic herbicide use or not if the need arises. (Page 14)	and wasteways are especially vulnerable to the application of herbicides by the irrigation districts. This is so because these year-round water bodies have more uses that must be protected (instream and downstream) when compared with canals/laterals/drains/wasteways that flow only during the irrigation season. The uses associated with these two broad categories of waters are discussed in Section 6 of the report. Short-term water quality modifications are regularly used to permit the application of aquatic pesticides e.g., for mosquito control or the control of noxious weeds. Jeopardizing the operational and structural integrity of the conveyance facility is a concern shared by Ecology. In this regard, Ecology will work with the irrigation districts and others to minimize risks to the facility. Ecology also does not want to jeopardize the quality of the waters within the Project. We recognize, as discussed in the report, that there are alternatives to the application of herbicides and that some of these are in use within the Project today. These include the sole reliance on mechanical removal of in-water weed growth in all of the drains and wasteways of the South District and the use of grass carp in certain laterals and drains of the East District, both in lieu of the application of aquatic herbicides.
"	26. If Crab Creek and its tributaries are Class B, then one could argue that Potholes Reservoir, Frenchman Hills Wasteway, etc. could also be Class B waters, because they are tributary to Crab Creek. (Page	Potholes Reservoir is a lake. Frenchman Hills Wasteway is tributary to Potholes Reservoir and is therefore Class AA according to the <u>general</u> class designations described on page 19 of the report. Upper Crab Creek is tributary to Moses Lake

	18)	(Lake Class) and it would also be Class AA except that it and its tributaries are specifically classified in the standards as Class B (see page 18 of report).
"	27. In the third sentence "industrial wastewater from farms" should be changed to read "…agricultural return flow from farms". Return flows from farm units is not an industrial waste. (Page 37)	Agree. The suggested language is more clear and will be used.
"	28. Under the existing uses column (page 37, Table 5-5), salmonid migration and rearing are mentioned. If not already done, the existence of salmonids should be investigated a little more through the State Fish and Wildlife Dept. As I understand salmonids, they are artificially introduced in Potholes and some tributaries for harvest purposes only. The reproduction of salmonids (trout) in these waters is questionable. (Page 37)	Salmonids are found in streams, lakes, drains, and wasteways throughout the Project. They may also be found in certain canals and laterals during the irrigation season. Generally, their occurrence in a particular water body may be as a result of intentional stocking, natural migration, or accidental migration (e.g downstream through the canal system from Banks Lake). Where salmonids are found, typical uses for the water body include migration, rearing, and harvesting (i.e. sport fishing). Natural salmonid spawning is generally believed not to occur or to occur rarely in Project waters except for a self-sustaining population of rainbow trout known to exist in upper Crab Creek. Also, adult salmon and steelhead have been reported in three Project waterways (Crab Creek, Sand Hollow Creek, and Red Rock Coulee). A part of the federal definition for existing uses is that where water quality is suitable to support a use, even though the use doesn't exist at the time, that use is considered existing. In this context, the fact that salmonids may or may not have been introduced into a water body may be largely irrelevant when assigning uses. The important question is whether or not the existing or

		attainable water quality is suitable to support the use.
"	29. In cases where salmonids have accidentally migrated through the irrigation system from Banks Lake and are found in wasteways and drains above downstream migratory barriers, this is not a reason for protection as suggested in the fifth sentence (Page 40, paragraph 4). These areas are not open to the public for recreation and violators are considered to be trespassing. (Page 40)	"Waters of the state" are defined in RCW 90.48.020 as "lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the State of Washington." RCW 90.48.030 grants the Department of Ecology "jurisdiction to control and prevent the pollution of streams, lakes, rivers, ponds, inland waters, salt waters, watercourses, and other surface and underground waters of the State of Washington." If irrigation system water bodies are considered waters of the state, then the existing and attainable uses of those water bodies must be protected, regardless of the degree of public access.
"	30. Throughout the report, mention is made that many of the waters within the Columbia Basin Project cannot meet current Class Standards, because they are realistically unattainable. I think some explanation should be given on why standards may be unattainable. For instance temperatures. Being in a hot desert climate, normal ambient conditions dictate normal water temperature, which often times exceed current standards.	Temperature, pH, and dissolved oxygen were discussed in Section 4 of the report as the most commonly violated parameters within the Project to be found on the current 303(d) list. With regard to temperature, a study was referenced in the report suggesting that the duration and magnitude with which water temperatures exceed criteria is greater due to the presence of dams than it would be with dams removed. I was not able to find a detailed study that looked at how water temperature changes as it moves (underground and as surface flow) through the Project.
Environmental Protection Agency – Region 10	31. Another nuance of the federal definition of existing uses is that where water quality is suitable to support a use, even though the use doesn't exist at the time, that use is considered existing (see Questions and	Added to "'Uses' in Federal Law and Regulation" section of report.

	Answers on Antidegradation, EPA, 1985). (Page 10)	
"	32. The use attainability section is somewhat confusing. It isn't the uses in #1 that cause the UAA to be required; it's the absence of the fishable-swimmable uses. (Page 12)	Agree. See response to question 24.
"	33. Although temperature, pH, and DO are the most common reasons for listing, I suspect that nutrients, pesticides/herbicides, and sediment are not regularly measured or they would be a cause for listing, and therefore need to be of concern in considering any change to the applicable uses and criteria. (Page 24 and following)	Agree. There are many water bodies around the state that are not measured regularly and the number of impaired water bodies on the 303(d) list represents only a fraction of the total number of water bodies. Any change to applicable uses and criteria would have to take into account all known and potential causes for listing.
"	34. As noted in the document there are two aspects to the shift to a use-based system: what uses are applicable and what criteria are needed to fully protect those uses. The first sentence in the second paragraph at the top of page 44 is perhaps overly simplistic and optimistic in the presumed variability in the criteria applicable to a given use under a use-based system. Criteria to protect a use may vary on a site-specific basis only if a site-specific criterion has been developed with appropriate technical justification. The current class system already allows for natural conditions exceeding the criterion to become the criterion.	The current flexibility allowing natural conditions exceeding the criterion to become the criterion if retained is the main benefit I envisioned. Because it already exists I'll delete this paragraph.
"	35. If a new use category for constructed conveyances is created wherein wildlife use is the only remaining category to capture the use by biota (invertebrates and waterfowl), there will need to be a	Agree. I will include similar language in the report in "Section 7. Adding a Separate Class for Constructed Conveyances".

	determination of what will constitute criteria to fully support this use (conventional parameters [DO, Temperature, and pH], toxic contaminants, and ammonia). While the conventional parameters for this use might grant some relief and be attainable, I'm not so sure about the other contaminant categories. In other words, simply creating a new set of uses may not alleviate potential compliance problems for these waters with respect to toxic contaminants.	
"	36. This analysis correctly notes that changes to the current system, wherein the Clean Water Act "fishable/swimmable" uses are not adopted or less stringent criteria are adopted for a subcategory of uses, will require a UAA.	Agree.
"	37. One topic not fully explored is the need to assure that downstream uses and water quality are protected by whatever new uses and criteria are designated (I assume this is how the "tributary rule" evolved in the first place).	I will add a sentence stating this to the first paragraph of the "Protection of Downstream Uses" part of Section 3.
Washington State Dept. of Fish and Wildlife – Ephrata Office	38. "….WDFW will not support any state or federal changes that would reduce current water quality protection in Washington. In fact, you will be finding WDFW will only be more persistent in pursuing that current rules and regulations are being suitably imposed to protect and restore waters of the state, particularly where degraded waters are contributing to fish and wildlife declines or inhibiting their	Ecology does not intend to reduce protection for existing in-stream uses and we support and share your goal of being more persistent in pursuing clean water goals.

	recovery efforts."	
"	39. "More specifically addressing your document, it states on page 8, paragraph 3, under Potential Use-Based approach: "An alternative use-based organization of the standards eliminates the classes and instead provides for the assignment of individual, designated uses to each water body independently. These assigned or designated uses are intended to reflect actual existing and attainable uses for a given water body." The fact that your term "attainable" is not defined, I assume you are making a reference to what is currently attainable. Considering the dynamic nature of the science for improving water quality protection WDFW finds this premise unacceptable for long-term water quality protection or recovery. In fact we are concerned, utilizing this use-based approach could well facilitate allowing further degradation of specific waters or precluding them from future restoration efforts which would not be in the best interest of the public or fish and wildlife.	"Attainable" is defined on page 10 in the subsection entitled "'Uses' in Federal Law and Regulation" as follows: "Uses are considered attainable under 40 CFR 131.10(d) if they can be achieved, at a minimum, by the imposition of effluent limits (point sources) and cost-effective and reasonable best management practices (non-point sources)." The word "imposition" in this definition suggests that these uses are not currently attainable (as you surmise) but rather uses that could be achieved in the future as a result of sacrifice (e.g. limits or BMPs). The primary weakness of the class-based system is the default nature of assigning uses to a water body. Once a class is assigned to a water body you get all the uses of that class whether they exist or not, whether they are attainable or not. The primary strength of the use-based approach is the flexibility to customize existing and attainable uses to a particular water body. "Flexibility" here and in the report does not mean weak or bendable. Rather it means utility in producing standards that are more accurate i.e., standards that encompass both an existing reality and an attainable future reality.
"	40. Your document further states on page 9, paragraph 1, "The current standards were organized into a class-based system in order to assign a set of default uses and attendant criteria to water bodies in lieu of determining actual uses and criteria. The statewide scope of the standards precluded the individual determination on the	This section of the report was added to provide historical context only – not to complain about a lack of resources. If Ecology adopts the use-based approach, we would not be starting from scratch. The most likely implementation scenario, as described in the report on pages 10 and 44, "starts with the dropping of all class

	presence of specific uses in each water body (i.e. there were not enough resources available to Ecology to catalog uses and criteria for all the state's surface waters). A significant problem with the existing class-based approach is that some of the default designated uses and criteria assigned by a class to specific water bodies do not reflect actual existing uses – they may be too stringent, not stringent enough, or the use may not exist at all." Although our agency can appreciate when an agency lacks sufficient commitments or funds to adequately implement a program, our agency contends these are long-term projects to be pursued over many years. If not perpetually to address changing conditions they should not be abandoned due to temporary funding limitations. Additionally, it would not appear from the above reference that Ecology could improve water quality protection measures by taking on a new water classification system that would require starting from "scratch" on yet another statewide water inventory/classification when the last one could not be completed.	designations but the retention of all uses and criteria currently listed in the standards for each water body. Then, as necessity and resources allow, the assignment of existing and attainable uses and criteria would follow, perhaps systematically as part of the current five-year watershed management cycle." This "crosswalking" of uses and criteria in the first phase means that the standards would remain essentially as they are today. The second phase of cataloging actual existing and attainable uses would be implemented over years and would represent a long-term commitment to make the standards better in terms of accuracy, utility, and environmental protection. This evolutionary approach fits well with the existing federal regulatory requirement, to which Ecology subscribes, to revisit standards on a regular basis (the triennial review process). In fact, to increase its responsiveness, Ecology is considering modifying its review process from the current triennial review period to an annual or biennial period.
"	41. If in fact, Ecology is trying to more adequately reflect "existing water conditions" it appears the current class-based system provides this opportunity as stated on page 9, paragraph 1, "The current standards have attempted to correct this problem by allowing certain water bodies to have "special	As stated in the final sentence of this paragraph 1, page 9, the current standards do not have special condition <u>uses</u> analogous to the special condition <u>criteria</u> you mention. That is to say, under the current class-based system uses don't change but criteria may. And changing criteria is difficult because criteria to protect a use may vary only if a site-specific

	condition" criteria, that reflect actual conditions". Obviously this would require more fieldwork and documented science, however, it would appear this would demand less resources than implementing the new use-based system.	criterion has been developed with appropriate technical justification. See Comment #34.
"	42. In summary WDFW would not support Ecology's considerations for changing the surface water quality standards from current class-based system to a use-based system in the Columbia Basin Project area or anywhere else in the state of Washington. Based on the information provided in this document, WDFW believes this approach would provide for less water quality protection and or future recovery of water quality, ultimately further contributing to degraded water quality impacts (on) fish and wildlife dependent upon state water. Lastly, we believe with adequate implementation of the current class-based system, Ecology's desires to more adequately reflect current conditions could be met.	In light of the clarification offered by the responses to comments #38 – 41 above, WDFW may reconsider at least some of their objections. In any case, Ecology will consider all comments received from reviewers of this report, from focus groups, and from any other interested parties before deciding whether or not to adopt a use-based system of classification. However the standards are ultimately organized, Ecology's overarching goal, as described in the report (section 3, paragraph 1), is to produce water quality standards that protect public health and welfare, enhance the quality of the water and serve the purposes of the Clean Water Act.