

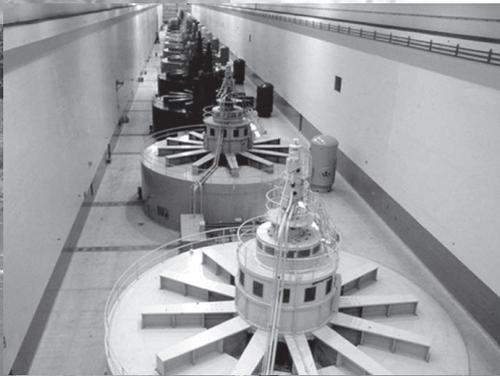
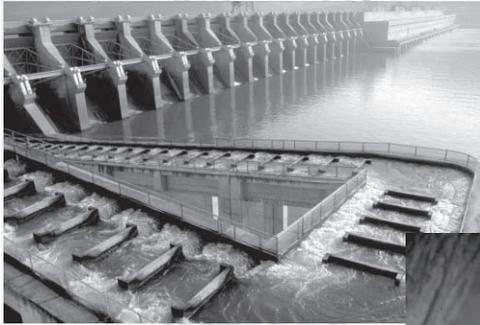


US Army Corps
of Engineers®
Portland District

Salmon Recovery through John Day Reservoir

John Day Drawdown Phase I Study

Engineering Technical Appendix Utilities Section



September 2000

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Section 1. Introduction

This technical appendix section documents the results of the utilities evaluation for the John Day Drawdown Phase I Study. This Phase I Study is a reconnaissance-level evaluation of the potential consequences and benefits of the proposed drawdown of the John Day Reservoir. This technical appendix section supplements the main report, which describes more fully the alternatives, purpose, scope, objectives, assumptions, and constraints of the study.

Section 2. Background of the Project

In 1991, the National Marine Fisheries Service (NMFS) proposed that Snake River wild sockeye, spring/summer chinook, and fall chinook salmon be granted “endangered” or “threatened” status under provisions of the Endangered Species Act. Natural resource agencies believe that the drawdown of the 76-mile John Day Reservoir may provide substantial improvements in migration and rearing conditions for juveniles by increasing river velocity, reducing water temperature and dissolved gas, and restoring riverine habitat. It is also speculated that drawdown may improve spawning conditions for adult fall chinook by restoring spawning habitat and the natural flow regimes needed for successful incubation and emergence.

As a result, the NMFS Reasonable and Prudent Alternative Action #5 of its’ Biological Opinion on Operation of the Federal Columbia River Power System (FCRPS), and subsequent reports recommended that USACE investigate the feasibility of lowering John Day Reservoir. In compliance with appropriation conditions, only two alternatives were to be evaluated: reduction of the current water surface elevation 265 to the level of the spillway crest that would vary between elevations 217 and 230, or reduction to natural river level elevation 165. Both alternatives were proposed by NMFS. These two alternatives were then expanded to consider each alternative with 500,000 acre-feet of flood storage and without such storage. Flood storage and hydropower are the current approved authorizations for the John Day project.

Section 3. Description of the Study Area

The Columbia River originates in Canada and flows for 300 miles through eastern Washington to Oregon and continues west to the Pacific Ocean, as shown in [Figure 1](#). The adjoining region is mostly open country, with widely scattered population centers. The climate of the region is semiarid. Agriculture, open space, and large farms are prevalent. Lands adjacent to the reservoir are used to grow grains and other crops. The reach of the Columbia River under consideration in this report extends from John Day Lock and Dam at river mile (RM) 215.6, to McNary Lock and Dam RM 291. The body of water impounded by John Day Dam, Lake Umatilla, is referred to as the John Day Reservoir throughout this report. The John Day is the second longest reservoir on the Columbia River, extending 76 miles upstream to McNary Dam.

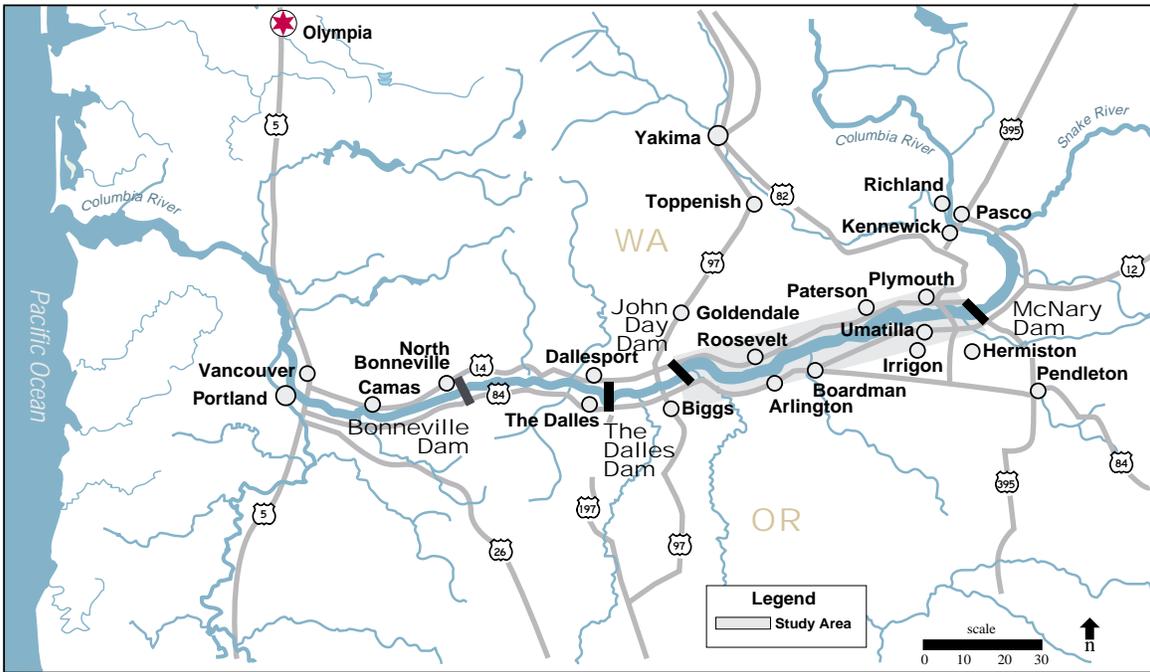


Figure 1. John Day Drawdown Phase 1 Study Area

John Day Dam and Reservoir are part of the Columbia-Snake Inland Waterway. This shallow-draft navigation channel extends 465 miles from the Pacific Ocean at the mouth of the Columbia River to Lewiston, Idaho. The entire channel consists of three segments. The first is the 40-foot-deep water channel for ocean-going vessels that extends for 106 miles from the ocean to Vancouver, Washington. The second is a shallow-draft barge channel that extends from Vancouver to The Dalles, Oregon. Although this section is authorized for dredging to a depth of 27 feet, it is currently maintained at 17 feet. The third section of the channel is authorized and maintained at a depth of 14 feet and extends from The Dalles to Lewiston. In addition to the main navigation channel, channels are dredged to numerous ports and harbors along the river.

The middle Columbia River area is served by a well-developed regional transportation system consisting of highways, railroads, and navigation channels. Railroads and highways parallel the northern and southern shores of the reservoir. Interstate 84 (I-84), a divided multilane highway, runs parallel on the south shore with the Columbia River from Portland, Oregon, to points east. Washington State Route 14 (SR-14) also parallels the Columbia River from Vancouver to McNary Dam on the north shore. Umatilla Bridge at RM 290.5, downstream from McNary Dam, is the only highway bridge linking Oregon and Washington across the Columbia River in the John Day Reservoir.

The study area includes lands directly adjacent to the reservoir as well as those directly and indirectly influenced by the hydrology of the reservoir (e.g., irrigated lands). It includes the reservoir behind the John Day Dam, and adjoining backwaters, embayments, pools, and rivers.

Section 4. Alternatives

The Phase 1 Study includes a preliminary evaluation of the impacts of the drawdown scenarios relative to the “without project condition,” which is defined as the condition that would prevail into the future in the absence of any new federal action at John Day. The four alternatives are summarized below. One of the most important constraints on the alternatives is the requirement to pass fish for river flows up to the 10-year flood flow of 515,000 cfs. Under the four alternatives, John Day Reservoir would be drawn down at a rate of one foot per day. For greater detail, please refer to the main report, *John Day Drawdown Phase 1 Study*, and *John Day Drawdown Phase 1 Study, Engineering Technical Appendix, Structural Alternatives Section*.

4.1. Spillway Drawdown without Flood Control (Alternative 1)

The first drawdown alternative is based on requirements for improved downstream fish passage conditions during both low and flood flow conditions on the Columbia River. The existing 20-bay spillway will be operated differently from current operations, but without any structural modifications. All project inflows will be directly passed through the dam spillway with the spillway gates fully opened in free overflow condition, resulting in a pool elevation that will vary from elevation 217 to 230. Impacts downstream from John Day Dam were not studied.

4.2. Spillway Drawdown with Flood Control (Alternative 2)

The second study alternative is based on requirements for improved downstream fish passage conditions during low flow periods, while maintaining authorized flood control for the John Day Project. The existing 20-bay spillway will be operated differently from current operations, but without any structural modifications. During low flow periods, project inflows will be directly passed through the dam spillway with the spillway gates set in fully open, free overflow condition. During a flood event, however, the spillway gates will be controlled to reduce downstream flood flows based on using 500,000 acre-feet of allocated project storage space. Ponding will occur upstream from the dam. Impacts downstream from John Day Dam were not studied.

4.3. Natural River Drawdown without Flood Control (Alternative 3)

The third study alternative is based on a natural river drawdown for fish passage “without flood control” condition. Natural river conditions pertain to an opening at the John Day Dam that permits acceptable upstream fish passage conditions. The size of the total dam opening must conform to two criteria based on an invert elevation at the dam of 135. The first criterion is that the opening must be sufficiently large to meet maximum allowable stream velocity criteria for sustained swim speed for the weakest salmon species, which is estimated to be 10 feet per second (fps). The second criterion is that fish passage for this opening must correspond to the 10-year annual flood peak (515,000 cfs). This alternative will require extensive modifications to John Day Dam even beyond modification of the 1,228-foot long spillway structure. Impacts downstream from John Day Dam were not studied.

4.4. Natural River Drawdown with Flood Control (Alternative 4)

This fourth study alternative is based on natural river conditions for fish passage and includes the “with flood control” condition. It requires natural fish passage conditions for both upstream and downstream directions at the dam and includes a requirement for full authorized flood control. The calculated width of the total dam opening will correspond to that previously calculated for natural river conditions without flood control (Alternative 3). Impacts downstream from John Day Dam were not studied.

Section 5. Existing Information

Phase I of the study will use existing information as detailed in the John Day Drawdown, Phase I Scope of Study. Existing information obtained during the Minimum Operating Pool (MOP) Drawdown Study was used to determine utility impacts and modifications. Twenty-three utilities have been identified along the reservoir. With the exception of seven, none of the remaining utilities (electrical lines, telephone lines, and gas lines) cross the reservoir. Existing information is shown in [Table 1](#). Site locations are shown on [Plates 1 through 6](#).

Table 1. Existing Utilities	
Utility Name	Preliminary Findings
Benton Rural Electric Assoc. (Plymouth Park)	Possibly an underground cable to Plymouth Park.
William Gas Pipeline - West (formally Northwest Pipeline)	Two 20" diameter gas pipes crossing under the Columbia River between east of Irrigon, OR and Plymouth, WA.
City of Arlington, OR (Sanitary Sewer)	Sanitary sewer located in water approximately 90 feet deep (from pool elevation 264).
City of Umatilla, OR (Sanitary Sewer)	Sanitary sewer outfall exposed at elevation 263. If pool is lowered city is in violation of the mixing zone requirements under their NPDES permit. NPDES: National Pollution Discharge Elimination System
City of Roosevelt, WA (Sanitary Sewer)	Sanitary sewer system with an outfall to the Columbia River. Outlet designed below pool elev. 257 (per as-built drawings). It is not currently operating.
City of Boardman, OR (Sanitary Sewer)	Sanitary sewer system with an outfall to the Columbia River. Outlet designed below pool elev. 257 (per as-built drawings). It is not currently operating.
Goldendale Aluminum Co. (Sanitary Sewer)	Sanitary sewer outlet is approximately 27 feet below "low water".
Bonneville Power Administration (BPA)	Aerial crossings at RM 262 (20 wires) and RM 290.5 (15 wires).
Umatilla Electric Cooperative	No underground facilities, only aerial lines. All lines are well back from river.
Klickitat County PUD	No underground facilities, only aerial lines. All lines are well back from river.
Wasco County Elec. Coop.	No service upstream of Rufus, OR.
Pacific Power and Light (PPL)	No crossings. All other lines are aerial and well back from the river.
Benton County PUD	They have no facilities that would be affected by pool drawdown.
U.S. West	No crossings, only lines are parallel to the river.
United Telephone Co. of the NW	No crossings
General Telephone and Electronics Pacific Telecom, Inc. (PTI)	No facilities along the pool. Facilities in both Fossil, OR and Boardman, OR but none of system expected to be affected.
American Telephone and Telegraph (ATT)	No crossings of Columbia River, just parallel lines along I-84.
Sprint	No crossings.
MCI	No crossings.
Pacific Gas Transmission Co.	Their only facility is a pipeline that crosses the John Day River, south of Condon. Therefore, pool drawdown will not affect their system.
Cascade Natural Gas Co.	They have no facilities that would be affected by pool drawdown.
City of Moro, OR (Sanitary Sewer)	Sewer outfall does not use the Columbia River as a receiving water.

Section 6. Impacts and Modifications

Seven utilities along and/or crossing the reservoir that may be affected include an electrical utility, gas pipeline, and five sanitary sewer outfalls (shown in bold on [Table 1](#)). Impacts and possible modifications include:

- **Benton Rural Electric Association.** Possible exposure of an underwater electrical utility between Plymouth, WA, and Plymouth Park may require relocation.
- **William Gas Pipeline - West.** Two, 20-inch-diameter gas pipelines crossing approximately 4 miles upstream of Irrigon, OR (RM 286.3). Increased velocity may result in an increase in scour, requiring riprap protection. See [Plate 6](#) for location.
- **Sanitary Sewer Outfalls.** Sanitary sewer outfalls for the cities of Arlington, Umatilla, and Boardman OR; Roosevelt, WA; and Goldendale Aluminum Company will be exposed, resulting in National Pollution Discharge Elimination System (NPDES) permit violations. Outfall pipes for the cities of Umatilla, Boardman, Arlington, and Roosevelt and for Goldendale Aluminum will require extensions into the lowered river level. See [Plates 1](#) through [6](#) for locations.

Impacts and modifications to the electrical utility crossing, gas pipeline crossing, and the Umatilla sanitary sewer outfall remain the same for each alternative. Modifications to the sanitary sewer outfalls for Boardman, Arlington, Roosevelt, and Goldendale Aluminum change under each alternative.

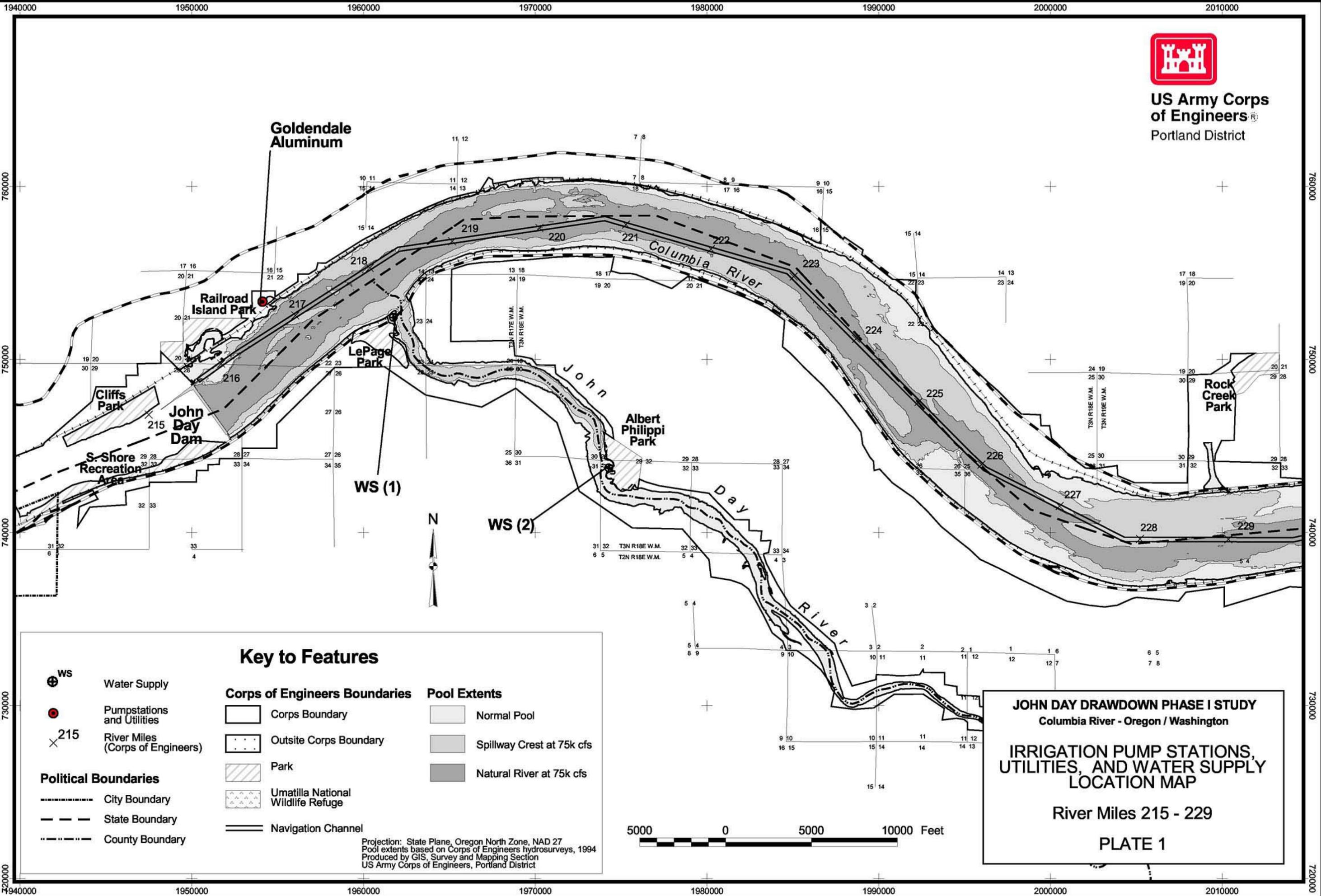
Section 7. Operation and Maintenance (O&M)

Additional O&M will be required for increased monitoring of the utility modifications following drawdown. The increased monitoring is estimated to be required over a 5-year period at \$10,000 per year.

Plates



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Key to Features

- | | | |
|---|---|---|
| <ul style="list-style-type: none"> WS (circle with cross) Water Supply ● Pumpstations and Utilities × 215 River Miles (Corps of Engineers) | <p>Corps of Engineers Boundaries</p> <ul style="list-style-type: none"> □ Corps Boundary □ Outside Corps Boundary ▨ Park ▨ Umatilla National Wildlife Refuge ▬ Navigation Channel | <p>Pool Extents</p> <ul style="list-style-type: none"> □ Normal Pool ▨ Spillway Crest at 75k cfs ▨ Natural River at 75k cfs |
| <p>Political Boundaries</p> <ul style="list-style-type: none"> --- City Boundary - - - State Boundary - · - · - County Boundary | | |

Projection: State Plane, Oregon North Zone, NAD 27
Pool extents based on Corps of Engineers hydrosurveys, 1994
Produced by GIS, Survey and Mapping Section
US Army Corps of Engineers, Portland District



JOHN DAY DRAWDOWN PHASE I STUDY
Columbia River - Oregon / Washington

**IRRIGATION PUMP STATIONS,
UTILITIES, AND WATER SUPPLY
LOCATION MAP**

River Miles 215 - 229

PLATE 1

2010000

2020000

2030000

2040000

2050000

2060000

2070000



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Harris Farms Pump Station

Roosevelt Park

Rock Creek Park

Arlington

Columbia River

Key to Features

⊕^{WS} Water Supply

● Pumpstations and Utilities

×²¹⁵ River Miles (Corps of Engineers)

Political Boundaries

--- City Boundary

- - - State Boundary

- · - · - County Boundary

Corps of Engineers Boundaries

▭ Corps Boundary

▭ Outsite Corps Boundary

▨ Park

▨ Umatilla National Wildlife Refuge

▬ Navigation Channel

Pool Extents

▭ Normal Pool

▭ Spillway Crest at 75k cfs

▭ Natural River at 75k cfs

Projection: State Plane, Oregon North Zone, NAD 27
Pool extents based on Corps of Engineers hydrosurveys, 1994
Produced by GIS, Survey and Mapping Section
US Army Corps of Engineers, Portland District



JOHN DAY DRAWDOWN PHASE I STUDY
Columbia River - Oregon / Washington

**IRRIGATION PUMP STATIONS,
UTILITIES, AND WATER SUPPLY
LOCATION MAP**

River Miles 228 - 242

PLATE 2

760000

750000

740000

730000

720000

760000

750000

740000

730000

720000

2070000 2080000 2090000 2100000 2110000 2120000 2130000 2140000

790000
780000
770000
760000
750000

790000
780000
770000
760000
750000

Key to Features

- Water Supply
 - Pumpstations and Utilities
 - River Miles (Corps of Engineers)
- Political Boundaries**
- City Boundary
 - State Boundary
 - County Boundary

Corps of Engineers Boundaries

- Corps Boundary
- Outside Corps Boundary
- Park
- Umatilla National Wildlife Refuge
- Navigation Channel

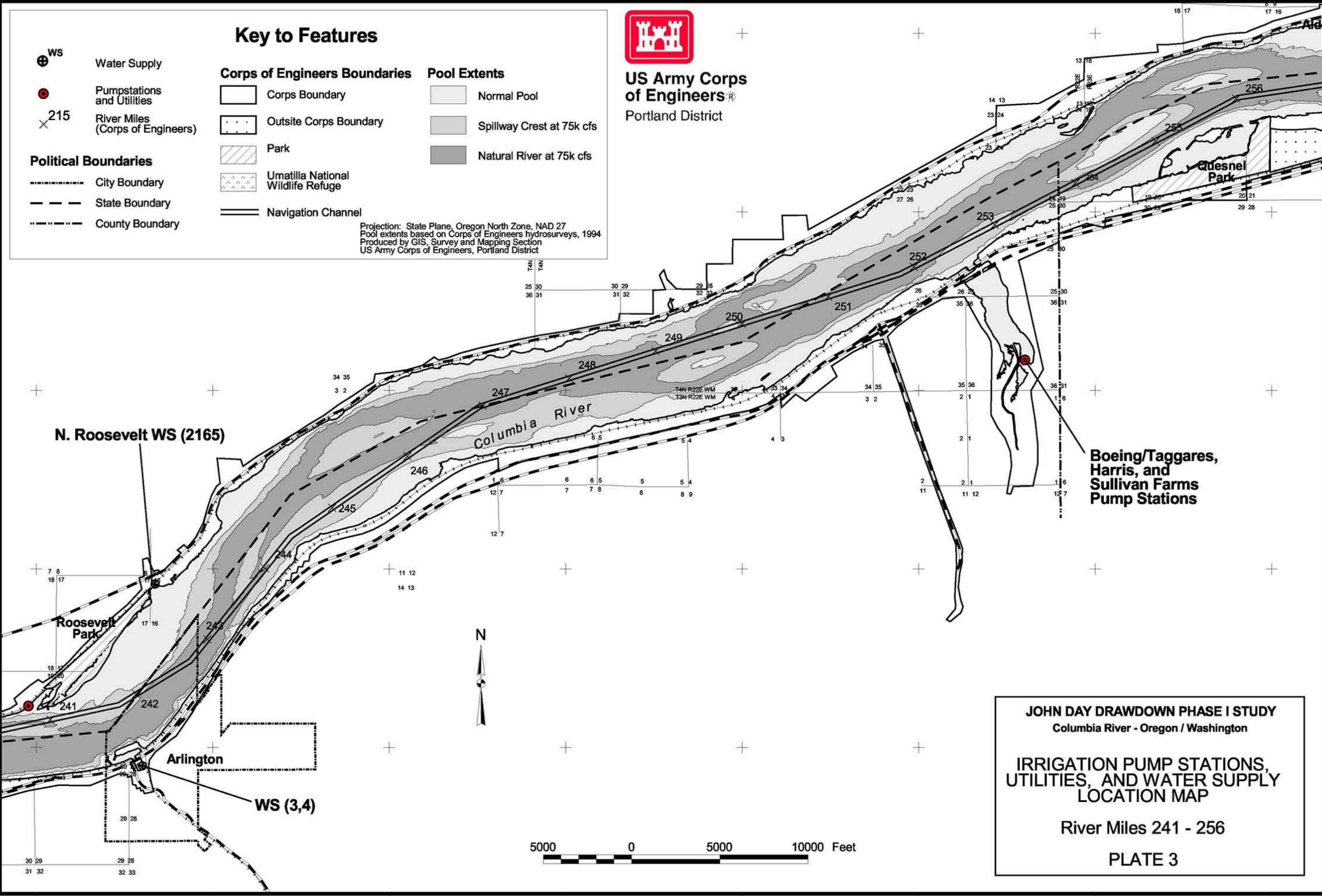
Pool Extents

- Normal Pool
- Spillway Crest at 75k cfs
- Natural River at 75k cfs



US Army Corps of Engineers
Portland District

Projection: State Plane, Oregon North Zone, NAD 27
Pool extents based on Corps of Engineers hydrosurveys, 1994
Produced by GIS, Survey and Mapping Section
US Army Corps of Engineers, Portland District



N. Roosevelt WS (2165)

Roosevelt Park

Arlington

WS (3,4)



Boeing/Taggares,
Harris,
and
Sullivan Farms
Pump Stations

JOHN DAY DRAWDOWN PHASE I STUDY
Columbia River - Oregon / Washington

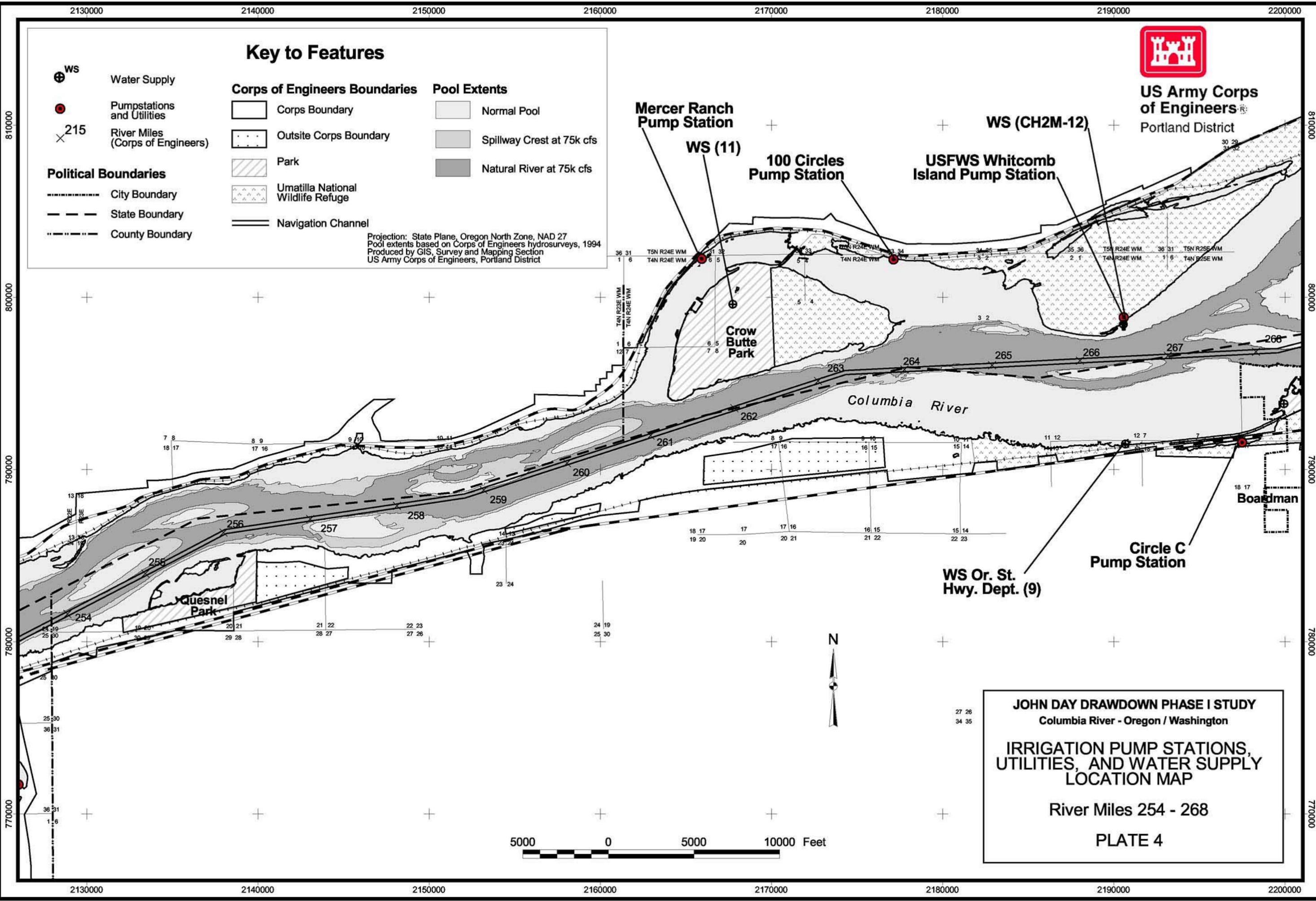
**IRRIGATION PUMP STATIONS,
UTILITIES, AND WATER SUPPLY
LOCATION MAP**

River Miles 241 - 256

PLATE 3

5000 0 5000 10000 Feet

2070000 2080000 2090000 2100000 2110000 2120000 2130000 2140000



Key to Features

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> WS Water Supply Pumpstations and Utilities 215 River Miles (Corps of Engineers) | Corps of Engineers Boundaries <ul style="list-style-type: none"> Corps Boundary Outsite Corps Boundary Park Umatilla National Wildlife Refuge Navigation Channel | Pool Extents <ul style="list-style-type: none"> Normal Pool Spillway Crest at 75k cfs Natural River at 75k cfs |
|--|---|---|

- Political Boundaries**
- City Boundary
 - State Boundary
 - County Boundary

Projection: State Plane, Oregon North Zone, NAD 27
 Pool extents based on Corps of Engineers hydrosurveys, 1994
 Produced by GIS, Survey and Mapping Section
 US Army Corps of Engineers, Portland District



US Army Corps of Engineers
 Portland District

WS (CH2M-12)

Mercer Ranch Pump Station

WS (11)

100 Circles Pump Station

USFWS Whitcomb Island Pump Station

Crow Butte Park

Columbia River

Quesnel Park

Boardman

Circle C Pump Station

WS Or. St. Hwy. Dept. (9)



JOHN DAY DRAWDOWN PHASE I STUDY
 Columbia River - Oregon / Washington

**IRRIGATION PUMP STATIONS,
 UTILITIES, AND WATER SUPPLY
 LOCATION MAP**

River Miles 254 - 268

PLATE 4

2190000 2200000 2210000 2220000 2230000 2240000 2250000

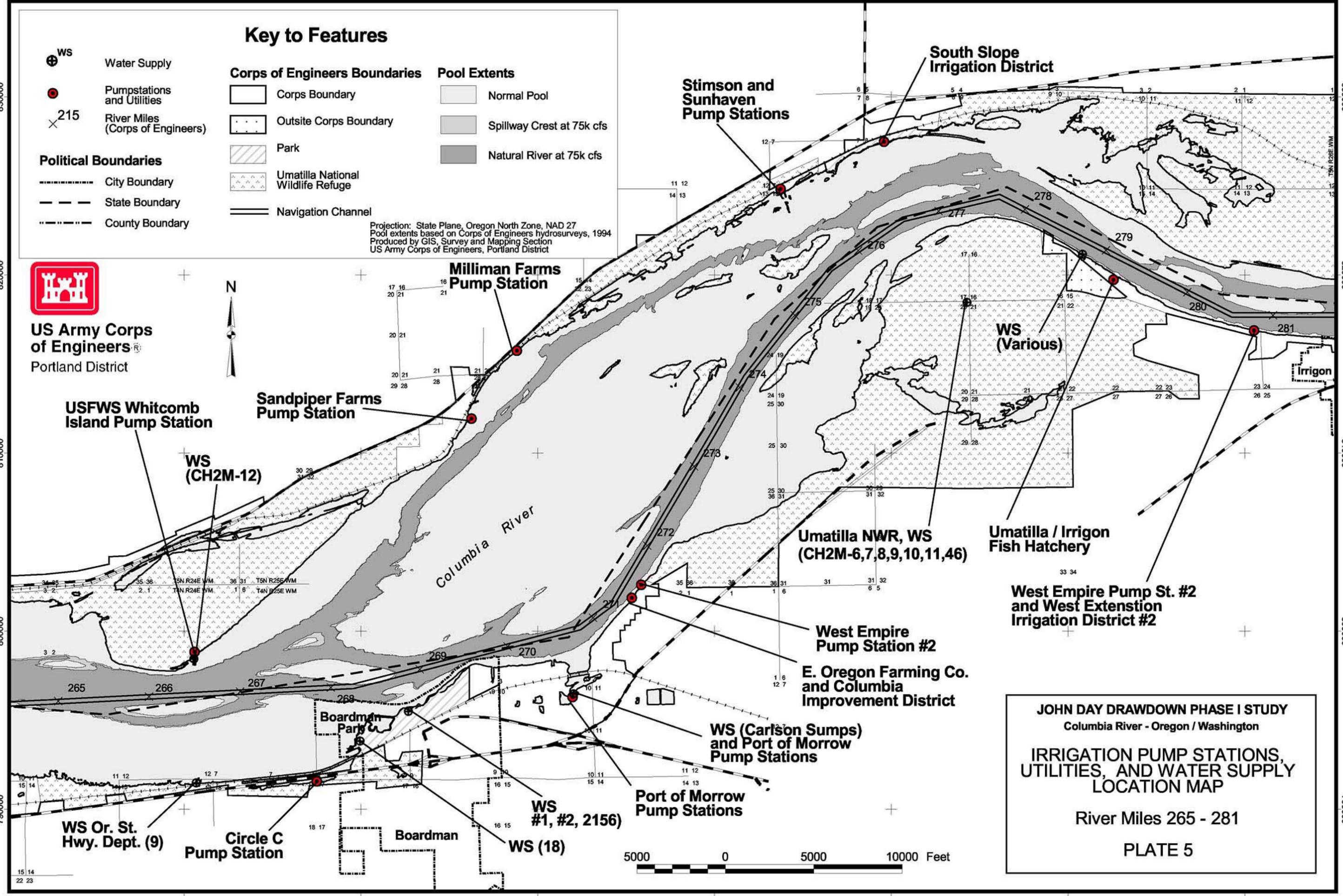
Key to Features

- WS** Water Supply
- Pumpstations and Utilities**
- River Miles (Corps of Engineers)** 215
- Political Boundaries**
 - City Boundary
 - State Boundary
 - County Boundary
- Corps of Engineers Boundaries**
 - Corps Boundary
 - Outside Corps Boundary
 - Park
 - Umatilla National Wildlife Refuge
 - Navigation Channel
- Pool Extents**
 - Normal Pool
 - Spillway Crest at 75k cfs
 - Natural River at 75k cfs

Projection: State Plane, Oregon North Zone, NAD 27
Pool extents based on Corps of Engineers hydrosurveys, 1994
Produced by GIS, Survey and Mapping Section
US Army Corps of Engineers, Portland District



US Army Corps of Engineers
Portland District



JOHN DAY DRAWDOWN PHASE I STUDY
Columbia River - Oregon / Washington

**IRRIGATION PUMP STATIONS,
UTILITIES, AND WATER SUPPLY
LOCATION MAP**

River Miles 265 - 281

PLATE 5

2190000 2200000 2210000 2220000 2230000 2240000 2250000

830000
820000
810000
800000
790000

830000
820000
810000
800000
790000

2240000 2250000 2260000 2270000 2280000 2290000 2300000 2310000

850000
840000
830000
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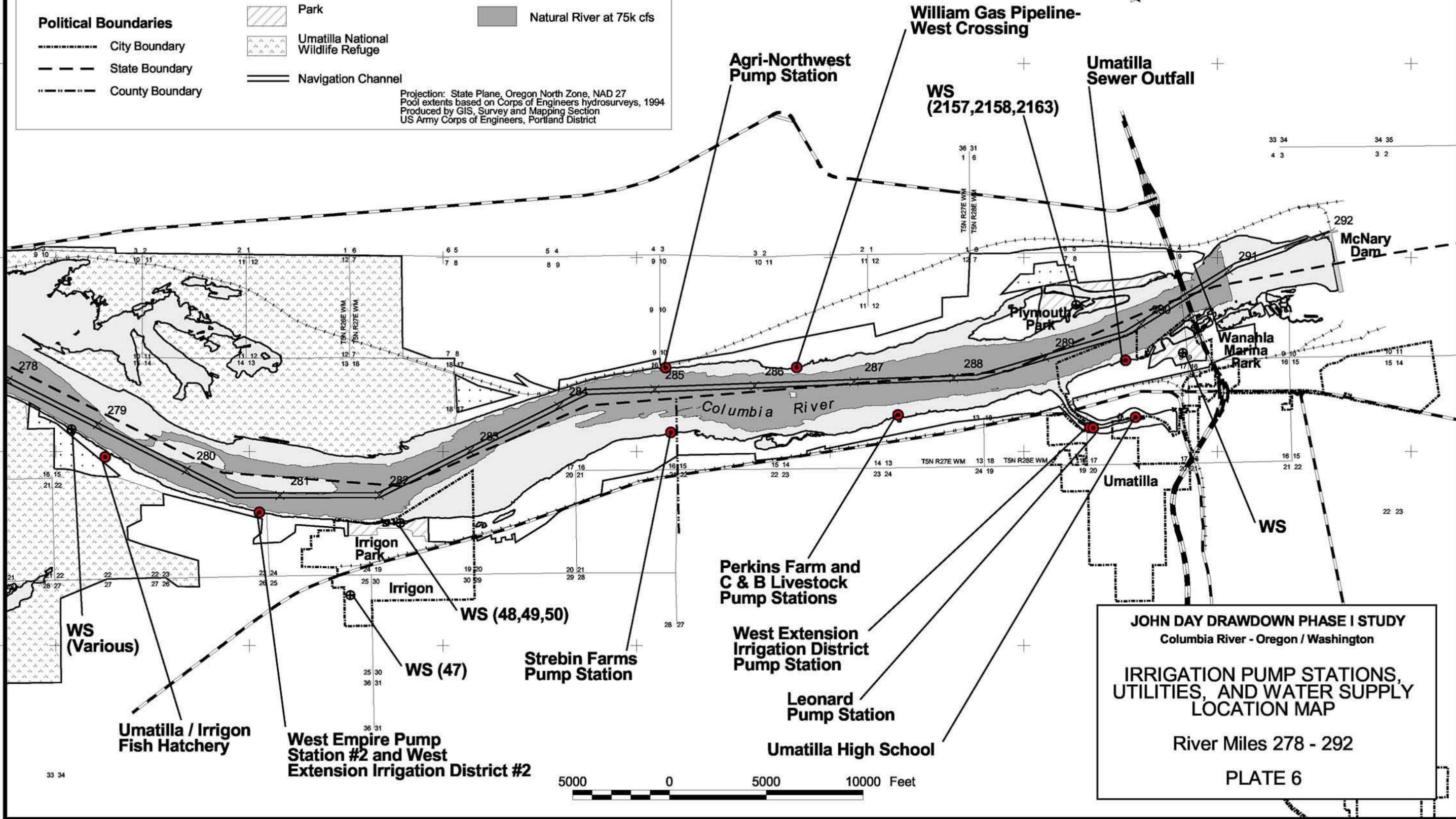
Key to Features

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Pool extents based on Corps of Engineers hydrosurveys, 1994
Produced by GIS, Survey and Mapping Section
US Army Corps of Engineers, Portland District



US Army Corps of Engineers
Portland District



JOHN DAY DRAWDOWN PHASE I STUDY
Columbia River - Oregon / Washington

**IRRIGATION PUMP STATIONS,
UTILITIES, AND WATER SUPPLY
LOCATION MAP**

River Miles 278 - 292

PLATE 6



2240000 2250000 2260000 2270000 2280000 2290000 2300000 2310000