



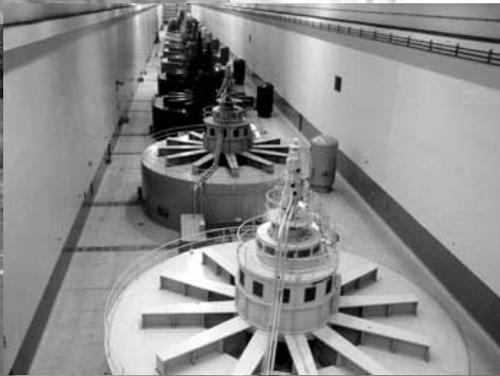
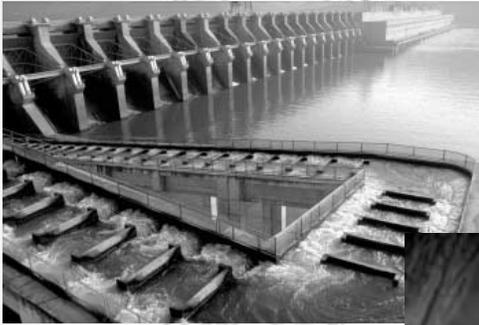
US Army Corps  
of Engineers®  
Portland District

# Salmon Recovery through John Day Reservoir

## John Day Drawdown Phase I Study

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### Engineering Technical Appendix Hazardous, Toxic and Radioactive Waste Section



September 2000

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## **SECTION 1. Introduction**

This technical appendix section documents the results of the Hazardous, Toxic, and Radioactive Waste (HTRW) 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.

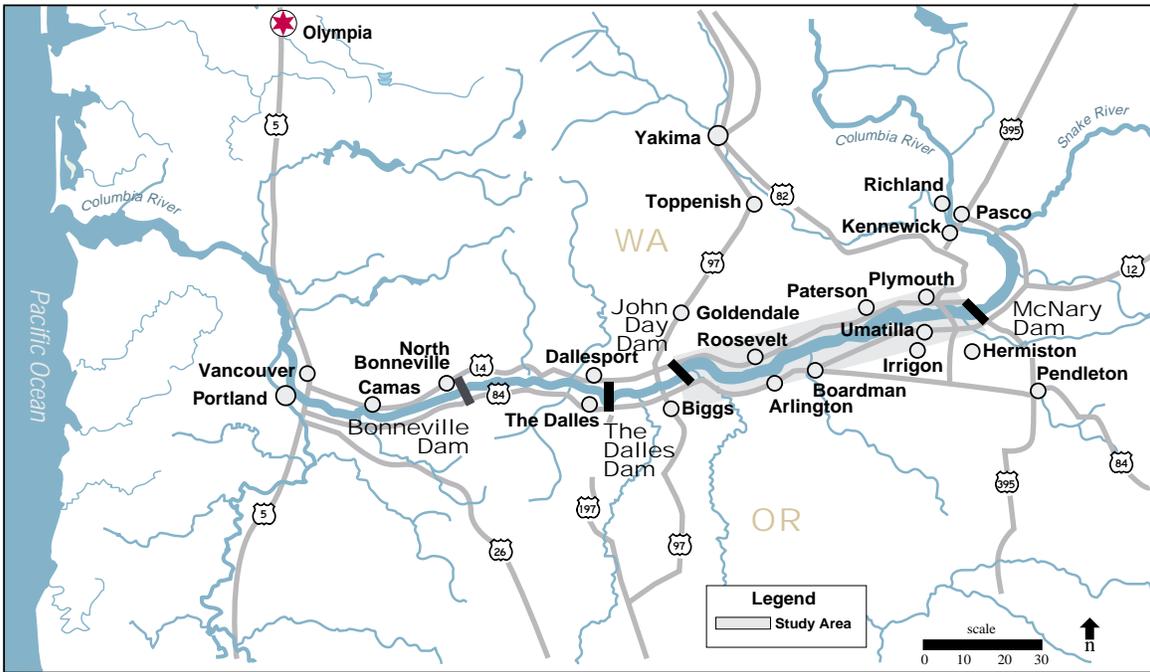


Figure 1. John Day Drawdown Phase 1 Study Area

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. HTRW Overview**

As part of the Phase I Study an investigation was undertaken to determine the potential for encountering HTRW during drawdown (in accordance with ER 1165-2-132), and future actions that may be necessary for further investigation and/or necessary remediation. Much of the investigation focuses on lands presently inundated by the John Day Reservoir that would be exposed during drawdown. While solid waste and possibly HTRW may be encountered throughout the reservoir, the greatest likelihood of such encounters is near towns which were totally or partially relocated for the reservoir (Umatilla, Boardman, and Arlington, Oregon; and Roosevelt, Washington), as well as the Goldendale Aluminum smelter located just upstream of John Day Dam in Washington. Each of those locations is discussed in detail, below. Federal- and state-regulated sites along the John Day Reservoir are identified by number in the text and shown on a map at the end of this section ([Plates 1 to 6](#)).

Due to the large number of underground storage tank (UST) sites, only those sites with either currently active or leaking USTs located on the riverbank are shown on the map.

## **SECTION 6. Federal Regulated Sites Along the John Day Reservoir**

The U.S. Environmental Protection Agency (EPA) may regulate sites under several federal laws. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, commonly known as Superfund) regulates abandoned hazardous waste sites. The inventory of sites evaluated under CERCLA is in the database CERCLIS. The Resource Conservation and Recovery Act (RCRA) regulates sites where hazardous materials were used, stored, and/or disposed which were in operation when the law was signed in 1976 or which began operations after that date. The Emergency Preparedness and Community Right to Know Act (EPCRA) requires operating facilities which use, store, or dispose of hazardous chemicals on their property to report data to the EPA, which the EPA inputs into a database called the Toxics Release Inventory (TRI). A facility on the TRI may or may not have contamination present in any medium (soil, surface water, groundwater, sediment). The Clean Water Act requires all facilities that discharge effluent into a waterway to obtain a National Pollution Discharge Elimination System (NPDES) permit, which specifies maximum concentrations of contaminants (chemicals, pathogens) and/or physical properties (temperature, turbidity) which can be discharged by a particular facility. The following information was obtained from EPA databases on the Internet on April 13, 1999. Only those sites that are within the immediate river valley are listed in this appendix.

### **6.1 CERCLIS Listings**

Five John Day Reservoir sites are on the CERCLIS list<sup>1</sup>:

- John Day Dam
- Three Mile Canyon (a Portland District cleanup site 8 miles east of Arlington, Oregon)
- Puregro Company (Umatilla, Oregon)
- Martin Marietta Aluminum (now Goldendale Aluminum, Goldendale, Washington)
- Northwest Pipeline (Plymouth, Washington)

All five sites are classified in CERCLIS as No Further Remedial Action Planned, which means the sites are not contaminated enough to be Superfund sites. Although there is no EPA interest in these sites, the equivalent state regulatory agency may require additional investigation/cleanup. The only current Superfund site in the area is the Umatilla Army Depot, an active chemical weapons storage facility located southwest of Umatilla, Oregon. The depot is located on a ridge away from the Columbia River and will not be affected by drawdown.

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<sup>1</sup> Note: numbers following listed sites can be referenced to the map included at the end of this document.

## **6.2 RCRA Listings**

There are no RCRA treatment, storage, and disposal facilities on the John Day Reservoir.

## **6.3 EPCRA TRI Listings**

Two sites on the John Day Reservoir are required to report under EPCRA: Goldendale Aluminum, Goldendale, Washington, and Lamb-Weston Inc., Boardman, Oregon.

## **6.4 NPDES Permits**

There are four NPDES permits for discharge into the John Day Reservoir: Lamb-Weston Inc., Boardman, Oregon, City of Umatilla (Oregon) sewage treatment plant, City of Arlington (Oregon) sewage treatment plant, and Goldendale Aluminum, Goldendale, Washington.

# **SECTION 7. State-Regulated Sites Along the John Day Reservoir**

## **7.1 Oregon**

The state of Oregon maintains several listings of contaminated or potentially contaminated sites. The Environmental Cleanup Site Inventory (ECSI) lists sites where a hazardous substance release is known or suspected. Sites on this list may or may not have contamination present in any medium. The Confirmed Release List is a listing of sites where contamination has been confirmed via chemical testing. The underground storage tank (UST) facilities list is a listing of all registered USTs in the state. These UST facilities may or may not have contamination present in any medium. The UST Cleanup list is a listing of all registered USTs where a release has been confirmed. Only those sites that are within the immediate river valley are listed here.

### **7.1.1 ECSI List**

There are 11 sites on the John Day Reservoir on the ECSI list updated February 19, 1999. These sites include:

- John Day Dam
- Three Mile Canyon cleanup site east of Arlington
- Portland General Electric Carty Reservoir Power site in Boardman
- Morrow County Roadside Gasoline Release at the Port of Morrow (east of Boardman)
- (Former) Ready Mix Asphalt Batch Plant at the Port of Morrow
- Crop Production Services
- McNary Dam Substation
- Wilbur-Ellis Company
- Texaco and Unocal service stations in Umatilla

### **7.1.2 Confirmed Release List**

No sites are near the shoreline of the John Day Reservoir on the Confirmed Release list dated April 7, 1999.

### **7.1.3 UST Facilities List**

There are eight sites in Rufus on the UST facilities list dated February 9, 1999. All sites except for John Day Dam are located south of Interstate 84. The USTs at John Day Dam are located downstream of the dam structure and were upgraded in 1998. There are 14 sites in Arlington on this list. Only five of those sites have active USTs, and none of those sites are located right on the shoreline. There are 27 sites in Boardman on this list, 14 of which have active USTs. The only active USTs on the shoreline in Boardman are 2 located at the Boardman City Park, and are used to refuel recreation boats. There are 16 sites in Irrigon on this list, 7 of which have active USTs. The only site on the shoreline is the Umatilla Fish Hatchery, which has one UST. There are 27 sites in Umatilla on this list, 11 of which have active USTs. There are two active USTs at the Umatilla Marina and one active UST at the Umatilla Pump Station. The remaining Umatilla sites are not on the reservoir shoreline.

### **7.1.4 UST Cleanup List**

Of the active UST sites on the shoreline of the John Day Reservoir listed in the previous paragraph, only the Umatilla Fish Hatchery in Irrigon and the Umatilla Marina in Umatilla are on the UST cleanup list dated January 19, 1999.

## **7.2 Washington**

The state of Washington maintains three listings of contaminated or potentially contaminated sites. The Inventory of Confirmed and Suspected Contaminated Sites (CSCS) lists all sites where contamination is confirmed or suspected. The UST Facilities list is a listing of all registered USTs in the state. Sites on this list may or may not have contamination present. The Leaking UST list is a listing of all sites where a release has been documented from a UST.

### **7.2.1 CSCS List**

There are two sites along the John Day Reservoir on this list dated May 4, 1999; Goldendale Aluminum<sup>2</sup>, and Flying J, Roosevelt. The Flying J facility has confirmed petroleum contamination in soil and groundwater. This site is not located on the riverbank.

### **7.2.2 UST Facilities List**

Three USTs have been removed from the Goldendale Aluminum property. There are six sites in Roosevelt on this list, one of which has an operational UST. One UST has been removed from Crow Butte State Park, located on an island in the river near Whitcomb. There are nine sites in Paterson on this list, three of which have active USTs. There are two sites in Plymouth on this list, one of which as an active UST. Other than Goldendale Aluminum and Crow Butte State Park, none of these sites are on the bank of the river.

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<sup>2</sup> For additional information on Goldendale Aluminum, see below.

### **7.2.3 Leaking UST Facilities List**

The only site on the shore of John Day Reservoir on this list is Crow Butte State Park.

## **7.3 John Day Dam**

In 1993, the Portland District prepared a Preliminary Assessment report on John Day Dam for EPA Region 10. No areas of waste disposal upstream of the dam were identified at that time. One area of construction debris disposal upstream of the dam on the Washington side was identified during an examination of aerial photos of the dam during construction obtained from the Walla Walla District for this study. This waste disposal site is located in a natural depression approximately 800 feet north of the navigation lock along the earth embankment and 2,000 feet east of the earth embankment. An uncovered pile of waste materials approximately 150 feet by 125 feet is observed on the photos. A potential second area of waste disposal is located immediately west of the confirmed waste disposal site. This second area is a mound approximately 400 feet by 600 feet. Both sites were in use at the time of the photos and would have been covered with soil. Both sites are currently inundated but will be exposed if the reservoir is drawn down below elevation 230 to 240 feet which includes all four alternatives. One former construction debris disposal site has been identified on the Oregon side of the river. It is located adjacent to the riverbank about 3.3 miles downstream of the dam structure and was identified during preparation of the Preliminary Assessment report. It was evaluated at the time of the Preliminary Assessment and no elevated levels of contamination were found. It is possible another construction debris disposal site exists on the Oregon shore, since it is unlikely dam construction waste materials were transported across the spillway for disposal. Also, the identified site is believed too small to account for all waste disposal during powerhouse construction, although it is not known what proportion of construction debris was disposed on site. Two upland areas of contamination on the Washington side were identified by samples collected during the preparation of a Site Inspection report for EPA Region 10. These areas are a former oil storage pad located in the north storage yard near the navigation lock, and a burn pile located upstream of the dam. Soil around the oil storage pad contains elevated levels of petroleum hydrocarbons, while soil in the burn pile area contains elevated levels of petroleum hydrocarbons, arsenic, lead, and zinc. When funding becomes available the project plans to award a contract for the cleanup of those areas.

Hazardous chemical products are used during the normal operation of any hydropower facility. These include polychlorinated biphenyls (PCBs), asbestos, paint/sand blast grit, oil, mercury, antifreeze, solvents, greases, halon, petroleum fuels, batteries, and wastewater treatment residue. For many products a continuous cycle exists as new products are bought, temporarily stored, used, and temporarily stored again prior to removal and disposal.

## **7.4 Goldendale Aluminum**

Aluminum production began at this site in 1971. The plant has previously been known as Commonwealth Aluminum, Martin Marietta Aluminum, and Columbia Aluminum. The Washington Department of Ecology has voluminous environmental reports/data on file for this site. The Portland District has obtained copies of the major reports. The plant monitors six groundwater aquifers under this site. The six aquifers are hydraulically connected via joints and fractures in the basalt rock that underlies the plant. Groundwater flow in all the aquifers is toward the Columbia River. The top four aquifers discharge above the normal

operating pool of the John Day Reservoir as seeps. Groundwater monitoring wells in the two deepest aquifers indicate those aquifers are hydraulically connected to the reservoir. Shallow groundwater (top three aquifers) underneath the plant is contaminated by nickel, potassium, cyanide, strontium, chloride, iron, manganese, copper, thallium, sodium, calcium, zinc, nitrate, total phenols, fluoride, silver, sulfate, and total organic carbon. Deep groundwater (lower three aquifers) underneath the plant is contaminated by cyanide, fluoride, chloride, iron, manganese, sodium, zinc, nitrate, total phenols and sulfate. In general, contaminant concentrations are lower in each successive, lower aquifer. Sediments located within two surface impoundments and four settling ponds on site would be classified as Dangerous or Extremely Dangerous Waste under Washington state regulations if they were dredged. The only sediment quality data from the Columbia River near the aluminum plant is from the mid-1980's and is probably not representative of current conditions; it will only be mentioned briefly here. Samples collected by both the USACE and J-U-B Engineers (under contract to Commonwealth Aluminum) indicate sediment near the aluminum plant is contaminated with polynuclear aromatic hydrocarbons and heavy metals. These sediments may be exposed during drawdown and precautions would be necessary depending on the contaminant levels present.

## **7.5 City of Umatilla**

According to Design Memorandum (DM) No. 38, *Relocation of City of Umatilla, Oregon*, most of the city was above the normal operating pool of 265 feet mean sea level (msl) prior to construction of John Day Dam. Because the John Day Reservoir design flood flow with wave action elevation was calculated to be 290 feet at Umatilla, some developments were relocated or modified along the riverbank. These included homes; churches; commercial buildings; three industrial operations (petroleum tank farm, heavy equipment shop with fueling facility, and grain elevator); and city fire station, maintenance shop, jail, sewage treatment plant and lift station, and park. Of those facilities, only the area under two former loading docks (one at the grain elevator and one at the petroleum tank farm) are currently inundated under normal operating conditions. The tank farm and fuel loading dock were dismantled, but were located one block west of the present-day city sewage treatment plant.

## **7.6 City of Boardman**

According to DM No. 12, *Relocation of Boardman, Oregon*, the entire City of Boardman was relocated for the construction of John Day Dam. Most of the former city is currently inundated under normal operating conditions; however, the southern portion of the former city comprises the present-day location of the Boardman City Park and the Faler Road Treaty Fishing site (construction recently completed). In addition to homes, churches, a school and a few small motels, relocated facilities include seven gasoline stations, two vehicle/machinery repair garages, the city fire station, an Oregon State Highway Department (OSHD) maintenance shop, and a school bus garage. Two of the former gas stations are not currently inundated under normal conditions; one is located on the Faler Road Treaty Fishing site and one is located on the city park. The remaining gas stations, as well as the garages, fire station, and OSHD shop are currently inundated.

## **7.7 City of Arlington**

According to DM No. 11, *Relocation of Arlington, Oregon*, most of the city was below the normal operating pool and required relocation. Approximately 80 per cent of the city including 157 buildings required demolition or relocation. The city is located in a north south tending steep walled valley and the original, main business and industrial district elevation averaged 259 feet. All structures within the valley floor were demolished or moved. The southern half of the valley floor was raised with earth fill to elevation 280 feet. The northern half was only filled to provide for the relocated highway and railroad, and eventually to serve the grain elevators north of the present marina. The central business district was reconstructed on the raised valley floor and residential development was moved further up the valley. Most of the former business and industrial properties were located north of the former A street and inundated, either under the current lagoon, under road fill for Interstate 84 and the railroad, or under the flooded pool.

The former city was the primary stopping point for highway traffic between Umatilla and The Dalles. The town was also a railway junction with two sidings and roundhouse, and included a port facility with barge dock, grain elevators, bulk fuel tank farm, and a toll ferry landing. Service stations, hotels, a business district with banks, the city hall, elementary school, churches, and residences were all demolished to ground level. A list of real estate assets is not included in the design memorandum, but photographs and maps indicate the following inundated facility sites would be exposed by lowering the pool: railroad roundhouse and sidings, former water treatment plant, two machine or heavy equipment shops, grain elevator, barge dock, four service stations, four blocks of the central business district (including one to three story wood frame and concrete block hotels), residences, storefronts, and an auto dealership. Demolished structure sites that are inundated, but beneath new fill, include the bulk fuel site and heavy equipment buildings. The former downtown area south of the shore of the lagoon and beneath the fill is separated from the river by a seepage cutoff wall.

## **7.8 Town of Roosevelt**

Little documentation is readily available about the former town of Roosevelt prior to its relocation. The relocation is not detailed in a design memorandum. Historic air photos are at too large of a scale to discern the types of structures/businesses. The former town of Roosevelt was located southwest of the relocated town, near the location of the present-day Roosevelt Park. It is believed most, if not all of the former town was inundated.

## **7.9 Sediments**

The only sediment quality data available for the John Day Reservoir, in the area near the Goldendale Aluminum plant, is about 15 years old and probably not indicative of current conditions. Sediments exposed during drawdown will eventually dry out and may erode by wind or water action if not covered by vegetative growth, erosion control blankets, or soil. Contaminated sediment can not be exposed without some type of cover. For more detailed information, see the appendix on Sediment Quality.

## SECTION 8. Conclusions

Most of the federal and state listed sites mentioned in this appendix would not be impacted by drawdown because they are not located along the present riverbank. Goldendale Aluminum, the John Day Dam and the USTs at Umatilla Marina, Umatilla Pump Station, Boardman Park, and possibly Crow Butte State Park may be impacted by drawdown. The active USTs at Umatilla Marina and Boardman Park are located at the shoreline of the current reservoir. It is not known if the former UST at Crow Butte State Park was located on the reservoir shoreline, but a release has been documented from that tank.

If the John Day Reservoir were drawn down below elevation 230 to 240 feet, a construction debris disposal site on the Washington shore would be exposed.

If hydropower generation were to cease at John Day Dam, all chemical products stored at the facility would require removal. Unused products could be transferred to another operating District dam for use. The Dalles/John Day Project has contracts in place for the routine removal/disposal of used chemical products. Those contracts could be used for the final removal of used products from the John Day Dam. Additionally, two USTs located near the warehouse would require decommissioning if hydropower generation were to cease.

As stated, six hydraulically connected groundwater aquifers beneath the Goldendale Aluminum plant are contaminated. The lower two aquifers are hydraulically connected to the John Day Reservoir. Since groundwater flow is toward the river, drawdown might impact the groundwater flow regime under the plant. If drawdown occurs, groundwater flow to the river would likely increase. Greater contaminant loading from the aquifers to the reduced size river would be expected.

Sediments in the vicinity of the Goldendale Aluminum plant, as well as the towns along the current shoreline, may be contaminated. If contaminated sediments are exposed during drawdown, they eventually would dry out and be subject to wind erosion and water action. In addition, if humans or wildlife walked on the sediments, an unacceptable exposure to contaminants might occur.

All of the relocated gasoline stations, garages, maintenance shops, fuel tank farm, some of the residences, motels, and schools in the former towns of Boardman, Arlington, and Roosevelt used USTs for motor vehicle fuel or heating oil storage. When the relocations occurred during the 1960s, the potential for contamination associated with leaking USTs had not been recognized. Regulations governing the removal of USTs were non-existent. At least some of the USTs probably remain in place. Most of the former City of Arlington was served by a sewer collection system that disposed untreated sewage into the river. Sewage disposal in the rest of Arlington and the former City of Boardman consisted of individual septic tanks with ponds/drainfields. Many of those systems may remain in place. Due to the small size of the former town of Roosevelt, sewage disposal there likely consisted only of individual septic systems.

There is a possibility that clandestine disposal of solid or hazardous waste may have also occurred in the reservoir. Drawdown of the reservoir may expose these areas (if any).

## SECTION 9. References

ER 1165-2-132, Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works Projects, 26 June 1992

EPA Region 10 BASININFO Mapping application  
(<http://www.epa.gov/r10earth/r10gis/r10basinmethod.html>)

Oregon Department of Environmental Quality ECSI list  
(<http://www.deq.state.or.us/wmc/cleanup/ecsilist.htm>)

Oregon Department of Environmental Quality Confirmed Release, UST Facilities, and UST Cleanup Lists

Washington Department of Ecology CSCS List  
(<http://www.wa.gov/ecology/tcp/cscs/cscstest.html>)

Washington Department of Ecology UST Facilities and Leaking UST Facilities Lists  
(<http://www.wa.gov/ecology/tcp/ust-lust/tanks.html>)

DM No. 11, Relocation of Arlington, prepared by the Walla Walla District, Corps of Engineers, 19 September 1958.

DM No. 12, Relocation of Boardman, Oregon, prepared by Cornell, Howland, Hayes & Merryfield, Seattle, Washington, 10 September 1963.

DM No. 38, Relocation of City of Umatilla, Oregon, prepared by the Walla Walla District, Corps of Engineers, 8 August 1962.

Preliminary Assessment Report, John Day Lock and Dam, Oregon-Washington, prepared by Portland District, Corps of Engineers, May 1993.

Site Inspection Report, Columbia Aluminum, prepared by Richard V. Heggen, Washington Department of Ecology, May 1989

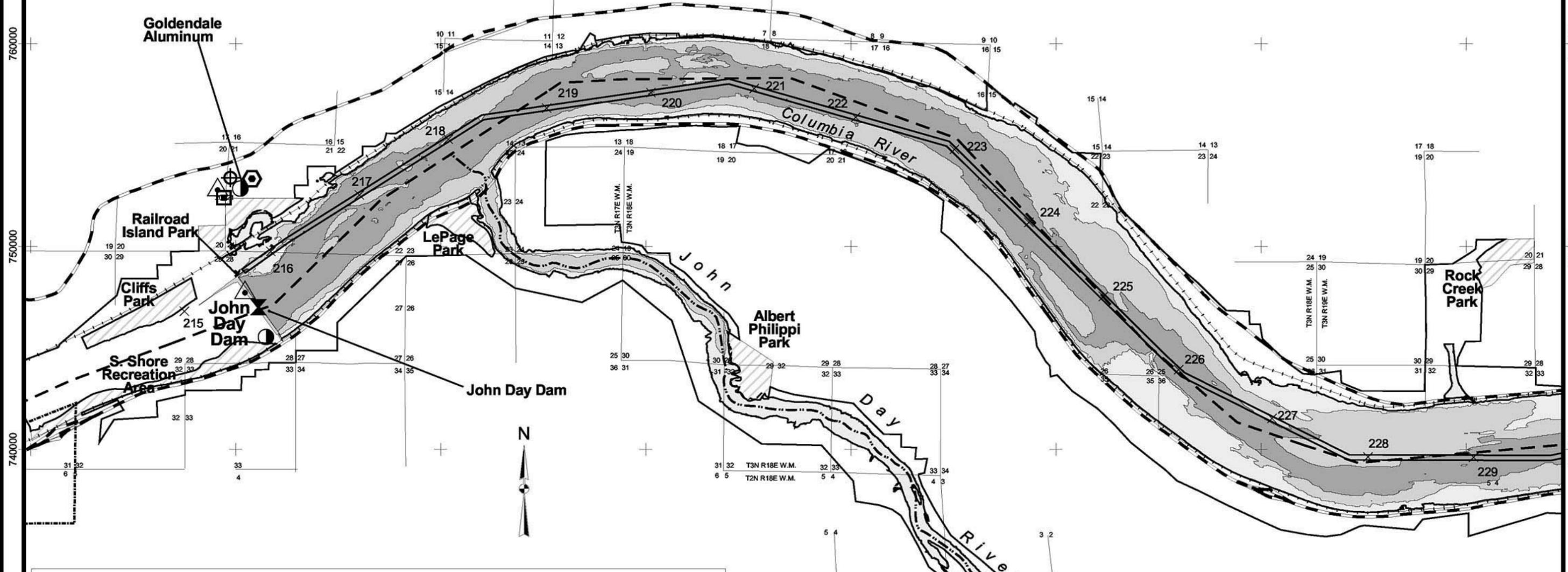
Sediment & Water Quality Surveys Near the Commonwealth Aluminum Plant, Winter 1985, prepared by J-U-B Engineers, Inc.

## **Plates**

1940000 1950000 1960000 1970000 1980000 1990000 2000000 2010000



**US Army Corps of Engineers**  
Portland District



**Key to Features**

**HTRW Listings**

- CERCLIS
- EPCRA TRI
- NPDES
- OR ECSI
- UST
- WA CSCS

**Corps of Engineers Boundaries**

- Corps Boundary
- Outsite Corps Boundary
- Park
- Umatilla National Wildlife Refuge
- Navigation Channel
- 215 River Miles (Corps of Engineers)

**Pool Extents**

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

**Political Boundaries**

- City Boundary
- State Boundary
- County Boundary



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

**HTRW Sites**  
**Plate 1**  
**River Miles 215 - 229**

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

1940000 1950000 1960000 1970000 1980000 1990000 2000000 2010000

2010000

2020000

2030000

2040000

2050000

2060000

2070000



US Army Corps of Engineers  
Portland District



Flying J

Roosevelt Park

Rock Creek Park

Arlington

City of Arlington

Columbia River

### Key to Features

#### HTRW Listings

- CERCLIS
- EPCRA TRI
- NPDES
- OR ECSI
- UST
- WA CSCS

#### Corps of Engineers Boundaries

- Corps Boundary
- Outside Corps Boundary
- Park
- Umatilla National Wildlife Refuge
- Navigation Channel
- 215 River Miles (Corps of Engineers)

#### Pool Extents

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

#### Political Boundaries

- City Boundary
- State Boundary
- County Boundary

5000 0 5000 10000 Feet

Projection: State Plane, Oregon North Zone, NAD 27  
Pool extents based on Corps of Engineers hydrosurveys, 1994  
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JOHN DAY DRAWDOWN PHASE I STUDY  
Columbia River - Oregon / Washington

HTRW Sites  
Plate 2  
River Miles 228 - 242

760000

750000

740000

730000

720000

760000

750000

740000

730000

720000

2010000

2020000

2030000

2040000

2050000

2060000

2070000

2070000 2080000 2090000 2100000 2110000 2120000 2130000 2140000

790000  
780000

770000

760000

750000

2070000 2080000 2090000 2100000 2110000 2120000 2130000 2140000

### Key to Features

#### HTRW Listings

- CERCLIS
- EPCRA TRI
- NPDES
- OR ECSI
- UST
- WA CSCS

#### Corps of Engineers Boundaries

- Corps Boundary
- Outside Corps Boundary
- Park
- Umatilla National Wildlife Refuge
- Navigation Channel
- 215 River Miles (Corps of Engineers)

#### Pool Extents

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

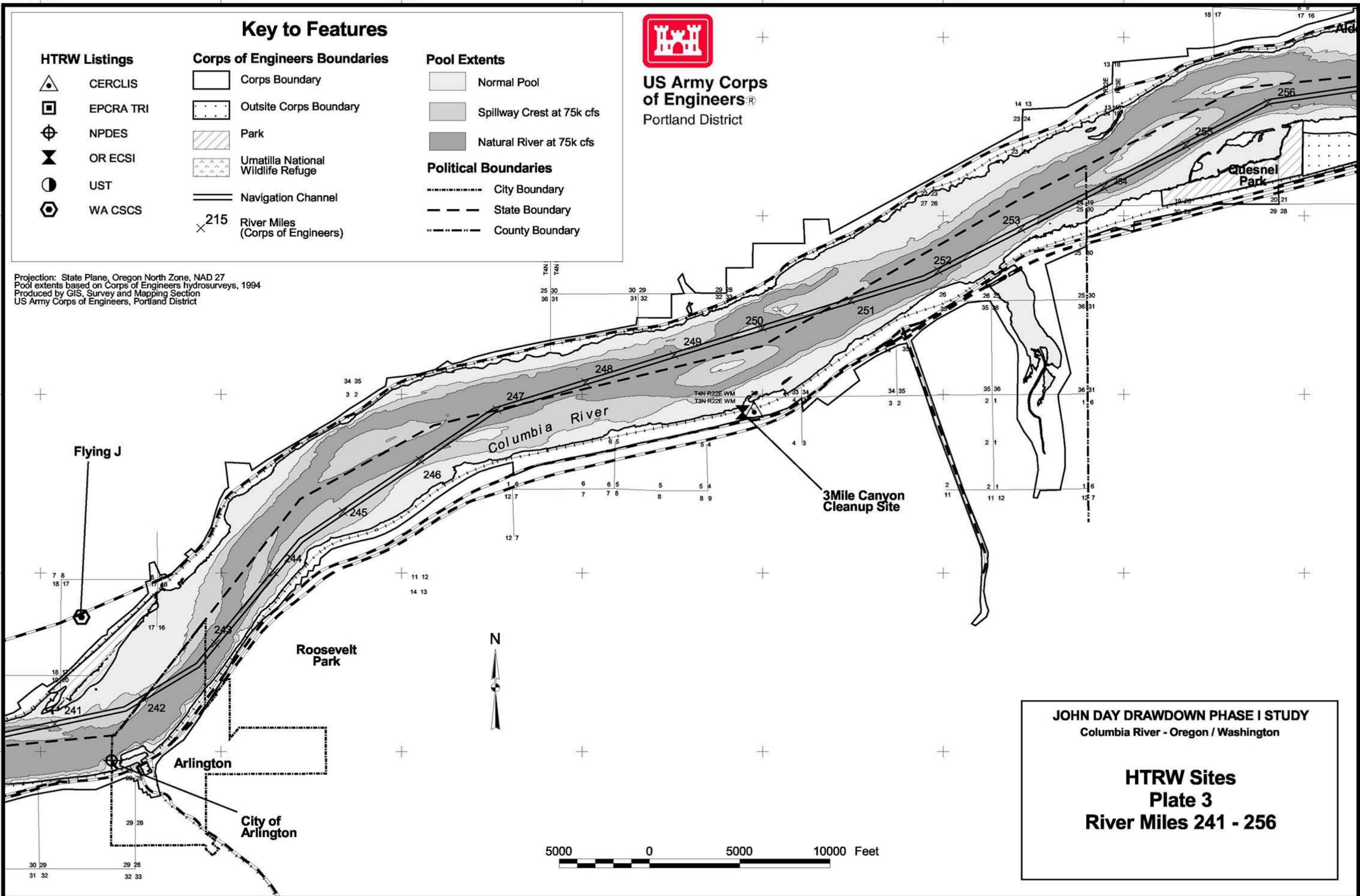
#### Political Boundaries

- City Boundary
- State Boundary
- County Boundary



**US Army Corps of Engineers**  
Portland District

Projection: State Plane, Oregon North Zone, NAD 27  
Pool extents based on Corps of Engineers hydrosurveys, 1994  
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US Army Corps of Engineers, Portland District



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

**HTRW Sites**  
**Plate 3**  
**River Miles 241 - 256**

2130000 2140000 2150000 2160000 2170000 2180000 2190000 2200000



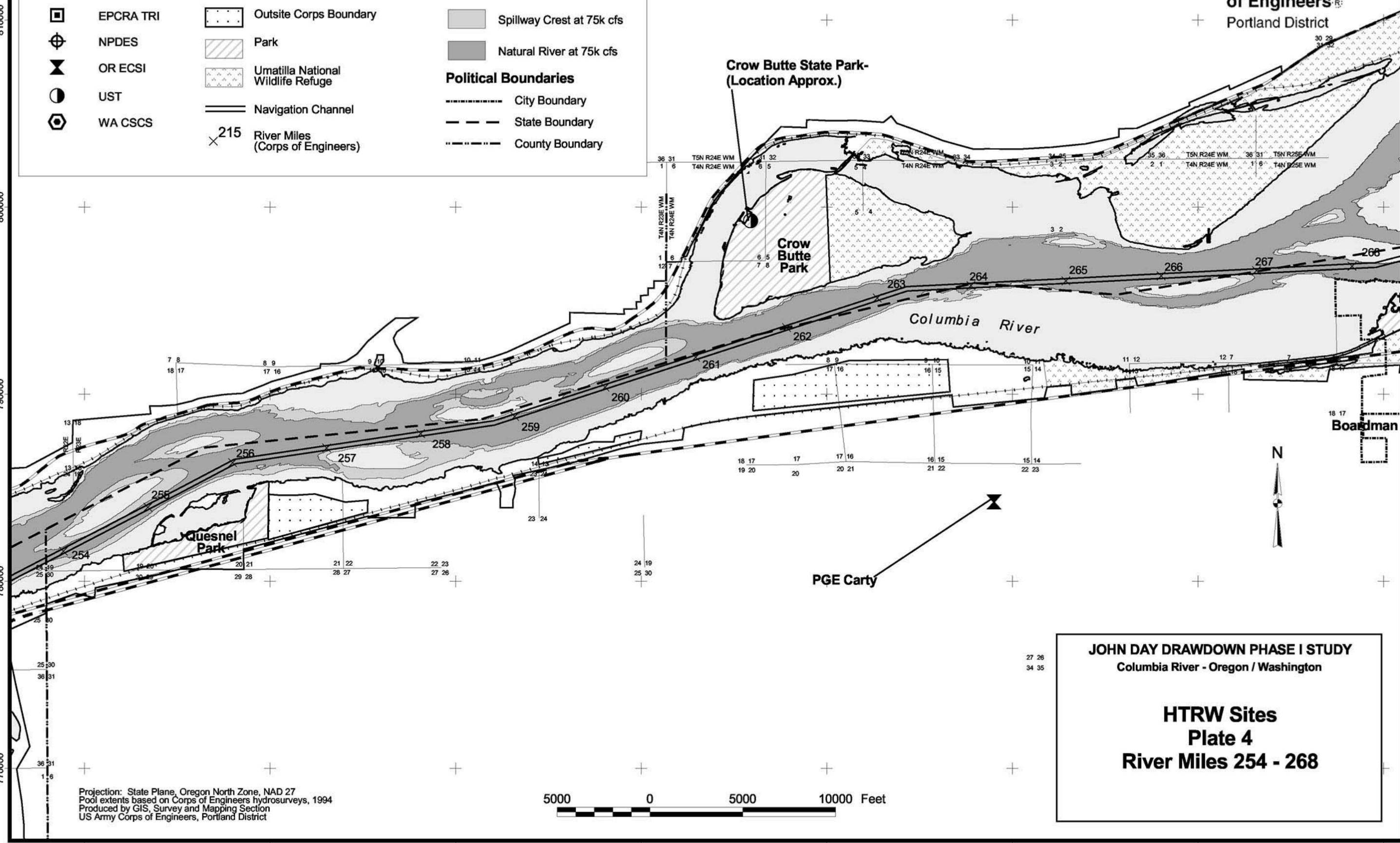
US Army Corps of Engineers  
Portland District

### Key to Features

HTRW Listings	Corps of Engineers Boundaries	Pool Extents
CERCLIS	Corps Boundary	Normal Pool
EPCRA TRI	Outside Corps Boundary	Spillway Crest at 75k cfs
NPDES	Park	Natural River at 75k cfs
OR ECSI	Umatilla National Wildlife Refuge	<b>Political Boundaries</b>
UST	Navigation Channel	City Boundary
WA CSCS	215 River Miles (Corps of Engineers)	State Boundary
		County Boundary

810000  
800000  
790000  
780000  
770000

810000  
800000  
790000  
780000  
770000



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

**HTRW Sites**  
**Plate 4**  
**River Miles 254 - 268**

2190000 2200000 2210000 2220000 2230000 2240000 2250000

### Key to Features

#### HTRW Listings

- CERCLIS
- EPCRA TRI
- NPDES
- OR ECSI
- UST
- WA CSCS

#### Corps of Engineers Boundaries

- Corps Boundary
- Outside Corps Boundary
- Park
- Umatilla National Wildlife Refuge
- Navigation Channel
- 215 River Miles (Corps of Engineers)

#### Pool Extents

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

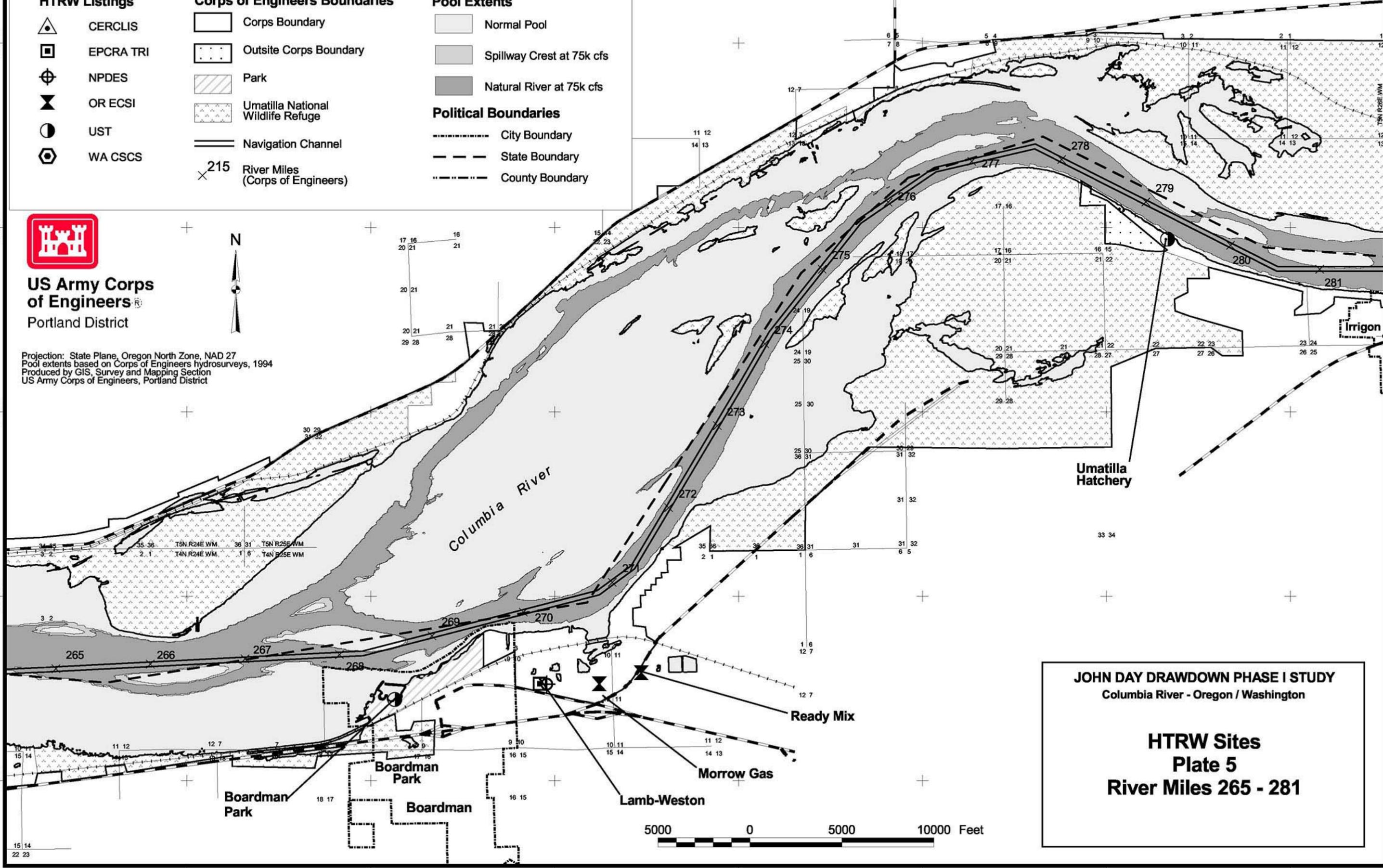
#### Political Boundaries

- City Boundary
- State Boundary
- County Boundary



**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



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

**HTRW Sites**  
**Plate 5**  
**River Miles 265 - 281**



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

### Key to Features

#### HTRW Listings

- CERCLIS
- EPCRA TRI
- NPDES
- OR ECSI
- UST
- WA CSCS

#### Corps of Engineers Boundaries

- Corps Boundary
- Outside Corps Boundary
- Park
- Umatilla National Wildlife Refuge
- Navigation Channel
- 215 River Miles (Corps of Engineers)

#### Pool Extents

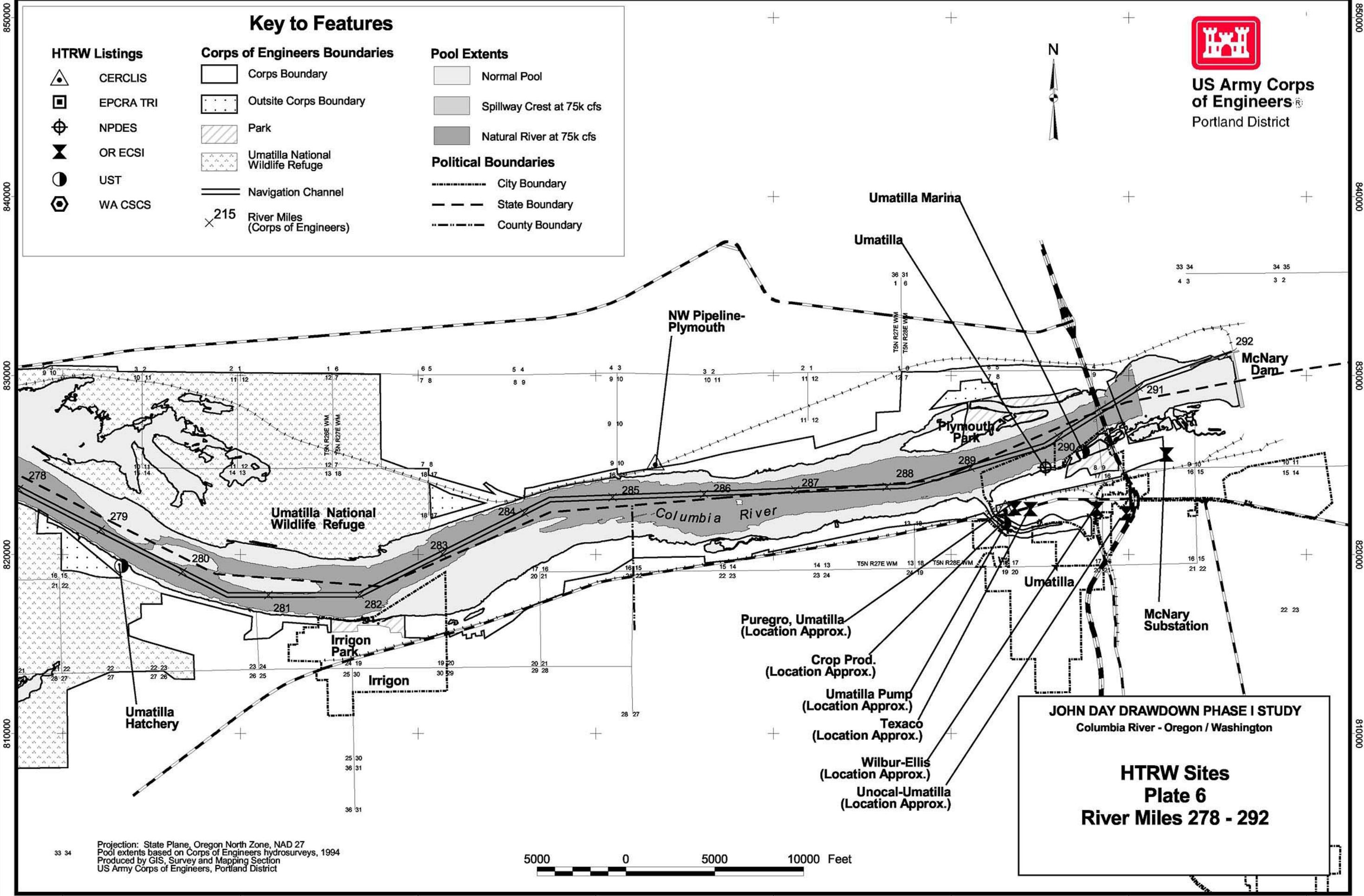
- Normal Pool
- Spillway Crest at 75k cfs
- Natural River at 75k cfs

#### Political Boundaries

- City Boundary
- State Boundary
- County Boundary



**US Army Corps of Engineers**  
Portland District



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

**HTRW Sites**  
**Plate 6**  
**River Miles 278 - 292**

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

5000 0 5000 10000 Feet

2240000 2250000 2260000 2270000 2280000 2290000 2300000 2310000