US Army Corps of Engineers ®
Portland District

Salmon Recovery through John Day Reservoir

John Day Drawdown Phase I Study

Engineering Technical Appendix Public Recreation Section






September 2000

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Section 1. Introduction

This technical appendix section documents the results of the recreation 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.

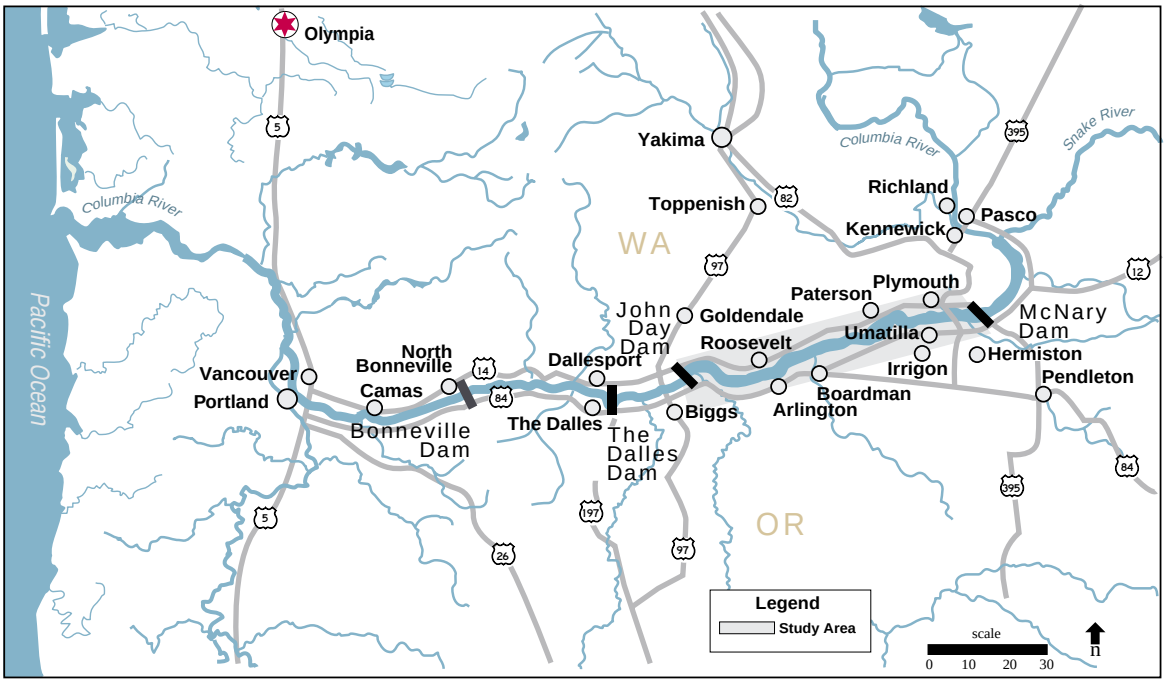

Figure 1. John Day Drawdown Phase 1 Study Area

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. Overview

Public recreation is a beneficial resource in the John Day project area. Estimated annual visitation from 1994 through 1998 averaged more than two million (Corps, 1999). Drawdown of the John Day reservoir would physically impact 15 recreation sites located along both sides of the Columbia River[1]. The range in water surface elevation for each of the alternatives is shown in the following table:

[1] Thirteen actual recreation sites in various states of use or non-use, one harbor-of-refuge on the south shore of the Columbia River, and one city-owned park located on the Umatilla River for a total of 15 sites.

Table 1. Drawdown Alternatives	
Alternative	**Range in Water Surface Elevation*, ft**
#1 Spillway Crest without Flood Control	218 to 233
#2 Spillway Crest with Flood Control	218 to 255
#3 Natural River without Flood Control	160 to 165
#4 Natural River with Flood Control	160 to 227
*Listed elevations are at the John Day Dam	

While each alternative may affect each site differently, some anticipated, general types of physical impacts may include: dry boat launching facilities, no dock access, dry swimming beaches, slope erosion, and a significant reduction in the aesthetic quality of the riverbank and recreation areas during the vegetation recovery period. Physical, social, economic, and aesthetic impacts are anticipated due to the initial lowering of the pool from current normal operating pool of Elev. 265 down to elevations varying from 254 to 160 (depending on the drawdown alternative). In addition, due to varying water surface elevations, the drawdown alternatives that do not provide for flood control storage (1 and 3) will create fewer long-term impacts than the alternatives that provide flood control storage (2 and 4). The purposes of this appendix are:

- Summarize current recreation activities
- Analyze impacts on current recreation activities
- Describe physical, social, and other impacts to recreation features
- Investigate potential for replacement, and associated costs

In addition, this document presents the general impacts to current recreational use of the reservoir; identifies potential changes to recreational uses; and evaluates the specific impacts and improvements required to maintain the existing level of river access, wherever possible, for the four drawdown alternatives (see Table 1). It is assumed that impacted boat access facilities can be relocated along the drawn-down John Day reservoir shoreline. Swimming beach impacts will be identified and potential sites for relocation identified.

Section 6. Authorization

John Day Lock and Dam was authorized in the Flood Control Act of 1950 (P.L. 516, May 17, 1950), substantially in accordance with House Document 531, 81st Congress, 2nd Session. The authorization was subsequently modified by Public Law 89-298. The project is operated for the purposes of flood control, navigation, recreation, fish and wildlife, water quality, and power. The report *Authorized and Operating Purposes of Corps of Engineers Reservoirs* (July 1992), identifies public recreation as an operating purpose of the project, while all others are described as authorized purposes. This report was prepared pursuant to Section 311 of the Water Resources Development Act of 1990 (P.L. 101-640) which directed the Secretary of the Army to conduct a study of reservoir operation and to identify the purposes for which each project was authorized and to identify the purposes for which the project is operated.

Construction of public recreation facilities at John Day was initiated during the project construction phase prior to the John Day Reservoir filling in 1965. Nearly all of the recreation facilities at the 15 public recreation sites on John Day Reservoir were constructed by the Corps of Engineers under authority of the Flood Control Act of 1944 (P.L. 78-534, 22 December 1944), and the Federal Water Project Recreation Act (P.L. 89-72, 9 July 1965)[2].

Section 7. Background

Operation of the John Day reservoir at Minimum Operating Pool (MOP), was evaluated in *Columbia River Salmon Mitigation Analysis System Configuration Study, Phase I Report* (April 1994) and the *Draft Report on Mitigation Measures Associated with John Day Minimum Pool Operation* (August 1995). These reports identified activities and preliminary cost estimates for mitigating the impacts of operation at MOP. Information can also be found in the *Lower Snake River Juvenile Salmon Migration Feasibility Study*. The purpose of these studies was to evaluate benefits of increasing river velocities so that travel time for smolts to transit the river system would be reduced, and to evaluate the possibility of increased survival rates returning salmon during upstream migration.

The U.S. Army Corps of Engineers, Portland District Fish Management Committee, decided to terminate further study of the John Day drawdown and focus on implementation. The Northwest Power Planning Council, in revising its Fish & Wildlife program in 1994, called for the Corps to evaluate the feasibility of lowering the John Day reservoir to spillway crest pool. In 1995, the National Marine Fisheries Service (NMFS), in Reasonable and Prudent Alternative Action #5 of its Biological Opinion on Operation of the Federal Columbia River Power system, recommended that the Corps investigate the feasibility of lowering the reservoir to spillway crest.

There are a total of 15 established river access sites; 12 operating recreation sites, two closed recreation sites (Railroad Island, and Rock Creek), and one emergency harbor-of-refuge (Blalock Canyon), located on the John Day reservoir. Five sites (Arlington Marina and Earl Snell Park in Arlington, Crow Butte State Park, Boardman Park, Irrigon Park, and Umatilla Marina Park) are leased and managed by public entities from the Corps. Nugent Park is owned and operated by the City of Umatilla. The locations, management status, and a summary of facilities at each are summarized in Table 2.

7.1. Federal Sites, Managed by the Corps

Developed Corps recreation sites on the Oregon side of the river include Le Page Park , Philippi Park (on the John Day River arm), and Quesnel Park (Threemile Canyon). Sites on the Washington shore include Roosevelt Park and Plymouth Park. Railroad Island, and Rock Creek are sites on the Washington side that were officially closed following a directive to the Corps in the early 1980s to assess recreation sites and to close those not being economically used. However, due to continued public use the Corps has continued to maintain minimal facilities including portable toilets, mowing, and garbage collection. Blalock Canyon is a

[2] Fourteen sites were constructed by the Corps, while one site (Nugent Park) was constructed by the City of Umatilla, Oregon.

harbor-of-refuge on the Oregon side of the river, and is minimally developed with a gravel boat ramp. The purpose of this site is to provide refuge to boaters during storms.

7.2. Federally Owned Sites, Leased by Public Entities

Arlington Marina and Park (OR), Crow Butte State Park (WA), Boardman Park (OR), Irrigon Park and Marina, (OR), and Umatilla Marina Park (OR) are located on project lands and are leased and operated by state, city, or local parks departments. The Corps constructed most of the facilities at these sites, before being leased to local entities. Facilities at Irrigon Park were jointly constructed under a recreation cost-sharing contract. See Table 2 for a list of current leases, manager of the site, contact information, and Corps lease number.

7.3. Public, Non-Federal Sites

Nugent Park is owned and operated by the City of Umatilla and is located on the Umatilla River just upstream of the mouth. Most of this site lies outside of the federal project lands boundary. A fishing access structure for people with disabilities lies within project lands; the city holds a lease for that structure and access. The structure was constructed with funds from the Land and Water Conservation Fund, administered by the National Park Service.

7.4. Windsurfing Launch Areas

Windsurfing on the John Day Reservoir has grown significantly in the last 20 years improving the local economy with increased tourism, and an influx of windsurfers moving to the area, buying homes, and opening businesses. The Columbia Gorge Windsurfing Association has approximately 1,000 members and is responsible for creating, maintaining, and improving windsurfing sites throughout the Columbia River area. There are 14 windsurfing sites on the John Day Reservoir and seven sites below the reservoir. Approximately 16,800 windsurfers utilize the area during the windsurfing season (April to October) (CGWA, 1999). Recreation sites that support windsurfing are located in Table 2. Table 19 lists all windsurfing sites on the John Day Pool.

7.5. Columbia River Treaty, Fishing Access Sites

Some public recreation areas serve a dual purpose as treaty-fishing access (TFA) sites. These dual use sites are the only TFA sites discussed in this report. Discussion on all other TFA sites can be found in the Cultural Resources appendix.

- Railroad Island (North Shore) (WA)
- Le Page Park (OR)
- Roosevelt Park (WA)
- Quesnel Park – (Threemile Canyon) (OR)
- Crow Butte State Park (WA)
- Boardman Park – Faler Road Site (OR).

Future development is planned for separate treaty fishing access facilities at these dual use sites. The exception is Boardman Park, which will remain a shared use boat ramp with separate upland facilities developed for tribal use only. The Roosevelt, and Faler Road sites

were completed in 1999, while the rest of the sites are scheduled to be completed prior to 2004. Alderdale Park does see some public use, but it was designated as a treaty-fishing site on August 27, 1998, so it was not discussed in this report. In addition, Sundale Park sees public use, but upon completion of construction, it will be designated a treaty fishing site, so it was not discussed in this report. See the Cultural Resources appendix for more detailed information on all treaty fishing sites.

Table 2.
Existing Water-Related Recreation Sites and Facilities on the John Day Pool

Location	Facilities														Management Authority
	State Location	River Mile	Boat Ramp	Day Use Moorage	Long Term Moorage	Marina	Picnic Tables	Swimming	Windsurfing	Water Skiing	Camping	Well Water	Public Water Supply	Fishing	Rest Rooms***	
Railroad Island	WA	216	X				X			X				X		COE
Le Page Park	OR	217	X	X			X	X		X	X	X		X	X	COE
Philippi Park*	OR	JD-3.5		X			X	X	X	X	X	X		X	X	COE
Rock Creek	WA	229	X				X	X		X				X		COE
Blalock Is. Boat Ramp	OR	233	X							X				X		COE
Roosevelt Park	WA	241	X				X	X	X	X		X		X	X	COE
Arlington Marina	OR	241	X	X	X				X	X				X	X	Port of Arlington[1]
Arlington (Earl Snell) Park	OR	241		X			X	X	X				X	X	X	City of Arlington[2]
Quesnel Park	OR	255	X				X		X	X	X			X	X	COE
Crow Butte State Park	WA	262	X	X			X	X	X	X	X	X		X	X	Washington State Parks[3]
Boardman Park	OR	268	X	X	X	X	X	X	X	X	X		X	X	X	Boardman Park & Rec Dist.[4]
Irrigon Park	OR	282	X	X	X	X	X	X	X	X	X		X	X	X	City of Irrigon[5]
Nugent Park**	OR	U-.5	X				X						X	X	X	Private - City of Umatilla[6]
Umatilla Marina Park	OR	289	X	X	X	X	X	X		X	X		X	X	X	Port of Umatilla[7]
Plymouth Park	OR	289	X	X			X	X	X	X	X		X	X	X	COE

* Philippi Park is located on the John Day River at RM 3.5. Access to this site is by boat only.

** Nugent Park located on the Umatilla River and is a city park.

***Railroad Island, Rock Creek, and Quesnel Park only have Vault/Portable Toilets

[1]Port of Arlington - Arlington Marina; Francie Morris, Executive Secretary; PO Box 279 Arlington, Oregon 97812; Lease No. DACW57-1-83-0065 expires 8 Dec 2008. The lease area contains approximately 14.13 acres of land and water.

[2]City of Arlington - Arlington Park (Earl Snell Park); Fred Ericksen, Mayor - Kay West, Recorder, Tele. # (541) 454-2743. PO Box 68 Arlington, Oregon 97812; Lease No. DACW57-1-79-0122 expires 2 Oct 2003. The lease area contains approximately 12.41 acres of land and water.

[3]State of Washington – Crow Butte State Park; Parks and Recreation Commission; 7150 Cleanwater Lane KY –11, Olympia, Washington 98504-2650; Lease No. DACW57-1-78-0106 expires 30 Jun 2003. The lease area contains approximately 727 acres of land and 584 acres of water.

[4]Boardman Park and Recreation District; Ted Lieurance Park Ranger - Tele. # (541) 481-7217; PO Box 8 Boardman, Oregon;

Oregon Lease No. DACW57-1-75-0046 expires 15 Jan 2000 (new lease currently being negotiated) The lease area contains approximately 88 acres of land and 39 acres of water.

[5]Irrigon Park and Recreation Maintenance District; Burl Coolsy, Chairman, Tele. # (541) 922-3211; PO Box E Irrigon, Oregon 97844; Lease No. DACW57-1-79-0005 expires 5 Sep 2028. The lease area contains approximately 35.5 acres of land and water.

[6]City of Umatilla (Nugent Park); Bonnie Parker, Tele. # (541) 922-3226; PO Box 130 Umatilla, Oregon 97882; Lease No. DACW57-1-86-0063. The lease area contains approximately 1.82 acres of land and water.

[7]Umatilla Marina Park – Port of Umatilla; Susan Daggett, Director of Operations, Tele. # (541) 922-3224; PO Box 879 Umatilla, Oregon 97882; Lease No. DACW57-1-94-0008 expires 12 Dec 2018. The lease area contains approximate 60 acres of land and water.

Corps Public Information Pamphlet, Corps 1989; Corps, 1999

Section 8 Overview of Existing Site Facilities

8.1. General

The recreational impacts analysis study area encompasses 76 miles of the Lower Columbia River on John Day Reservoir. In this section and the next, current use at existing recreational facilities along the north and south banks of John Day Reservoir is presented. Also discussed are known impacts to the facilities and proposed measures for replacing lost river access due to drawdown of the reservoir. Anticipated changes in recreational opportunities and use are also presented. Assumptions and proposed replacement measures related to these changes are based on historical river flows for the past 25 years. The majority of information referenced in this report is based on data collected during the Corps' 1994 study of Minimum Operating Pool (MOP) Impacts.

8.2. Existing Recreational Use

The reservoir provides a broad range of recreational opportunities including picnicking, camping, swimming, boating, windsurfing, fishing, and hunting. During the summer months, the reservoir provides a welcome escape from the hot, arid environment. The public can currently access the site from highways on both sides of the reservoir (State Route 14 in Washington and Interstate Highway 84 in Oregon), or by boat (private and commercial). See Table 2 for a list of recreational opportunities available at each park. See Figure 6 for high/peak and low use rates at each recreation site.

8.3. Changes to Recreational Use at Drawdown

With drawdown, the opportunities for river access become limited due to topography. The parks themselves will not be lost, but the distance to the water and the boat ramps will increase. Therefore, the next section will only suggest possible alternative sites for the relocation of the boat ramps, docks, and swimming beaches.

Under drawdown conditions (particularly Alternative #3, natural river without flood control), the river will become narrow, velocities will increase, and backwaters or large eddies that provided suitable access will no longer exist. Without breakwaters or groins, boat launching will be difficult. Beaches that feature safe swimming may be hard to re-establish since the quiet backwater pools will be eliminated. The remaining alternatives for swimming will be in the Columbia River channel where river velocities may prohibit construction, or safe access (Corps, 1994).

The aesthetic feel that water gives will also be gone from many of the parks, so the recreational experience will change (from interviews taken during site visits, 1999). Many of the parks are duel use parks. They are not only for launching a boat and fishing, but are for camping and general enjoyment of the river. Upon drawdown, the parks will lose the draw they had for camping. At drawdown, the exposed land will be barren. Due to the arid environment (and inherent temperature extremes in summer and winter), landscaping in and around the parks will be difficult to establish without irrigation and frequent maintenance. Further information can be found in the recreational section of the Economics analysis report.

8.4. Assumptions

For purposes of this evaluation, it is assumed that flows up to 340,000 cfs will be present from January through the fish migration period, decreasing to as low as 75,000 cfs for the remainder of the season (the dry period from the end of August through mid-October). Designs for the recreation sites, including the marinas, are based on a minimum flow of 75,000 cfs with a water surface elevation varying for each alternative at John Day Dam. Although flows less than 75,000 cfs have been recorded, this flow was exceeded about 90 percent of the days during 1974 through 1995 during September and October. It is expected that flows would be less than 75,000 cfs fewer than 5 days each year during September and October, on average. Water surface elevations for Alternatives 1 and 3 (without flood control) are based on 340,000 cfs (the higher elevation) and 75,000 cfs (the lower elevation)[3]. The higher water surface elevation for Alternatives 2 and 4 (with flood control) is based on a flow of 598,600 cfs[4] while the lower elevation is based on a flow of 75,000 cfs.

The next section will recommend possible site/facility relocations based upon the spillway crest and natural river alternatives without flood control, or Alternatives 1 and 3. While flood control may provide a higher water surface elevation, it would only be a temporary condition[5], in that the water surface elevation would be steadily drawn down as the flood storage was released downstream. Consequently, the water surface elevations for Alternatives 2 and 4 (with flood control) will ultimately match the water surface elevations for Alternatives 1 and 3 (without flood control).

In the site descriptions that follow, the name of the site is given along with the state in which it is located and the river mile along the Columbia, John Day, or Umatilla Rivers. State designation is in parenthesis as (WA) or (OR). River Mile is indicated as "RM". Site locations on the John Day or Umatilla Rivers are indicated and Columbia River locations are assumed.

In evaluating replacement measures, every effort has been made to replace all affected river recreation access, including boat ramps and swimming beaches. However, since most of the appropriate locations for replacement are located in the main stem of the Columbia River, replacement of all facilities may be difficult. This will be especially true for swimming beaches since river velocities limit safe swimming locations. Slack water activities will be limited to the backwater pool of The Dalles Dam. In the backwater pool of the John Day Dam, there will still be opportunities for water-skiing and other leisure activities on the pool, but opportunities for these activities gradually diminish as recreators move upstream towards McNary Dam. At the Natural River alternatives it may be impractical to replace all 12 of the functioning recreation site boat ramps.

Many cultural/archaeological sites are located in the drawdown zone of John Day reservoir. Additional cultural resource investigations will be required prior to completing design of new recreation facilities requiring excavation.

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[3] From a HEC-RAS study conducted by the Corps in 1999

[4] Measured during the flood of 1997, from a HEC-RAS study conducted by the Corps in 1999

[5] See the Flood Control Evaluation Section of the Engineering Technical Appendix for a detailed draw down discussion following a flood event.

Section 9. Existing Site Facilities

9.1. General

Design criteria used to identify potential relocation sites are discussed in the Technical Requirements/Feasibility section of this report.

9.2. Railroad Island (WA), RM 216

9.2.1. Location and Access

The park is located on the Washington shore directly upstream of the dam. Vehicular access is by the John Day Dam Road exit off of State Route 14. River access is through a 20-foot-diameter culvert under the BNSF Railroad.

9.2.2. Existing Site Features and Conditions

Although the Corps has closed this site, it still receives day use. Facilities at the site consist of a gravel parking lot, boat ramp, dock consisting of two segments and three U-piles, and a vault toilet. Sediment has built up on the toe of the boat ramp. The ramp is used to launch boats for fishing in the main part of the river, and the gravel lot is used for temporary parking. Before the Corps closed this location, the site did have potable water system, but no evidence of this system remains. A portion of this site will be converted into the North Shore treaty-fishing area. Construction of the treaty-fishing site has not begun, but it is scheduled for completion by 2002.

9.2.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 3.
Water Surface Elevations, Railroad Island Park, RM 216

Condition/Alternative #	Elevation, ft
Existing WS Elevations	Up to 272
#1 - Spillway Crest without Flood Control	218 to 233
#2 - Spillway Crest with Flood Control	218 to 256
#3 - Natural River without Flood Control	160 to 166
#4 – Natural River with Flood Control	160 to 227

As can be seen from Plates 1 and 2 (see attachment), the lake north of Railroad Island, and all river access facilities, are dry at each of the drawdown levels. As stated above, the area was closed by the Corps, but still is used by the public and tribal fishermen. The average number of people that used this facility per month was 1,530 with the highest use in August and lowest use in December. The yearly average is 20,300 people (from 1995 to 1998). Of the 15 sites in this study, Railroad Island Park ranks 8th for visitation rates (Corps, 1999). Consequently, coupled with the fact that the area will also be a treaty-fishing site, new facilities may be required to provide access to the river.

9.2.4. Proposed Replacement Measures

Plates 1 and 2 show a natural-shaped area that could be excavated to provide an area for boat ramps and docks. Access to this location would be across the dry lake bed and through the culvert/tunnel under the BNSF railroad. If the spillway crest alternative is selected, the new location for the boat ramp and docks would be approximately 3,000 feet from the existing boat ramp. Although, there could be a possible congestion problem due to barge traffic through the lock at John Day Dam. If the natural river alternative is selected, the location of the boat ramp and docks would be approximately 3,450 feet from the existing boat ramp. The riverbanks in this area are steep (16 percent; Corps, 1955), so any new roads would require excavation and grading to reach the suggested alternatives. Note: both of these suggested alternatives will require further engineering and archeological study to evaluate their feasibility. Also since this site was officially closed in the 1980s, no replacement of facilities should be considered. However, the proposed treaty-fishing site would be relocated.

9.3. Le Page Park (OR), RM 217

9.3.1. Location and Access

This site is located on the Oregon shore, approximately three miles upstream from John Day Dam, at the confluence of John Day and Columbia Rivers. Access to the park is via I-84 at exit 114 or by boat under the Union Pacific Railroad and I-84 bridges.

9.3.2. Existing Site Features and Conditions

Le Page Park is a 51-acre, full service facility with picnicking, swimming, boating, boat launching, drinking water, showers, restrooms, boat handling/short-term moorage, and overnight camping. Convenient access from I-84 makes the park readily accessible and heavily used. Visitation has varied between 257,456 persons in 1995 and 195,624 in 1998. Fees are charged for day use, launching, and overnight camping. The site has an established, well-maintained, and complex landscape. The boat ramp at this location is also used by Tribal fishermen for launching and for net drying. Separate boat ramp and dock facilities for Tribal use are scheduled for construction in 2002. Most users of Philippi Park (approximately 3 miles upstream on the John Day River) launch from Le Page and use the parking lot for overnight parking. Recently completed borings (Corps, 1994) in the channel close to the docks and swimming beach show fill comprised of loose to medium dense sandy gravel over cobbles, and boulders. No rock was encountered.

9.3.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 4. Water Surface Elevations, LePage Park, RM 217	
Condition/Alternative #	**Elevation, ft**
Existing WS Elevations	Up to 269
#1 - Spillway Crest without Flood Control	218 to 233
#2 - Spillway Crest with Flood Control	218 to 256
#3 - Natural River without Flood Control	160 to 167
#4 – Natural River with Flood Control	160 to 227

The area around the boat ramp, the moorage on the landward side of the handling docks, and the established swimming area will be dry for all alternatives (see Plates 3 and 4 in the attachments). From visitation data compiled between 1994 and 1999, the average number of people that used this facility per month was 15,920, with highest use in May and lowest use in January. The yearly average is 218,845 people and is compiled between the years 1995 to 1998. Of the 15 sites in this study, LePage Park ranks 2nd for visitation rates (Corps, 1999). Consequently, coupled with the fact that the area will also be a treaty-fishing site, new facilities would be required to provide access to the river.

9.3.4. Proposed Replacement Measures

All the river access facilities included in this study will need to be relocated, but the level of facility relocation depends on the drawdown alternative. If the spillway crest alternative is selected, the swimming beach could be relocated with some excavation, contouring, and placing of sand. The beach area would be approximately half the size of the existing beach. The boat docks for both the public and Tribal fishermen could be relocated farther out into the John Day Riverbank while the ramps would be extended (see Plate 3). If the natural river alternative is selected, the ramp and boat docks could be relocated to a site on the Columbia River that is approximately 2,400-feet from the existing boat ramps (see Plate 4). Floating breakwaters coupled with a rock groin, or a series of rock-filled breakwaters could be used to create short-term moorage facilities at the ramp. Due to the swift currents expected, it is doubtful the swimming beach can be relocated to the main section of the Columbia River. Although, it may be possible to relocate the swimming beach in the backwater area created at the confluence of the John Day and Columbia River. Excavation, some contouring, and sand placement should be expected to create a safe swimming environment. Relocating the ramp and docks into the Columbia River would require a road to be built to provide access, but known archeological sites in the area may limit the available right-of-way.

9.4. Albert Philippi Park (OR), John Day RM 3.5

9.4.1. Location and Access

This “boat-in only” park is located approximately 3.5 miles upstream from the mouth of the John Day River. The park’s boundaries are private land and the John Day River, so there is no public road access.

9.4.2. Existing Site Features and Conditions

This 82-acre site has one developed beach. The park is accessible by boating or hiking in only. Recreation facilities consist of three boat docks and one large swimming beach, camping sites, with drinking water, flush toilets, and showers. Activities include camping, picnicking, fishing, windsurfing, swimming, and water skiing. Visitation for 1998 exceeded 8,800, the majority of which occurred from June through September. Sediment studies indicate approximately 12 million cubic yards of material has been deposited in the John Day River below river mile 9.5 (called "the Narrows"). The greatest portion of this material appears to have deposited in the middle reach between RMs 3 and 6 of the John Day River. In the vicinity of Albert Philippi Park, sediment deposition are creating extremely shallow conditions in the dock area. Access problems at the park will continue and probably worsen in the future, because the park is located on a point and is in a prime location to receive a constant supply of sediment.

9.4.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 5.
Water Surface Elevations, Albert Philippi Park, JD RM 3.5

Condition/Alternative #	Elevation, ft
Existing WS Elevations	Up to 269
#1 - Spillway Crest without Flood Control	218 to 233
#2 - Spillway Crest with Flood Control	218 to 256
#3 - Natural River without Flood Control	160 to 167
#4 – Natural River with Flood Control	160 to 227

For the John Day Drawdown alternatives the Columbia River will not back up into the John Day River as it does for the current operation (see Plates 5 and 6 in the attachments). The entire facility will be landward of the John Day River and dry. Recreational use will change from slack water to swift water activities. From visitation data compiled between 1994 and 1999, the average number of people that used this facility per month was 640, (average use in June, July, August, and Sept. was 1,575, 1,480, 1,375, and 1,105, respectively) with highest use in June and lowest use in January. The yearly average is 9,340 people and is compiled between the years 1995 to 1998. Of the 15 sites in this study, Albert Philippi Park ranks 12th for visitation rates (Corps, 1999).

9.4.4. Proposed Replacement Measures

Under the spillway crest alternative, the backwater effect from the Columbia River will just extend to the downstream end of the park (see Plate 5). Therefore, with excavation and relocation of the existing boat docks, river access can be maintained. Although, any sediment carried by the John Day River will start to drop out at the beginning of the backwater pool and cause a long-term maintenance problem in the area of the docks.

With the natural river as the selected alternative, river access will be limited to jetboats. As can be seen from Plate 6, there will be no backwater effect from the Columbia River, so the temporary docks at this site would need to be removed. Due to expected currents in the river,

the swimming beaches that currently exist would be difficult to re-create for either alternative. Due to increased river velocities and the reduction or elimination of the backwater pool caused by the drawdown, the current sediment problem should be eliminated or significantly reduced.

9.5. Rock Creek (WA), RM 229

9.5.1. Location and Access

Rock Creek Park is located on the Washington side of John Day Reservoir, on Rock Creek, approximately one mile upstream from the mouth of Rock Creek. Land access to the park is by a two-lane county road (Klickitat Road) connection to State Route (SR)-14. Boat access is via the culvert/tunnel under the SR-14/BNSF Railroad bridge.

9.5.2. Existing Site Features and Conditions

Due to lack of use, the Corps closed Rock Creek Park in 1981. Power to the park was removed, irrigation heads were removed, and all fixtures removed from the restrooms. Pumps for irrigation and potable water remain. Portable toilets and dumpsters, have been placed onsite and are maintained by the Corps.

Sediment has built–up in the backwater area of John Day reservoir and access to Rock Creek is limited to shallow draft vessels. Sediment has built-up on the toe of the boat ramp, further limiting access. The swim beach is reverting to wetlands.

9.5.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 6.
Water Surface Elevations, Rock Creek Park, RM 229

Condition/Alternative #	Elevation, ft
Existing WS Elevations	Up to 270
#1 - Spillway Crest without Flood Control	218 to 233
#2 - Spillway Crest with Flood Control	218 to 256
#3 - Natural River without Flood Control	168 to 183
#4 – Natural River with Flood Control	168 to 228

River access will be limited except for water coming down Rock Creek (see Plates 7 and 8 in the attachments). The backwater effect from John Day Reservoir will be eliminated. All water-based facilities will be dry at all drawdown alternative elevations. Currently, from John Day Project visitation data compiled between 1994 and 1999, the average number of people that used this facility per month is 1,235, with highest use in June and lowest use in January. The yearly average for Rock Creek is 16,590 people and is compiled between the years 1995 to 1998. Of the 15 sites in this study, Rock Creek Park ranks 9th for visitation rates (Corps, 1999).

9.5.4. Proposed Replacement Measures

As stated above, there will be no river access to Rock Creek Park. However, under the spillway crest alternative, there does appear to be a large, land-protected inlet approximately 1,000 feet from the current access tunnel (under the BNSF railroad). Upon excavation of the area and relocation of the ramp and boat docks, this inlet could be used (see Plate 7). If the natural river alternative is selected, the closest river access from the BNSF railroad access tunnel is approximately 2,300 feet (see Plate 8). Depending on further investigation, there should be a small shallow inlet formed by this drawdown alternative that could be deepened by excavation and then used for a ramp and boat dock. Either alternative would require a road to the relocated site, so other engineering and archeological considerations need to be investigated. The natural river bottom in this area has a 1 percent slope (Corps, 1955), so a road could easily be built. Both alternatives may also require groins and a floating breakwater, or a rock-filled breakwater to provide safe boat launching and short-term moorage facilities. With some excavation, contouring and sand fill, it should be possible to construct a swimming beach for either alternative. As in the boat launching facilities, groins and a floating breakwater, or a rock-filled breakwater may be needed to provide a safe swimming area.

9.6. Blalock Canyon Boat Ramp (OR), RM 233 5

9.6.1. Location and Access

Located on the Oregon shore approximately 27 miles upstream from John Day Dam. Land access is via I-84 at exit #129 (Blalock Canyon Road). River access is through a culvert that passes under the Union Pacific Railroad.

9.6.2. Existing Site Features

Blalock Canyon is not a recreation site but was built as a harbor-of-refuge to be used by small craft during stormy, high wind conditions. The boat ramp is gravel. There are no other facilities at this location. Access to the river is through a box culvert. The windsurfing community recommends this area for people with an advanced skill level. Windsurfing is considered to be good once a person is out on the water, but trains can sometimes block access.

9.6.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 7.
Water Surface Elevations, Blalock Canyon, RM 233

Condition/Alternative #	Elevation, ft
Existing WS Elevations	Up to 270
#1 - Spillway Crest without Flood Control	218 to 234
#2 - Spillway Crest with Flood Control	218 to 256
#3 - Natural River without Flood Control	172 to 187
#4 – Natural River with Flood Control	172 to 228

Access through the culvert will not be available under either drawdown scenario (see Plates 9 and 10 in the appendix), however during flood conditions, where water surface elevations exceed MOP (Elev. 257), access will be limited to *very* shallow-draft vessels. The boat ramp will not reach the water. There is no visitation data for Blalock Canyon.

9.6.4. Proposed Replacement Measures

The closest river access is located approximately 1,200 feet from the current boat ramp using the spillway crest alternative, or 2,500 feet under the natural river alternative. With the spillway crest alternative (see Plate 9), there is some protected river access, so river velocities could be low enough to launch boats, although a groin or other structure may still be required. With the natural river alternative (see Plate 10), there is no protected access, so river velocities would require a structure (a groin or equivalent) be built so boats could be launched safely. River access may be possible through the box culvert, but due to the steep slopes of the riverbanks in the general area (25 percent grade, Corps 1995) extensive excavation and grading would be required to locate a road past the UP railroad grade. Beyond the fill for the UP railroad, the banks of the Columbia River become very flat (<1 percent slope), so a road could easily be built to either alternate site. From a survey taken by the Corps in 1955, there was a road that extended from the highway to the river. The survey also shows a structure that could be a boat ramp. Each alternative will require further engineering and archeological study before any alternative relocation can be considered with confidence. Although this site does see occasional recreational use of the boat ramp, the primary use is as a harbor of refuge. Therefore, abandoning the site should also be considered in any future analysis.

9.7. Roosevelt Park (WA), RM 241

9.7.1. Location and Access

The park is located on the Washington shore of John Day Reservoir immediately south of the town of Roosevelt, Washington. Access is by Roosevelt Ferry Road, off of SR 14, or by boat.

9.7.2. Existing Site Features and Conditions

The developed area of the park is approximately 26 acres. Day use park activities include boat launching as well as picnicking, fishing, windsurfing, water-skiing, and swimming. Drinking water, restrooms, and showers are available. Three breakwaters provide protection from high waves. Boat launching activities are separate from the picnic area. There is a boat launching ramp and tie-up dock with piles and access in-place for a second dock along the boat ramp. A courtesy dock with gangway access is located adjacent to the launching area. There are no formal camping areas, however, camping has been observed. There is a large swimming beach adjacent to a large lawn area with picnic shelters and tables. The area west and windward of the groin was not developed as a formal swim beach but is used by windsurfers as a launching area. Local volunteers were maintaining the park, but recently the John Day project has taken over mowing and minor maintenance. The swimming beach that was developed east of and leeward of a rock groin breakwater, has not been maintained and except for peak use days, appears to receive minimal use. Some wetland plant species have been observed, but the entire beach is not vegetated. The park is in good condition, with a well-maintained lawn and ample shade from trees. On high wind days, windsurfing use is high. The site is considered to be a good overall location for beginning to advanced

windsurfers. There is a protected cove for beginners, while the main stem offers higher wind speeds and larger swells for the advanced surfer.

There is a separate treaty fishing access site located between the public boat launching area and the public day use facilities.

9.7.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 8.
Water Surface Elevations, Roosevelt Park, RM 241

Condition/Alternative #	Elevation, ft
Existing WS Elevations	Up to 270
#1 - Spillway Crest without Flood Control	218 to 234
#2 - Spillway Crest with Flood Control	218 to 256
#3 - Natural River without Flood Control	185 to 197
#4 - Natural River with Flood Control	185 to 229

It is possible that the boat launching facilities will be useable at the higher flows for Alternative #2, but this would be a short-term effect while the water surface levels return to normal. Therefore, all facilities will be dry for all proposed alternatives (see Plates 11 and 12 in the appendix). Visitation data compiled between 1994 and 1999 shows the average number of people that use this facility per month is 12,245, with highest use in June and lowest use in December. The yearly average is 158,470 people and is compiled between the years 1994 to 1998. Of the 15 sites in this study, Roosevelt Park ranks 7th for visitation rates. (Corps, 1999).

9.7.4. Proposed Replacement Measures

As can be seen from the spillway crest alternative (see Plate 11), it may be possible to relocate the park ramp, docks, and treaty-fishing facilities onto the Columbia River approximately 1,500 feet from the current boat ramp. Due to river velocities and wind-wave action, a groin and floating breakwater or a rock breakwater may be needed to provide safe river access. Some excavation may be needed in the general area of the ramp and docks to provide enough draft for boats. With further excavation a swimming beach can also be provided, but since the beach would be located on the Columbia River, some type of breakwater can be expected. Under the natural river drawdown option (see Plate 12), there is a long inlet of water that extends up toward Roosevelt Park. With excavation, it may be possible to create a marina with enough draft for a boat ramp and dock that is located approximately 3,000 feet from the current boat ramp. It may even be possible for a swimming beach, but this would require more excavation, some contouring, and placement of sand fill. Both alternatives will require a road to be built out to the suggested sites. From a survey taken by the Corps in 1955, there appears to be a road that may extend to the proposed sites. Consequently, further engineering investigation and archeological analysis will be required at this site.

9.8. Arlington Marina (OR), RM 241

9.8.1. Location and Access

Access to the marina is via I-84 at exit #137, by city streets, or by boat.

9.8.2. Existing Site Features and Conditions

The marina is leased and maintained by the Port of Arlington. The marina consists of a boat ramp and dock, public courtesy docks, parking, and rental moorage facilities. The Port has added to the existing moorage docks and charges a monthly fee for slips. A ramp for wheelchair access to docks was recently added. In addition, the port is adding sites for RVs. There is an indication of sediment buildup on the ramp from recent hydrographic surveys. Windsurfers consider this site approprate for people with an advanced skill level.

9.8.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 9.
Water Surface Elevations, Arlington Marina, RM 241

Condition/Alternative #	Elevation, ft
Existing WS Elevations	Up to 270
#1 - Spillway Crest without Flood Control	218 to 234
#2 - Spillway Crest with Flood Control	218 to 256
#3 - Natural River without Flood Control	185 to 197
#4 – Natural River with Flood Control	185 to 229

As can be seen from Plates 11 and 12 in the attachments, the marina will be dry except during high flood events for Alternative #2. Visitation data compiled between 1994 and 1999 shows the average number of people that use this facility per month is 2690, with highest use in June and lowest use in December. The yearly average is 6950 people and is compiled between the years 1994 to 1998. Of the 15 sites in this study, Arlington Marina ranks 13th for visitation rates. (Corps, 1999).

9.8.4. Proposed Replacement Measures

As shown in Plates 11 and 12, it may be possible to relocate the ramp and boat docks out in the Columbia River. Since this area would be located on the outside of a curve in the Columbia River, the current can be expected to be very strong. Therefore, a rock breakwater would be needed to provide protection for high channel velocities and wind-wave action. A road (approximately 2,300 feet in length from the existing boat ramp) through the existing marina could provide access to the new site. Another alternative is to excavate the marina. In the marina, the average bottom elevation is 225 feet (at the docks). To provide a 10-foot water depth at the docks would require increasing the depth of the marina by 50 feet (for the natural river alternative) and 17 feet (for the spillway crest alternative). Also, the banks of the marina along the island/jetty where the grain elevator is located may need to be sloped back to provide the room necessary for this excavation. This would require the island/jetty to be moved further out into the river to keep the current size of the grain load facility constant. Therefore, due to the extent of the excavation required, moving the marina out into the river may be the most viable alternative.

From recent borings taken in the marina, the bottom is composed of medium dense alluviums consisting of fill (basalt cobbles and boulders), and thick layers of sandy gravel, cobbles, and boulders interspersed with thin layers of sandy silt. No bedrock was encountered. Any

excavation or road building may also encounter a rail yard that was flooded by John Day Reservoir. This infrastructure could be a potential environmental problem, so it would need more investigation, in addition to further engineering analysis. As shown in Figure 2, the rail yard and round house/turntable is the approximate location of the current marina.

9.9. Earl Snell Park, Arlington (OR), RM 241

9.9.1. Location and Access

Access to the park is via I-84 at exit #137, by city streets, or by boat. This day-use park is located on China Ditch in the city of Arlington, Oregon.

9.9.2. Existing Site Features and Conditions

The land for this park is leased and maintained by the City of Arlington and is located between the marina and downtown Arlington (South of the UP railroad and I-84 bridges). It is fully developed and landscaped with mature trees and large lawn expanse. The park is the site of many local outdoor events. Site facilities include a floating bandstand, a small handling dock, a swimming beach, picnic areas, drinking water, and a children's play area. There are no boat launching facilities. The boat launching facilities are in the harbor area located in the marina. Bordering the park are restaurants and service stations. Windsurfing enthusiasts like the town of Arlington since the park, gas stations, restaurants, and motels are located just across the freeway.

9.9.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 10.
Water Surface Elevations, Earl Snell Park, RM 241

Condition/Alternative #	Elevation, ft
Existing WS Elevations	Up to 270
#1 - Spillway Crest without Flood Control	218 to 234
#2 - Spillway Crest with Flood Control	218 to 256
#3 - Natural River without Flood Control	185 to 197
#4 – Natural River with Flood Control	185 to 229

Under Alternative #2, a very large flood event would cause the water surface level in the park to be close to normal, but this level would recede as the storage from the flood is drawn down. Under all other alternatives, the lake in the park would be dry (see Plates 11 and 12 in the appendix). Visitation data compiled between 1994 and 1999, shows the average number of people that use this facility per month is 902, with highest use in the summer months and peak use in September and lowest use in December. The yearly average is 12,100 people and was compiled between the years 1994 to 1998. Of the 15 sites in this study, Earl Snell Park ranks 10th in visitation rates. (Corps, 1999).

Earl Snell Park is central to the town of Arlington. It provides a location to relax in an arid environment and tends to draw in motorists from I-84. Drawdown at all the studied alternatives would leave the park dry, so it could have a major impact on the city's economy (see the Regional Economics Appendix and Public Comment Appendix for more discussion).

9.9.4. Proposed Replacement Measures

The park is central to the city. The embayment could be excavated to provide very limited swimming at the higher flows of Alternatives #1, #2, or #4, but the higher water surface level would only be temporary. Any excavation may encounter sections of the old town of Arlington that was flooded by John Day Reservoir. This infrastructure could be a potential environmental problem. As shown in Figure 2, the central part of the abandoned town is the approximate location of the current park.

Figure 2 Aerial Photo of Old Town Arlington

Another alternative would be to create a small dam across the narrowest part of the waterway entrance to the park (in-between the I-84 roadway and UP railroad bridges). Columbia River water could be pumped in to maintain the water level and water quality of the impounded lake. Since there are no ramp facilities located in the existing park, river access should not be an issue.

9.10. Quesnel Park (Threemile Canyon) (OR), RM 255

9.10.1. Location and Access

Access to the park is by road off of I-84 at exit #151, or by boat through either of two entrance channels.

9.10.2. Existing Site Features and Conditions

Site facilities include windsurfing, small boat launching, and a pit toilet. The boat ramp was found to be in major disrepair during a site visit (Corps, June 1995). Currently, boaters are using a gravel ramp for launching. The road to the site from the exit turnoff has been recently graveled. Tribal fishermen use this site for launching and net drying. Borings taken in 1994 indicate that in the channel, any future work would encounter a top layer of loose sand with some gravel, then a layer of medium dense silty fine-grained sands, followed by medium dense sandy gravels and dense silty sands. No rock was encountered by the borings. A treaty fishing access site is planned for construction in 2001. The public and exclusive tribal use boat ramps will be side by side, similar to Le Page Park. The windsurfing community rates this location a beginner to advanced site. The site considered being the only location on the John Day Pool that is appropriate for all skill levels. The calm bay on the south side of the island is protected enough for beginners, while access to the main channel is good for intermediate to advanced skill levels.

9.10.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 11.
Water Surface Elevations, Quesnel Park, RM 255

Condition/Alternative #	Elevation, ft
Existing WS Elevations	Up to 270
#1 - Spillway Crest without Flood Control	218 to 235
#2 - Spillway Crest with Flood Control	218 to 257
#3 - Natural River without Flood Control	202 to 215
#4 – Natural River with Flood Control	202 to 232

Each of the proposed alternatives, except major flood events under Alternative #2, will cause Quesnel Park to be dry (see Plates 13 and 14). Visitation data compiled between 1994 and 1999, shows the average number of people that use this facility per month is 810, with highest use in the summer months with peak use in May and lowest use in February. The yearly average is 10,940 people and is compiled between the years 1995 to 1998. Of the 15 sites in this study, Quesnel Park ranks 11th in visitation rates. (Corps, 1999).

9.10.4. Proposed Replacement Measures

One possible replacement measure is moving the facilities to the river side of Threemile Island. A road from the existing site could be built from the new location. Using the spillway crest alternative, the ramp would be 2,800 feet from the current ramp (see Plate 13). This location would require a groin and floating breakwater or a rock breakwater to provide a safe area for boat launching due to river currents and possible wind-wave action. The natural river

alternative would place the ramp 3,000 feet from the current ramp (see Plate 14). Some excavation may be required for the natural river alternative to provide adequate depths for launching or mooring a boat.

Another replacement alternative would be to move this recreation site approximately one mile upstream from Threemile Island. With some excavation, it may be possible to provide a more protected boat launching and moorage facility. Before John Day Reservoir was created, a road existed (from a Corps survey dated 1955), so it should be possible to provide access to either of the proposed relocation sites. Although, on the river side of Threemile Island, the slope of the river bank does exceed 12 percent. From the same survey, a road does exist to the alternative relocation site one mile upstream from Threemile Island. In fact, the site was a location for a ferry crossing, which may indicate a location that has natural protection from the river. Finally, as with all of the other sites, any road, ramp, or docks would need to be evaluated for engineering judgement and archeological concerns.

9.11. Crow Butte (WA), RM 262

9.11.1. Location and Access

Access to the park is by road off of SR-14 or by boat.

9.11.2. Existing Site Features and Conditions

Crow Butte is a full facility park with restrooms, showers, picnic areas, swimming areas, boat launching at two ramps, overnight moorage, large picnic/day use areas and camping (tent and full site hookups). The park was originally built by the Corps, but is administered and maintained by the Washington State Parks Department. There are two boat ramps, one on the river and one within the boat basin. They are used frequently and fees are charged for launching. The swimming beach is well maintained. The toe of the river boat ramp has sediment build-up. Irrigation water is pumped directly from the river. The Washington State Parks Department modified the irrigation pump intake to a horizontal intake with a top elevation of 256 feet and a bottom elevation of 254.5 feet. The site is very well maintained, with extensive landscaping, and many shade trees. The site sees very high use on the weekends in the day-use area by the migrant farm working families. In addition, a separate treaty fishing access site at Crow Butte is scheduled for construction in 2001. The windsurfing community rates this location a beginner to intermediate site. The site is good for people that are beginning to learn windsurfing due to the protected bay and launch.

9.11.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 12.
Water Surface Elevations, Crow Butte, RM 262

Condition/Alternative #	Elevation, feet
Existing WS Elevations	Up to 271
#1 - Spillway Crest without Flood Control	219 to 236
#2 - Spillway Crest with Flood Control	219 to 257
#3 - Natural River without Flood Control	209 to 223
#4 – Natural River with Flood Control	209 to 235

Based on the most current hydrosurvey, all river access facilities including the irrigation intake will be dry (see Plates 15 and 16 in the attachments). Most people who use the camping and day-use facilities do so without boats (Camp Ranger, 1999). The main attraction is the park itself and the water that surrounds the park, which is used for swimming (especially on the weekends) and the aesthetic feel it provides. Therefore, without the water the recreation use of the park would be diminished. Visitation data compiled between 1994 and 1999, shows the average number of people that use this facility per month is 12,615, with highest use in the summer months with peak use in September and lowest use in February. The yearly average is 160,040 people and is compiled between the years 1994 to 1998. Of the 15 sites in this study, Crow Butte ranks 5th in visitation rates. (Corps, 1999).

9.11.4. Proposed Replacement Measures

For all alternatives, the boat ramp could be relocated to an area along the south bank of Crow Butte and an access road extended from existing roads in the park. Since this location would be on the main section of the Columbia River, groins and a floating breakwater or a rock breakwater may need to provide safe boat launching facilities and to provide protection from wind-wave action (see Plates 15 or 16). The same would be true for a swimming beach, but due to river velocities construction of a safe swimming area may be difficult, so it would be a candidate for elimination at this location. Both would require some excavation, and contouring, while the swimming beach would also require sand fill. The side slopes of the river in this area of Crow Butte exceed 35 percent (Corps, 1955), so an access road to this site would be very difficult to build.

Another alternative may be to place the facilities somewhere between the inlet that is between Crow Butte and the mainland (see Plates 15 and 16), or approximately 7,000 feet from the current boat ramp. From interviewing people in the area, it was found that there was an old road bed and Great Northern railroad bed that extended from Crow Butte out into this area that were in use prior to the filling of John Day Reservoir. The existence of the old beds was verified by a survey taken by the Corps in 1955.

The irrigation pump intake will need to be relocated so that the park grounds can be irrigated until other sources are found.

9.12. Boardman Park and Marina (OR), RM 269

9.12.1. Location and Access

Access to Boardman Park is by a road off of I-84 and exit #164. The area is also access by city streets (Main St. and Marine Dr.) and by river access.

9.12.2. Existing Site Features and Conditions

Recreation facilities available at Boardman Park include swimming areas, picnic areas, camping areas, a ball field, windsurfing, water skiing, boat ramp, docks, and long- and short-term boat moorage. The camping area has tent sites and full-service hookups. The swimming beach is maintained but, according to the park manager, receives minimal use due to poor water quality. The park is well maintained, well landscaped, and has trees for shade. From data given by the chief ranger at the park, there are 18 slips for temporary moorage and 26 slips for permanently moored boats (5 boats have a draft greater than 8-feet), and there is a waiting list for permanent moorage. The launch rate is about 5,000 boats per year. Windsurfers recommend this location for beginning to advanced skill levels. The river is very wide at this location so windsurfers do not feel crowded by other types of river traffic. Borings indicate the soils below the river bottom in the general area to be composed of alluviums, medium to dense sands, and dense sandy gravel and cobbles. No rock was encountered.

There is a treaty fishing access site located in the park (Faler Road). Upland facilities are located at the western end of Boardman Park. The existing public boat launching facilities will be used by the tribal fishers.

9.12.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 13.
Water Surface Elevations, Boardman Park & Marina, RM 269

Condition/Alternative #	Elevation, ft
Existing WS Elevations	Up to 271
#1 - Spillway Crest without Flood Control	221 to 236
#2 - Spillway Crest with Flood Control	221 to 258
#3 - Natural River without Flood Control	221 to 231
#4 – Natural River with Flood Control	221 to 240

Except for Alternative #2, the entire facility will be dry (see Plates 17 and 18 in the attachment). Under Alternative #2 the marina could possibly return to current levels, but after the flood the water level would quickly recede. Visitation data compiled between 1994 and 1999 shows the average number of people that use this facility per month is 12,245, with highest use in the summer months with peak use in June and lowest use in December. The yearly average is 161,315 people and is compiled between the years 1994 to 1998. Of the 15 sites in this study, Boardman Park and Marina ranks 6th in visitation rates. (Corps, 1999).

9.12.4. Proposed Replacement Measures

Using Plate 17 or 18, it can be seen that there is a naturally shaped inlet about 700 feet in front of the existing marina. Depths are very low, but it may be possible to excavate to create a new marina, although, the excavation and required contouring could be very extensive to provide the same level of facilities (size and depth availability) that are currently available. A groin, and floating breakwater or a rock breakwater may be needed to shield against wind-wave action. With excavation, contouring, sand fill, and some type of breakwater for protection from river currents, a swimming beach could also be built in this area. A road would need to be built from the current boat ramp (approximately 2,000 feet in length). Utilities would also need to be routed to the new marina. From a survey taken by the Corps in 1955, aerial photos, the approach to the suggested site is very flat and appears to be over farm land that existed before John Day Reservoir was filled.

Another alternative is to excavate the existing marina. The average bottom elevation in the dock area is 250 feet, so the marina would need to be excavated by 39 feet to provide the needed draft for the larger boats. The existing rock breakwater would also need to be moved further out into the river to provide the room for the side slopes created by the excavation. Therefore, due to the extent of the excavation, moving the marina may be the most viable alternative. The park manager has suggested abandoning the swimming beach because access to water will still be available and unless water quality can be improved, swimming will remain a low public activity. No matter the area selected, further engineering and archeological evaluation will be required to determine if the alternative sites are viable.

9.13. Irrigon Park and Marina (OR), RM 282

9.13.1. Location and Access

Access to Irrigon Park and Marina is by City Street (10th street and Main). From the Highway 730, the access is from 10th Street. The marina provides direct access to the park from the river.

9.13.2. Existing Site Features and Conditions

The park recreational facilities include a swimming area, field games area, playground, picnic areas, drinking water (city water), windsurfing, water skiing, fishing, and boat launching and moorage facilities. The marina is approximately one acre and has slips for 56 boats. Temporary moorage and permanent moorage is provided. The swimming beach has extensive bank erosion and the swimming area has scattered boulders/large cobbles throughout, making swimming a hazard. Consequently, the swimming beach that was in the original plans has been moved to the west side of the groin that protects the marina. The eroding bank that had overlooked the swimming beach has been re-enforced with a series of rock-filled gibions. The park is well maintained, and has many trees that provide shade. The boat ramp as-built drawings indicate that the ramp was extended and an additional dock segment was added. It is believed that the dock extension and additional piling were added but the piling was damaged during an ice storm and later removed by park staff. Hydrographic surveys indicate sediment has built up on the toe of the ramp. The deepest draft vessels using the marina have 6-foot keels.

9.13.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 14.
Water Surface Elevations, Irrigon Park and Marina, RM 282

Condition/Alternative #	Elevation, feet
Existing WS Elevations	Up to 273
#1 - Spillway Crest without Flood Control	236 to 249
#2 - Spillway Crest with Flood Control	236 to 261
#3 - Natural River without Flood Control	236 to 248
#4 – Natural River with Flood Control	236 to 256

All facilities will be dry at all but the highest high flood conditions under Alternatives #2 and #4 (see Plates 19 and 20). Visitation data compiled between 1994 and 1999, shows the average number of people that use this facility per month is 17,485, with highest use in the summer months with peak use in May and lowest use in December. The yearly average is 227,030 people and is compiled between the years 1994 to 1998. Of the 15 sites in this study, Irrigon Park and Marina ranks 1st in visitation rates. (Corps, 1999).

9.13.4. Proposed Replacement Measures

The marina could be located further out into the river (see Plates 19 and 20), and would require a rock breakwater to protect against wind-wave action. An earlier study found that a series of groins and a floating backwater were not practicable for this area due to the wind-wave action (Ogden, 1995). In addition to the rock breakwater, excavation can be expected so the relocated marina could provide the same level of services as is currently available. A large excavation would also be required to reestablish an area with adequate depth for swimming. Once the excavation is complete, the wave action that is causing the current bank erosion would continue, so a rock breakwater would also be required to protect the swimming beach.

The other alternative is to excavate the existing marina. Assuming a 10-feet depth, the marina would need to be excavated to an elevation of 226 feet. This would require a 26-foot excavation. In addition, the current rock breakwater would need to be moved to provide the room necessary for the required side slopes created by the excavation. Therefore, the most viable alternative may be to relocate the marina out into the river. No matter the area selected, further engineering and archeological evaluation will be required to determine if the alternative sites are viable.

9.14. Umatilla Marina Park (OR), RM 290

9.14.1. Location and Access

Access is by local road (Switzler Rd) from Hwy. 730, city streets, I-82 and exit #1 (exits onto Highway 730), and by river access.

9.14.2. Existing Site Features and Conditions

The park and marina provide day-use land and water based opportunities. The marina has a boat ramp with handling dock, fueling facility, and docks for short and long term moorage.

The marina long term moorage is operating at full capacity. Large cruise ships and the sternwheeler also use the marina for short term handling for passenger loading/unloading and fueling. The park has tent and full service hook-ups for camping. The day-use area has picnic shelters, drinking water, restrooms, and a swimming beach that is becoming overgrown and is reverting to wetlands.

9.14.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 15.
Water Surface Elevations, Umatilla Marina Park, RM 290

Condition/Alternative #	Elevation, ft
Existing WS Elevations	Up to 276
#1 - Spillway Crest without Flood Control	250 to 260
#2 - Spillway Crest with Flood Control	250 to 270
#3 - Natural River without Flood Control	250 to 260
#4 – Natural River with Flood Control	250 to 270

The average bottom elevation in the marina is 253 feet. Therefore, the marina (and swimming beach) will be dry under all alternatives using the lower water surface elevations (see Plates 21 and 22). The higher water surface elevations for Alternatives #1 and #3 would create a marina that could be usable for boats drawing less than 4 feet of draft, but it would only be for part of the year and the larger cruise ships would not be able to use the marina. The flood conditions under Alternatives #2 and #4 were ignored since the water surface elevations they would create would be temporary. Visitation data compiled between 1994 and 1999, shows the average number of people that use this facility per month is 14,820, with highest use in the summer months, although peak use in April and lowest use in December. The yearly average is 193,440 people and is compiled between the years 1994 to 1998. Of the 15 sites in this study, Umatilla Marina Park ranks 4th in visitation rates. (Corps, 1999).

9.14.4. Proposed Replacement Measures

Keeping the marina requires deepening the bottom to Elev. 238.5 for clearance of 11.5 feet at 75,000 cfs (an excavation of 14.5 feet). This will provide adequate depth for deep draft vessels. Total depth for the entrance will be 12.5 feet, or Elev. 237.5 (an excavation of 15.5 feet) to provide for wave and bottom clearance for larger ships using the marina. In addition, the current rock breakwaters may need to be moved to provide the room necessary for the required side slopes created by any excavation.

Another alternative (developed by Ogden Beeman during the MOP study), involved constructing a floating breakwater structure outside the marina with rubble mound breakwater on the upstream side for wind/wave protection. To provide the same area as the existing marina, the current rock breakwater/jetty would need to be removed and the area excavated to provide the proper depth. This alternative would place the marina very close to the proposed navigation channel (see Plates 21 or 22), so there could be a safety issue due to barge traffic. From Figure 3, it can be seen that the original marina was enlarged to construct the existing marina.

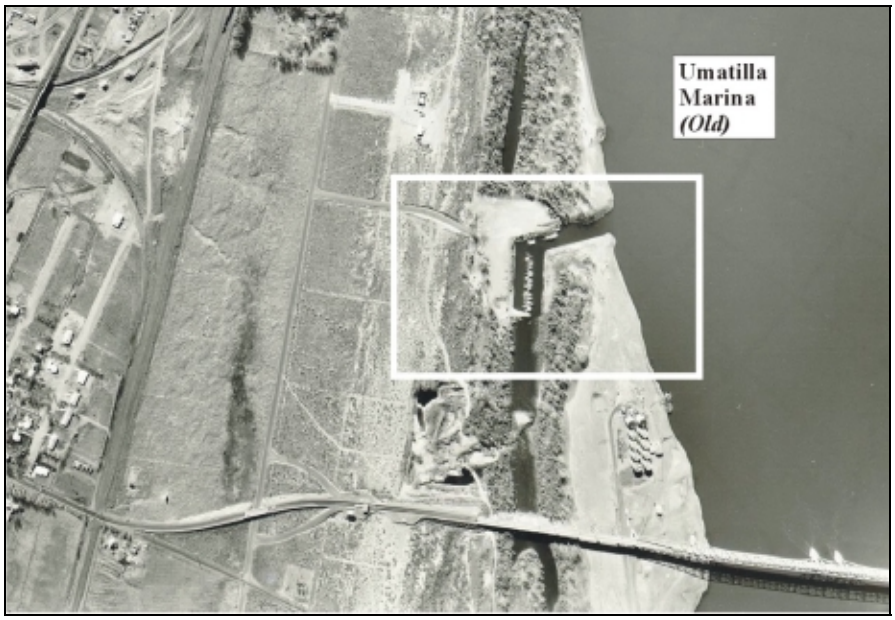


Figure 3. Umatilla Marina before the creation of John Day Reservoir

Therefore, excavation could be the most viable alternative, since all of the current park facilities would be least affected by excavation. Restoration of the swimming beach would require a large excavation, contouring, and placement of sand to achieve a maximum water depth of seven feet. The current swimming beach has little use due to poor water quality, sedimentation build up, and lack of maintenance. Therefore, the swimming beach may be a viable candidate for abandonment.

9.15. Plymouth Park (WA), RM 289

9.15.1. Location and Access

Access to the park is via roads off SR-14 or by boat.

9.15.2. Existing Site Features and Conditions

Plymouth Park is actually divided into two areas: the camping area with tent sites and full service hook-ups, and the day-use area. The day-use area has a boat marina with a boat ramp, two handling docks for the boat ramp, a separate courtesy dock, picnic areas with grass and trees for shade, and a swimming beach. A fee is charged to use the camping and day-use areas.

The channel approach is acceptable for shallow draft boats with a bottom surface at Elev. 252 to 252.6. The boat ramp bottom is at Elev. 253. The swimming beach appears to have been filled with sediment to a point just below the culvert that runs through a dike that separates the swimming area from the boat basin. Other features are picnicking, fishing, water skiing, windsurfing, drinking water, showers, and restrooms. The site was developed and is maintained by the Corps. The windsurfing community rates this an advanced intermediate to advanced site. Windsurfing comments are that Plymouth Park is one of the few locations on the John Day Pool not significantly dependent on the direction of the wind.

9.15.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 16. Water Surface Elevations, Plymouth Park, RM 289	
Condition/Alternative #	**Elevation, ft**
Existing WS Elevations	Up to 275
#1 - Spillway Crest without Flood Control	250 to 260
#2 - Spillway Crest with Flood Control	250 to 268
#3 - Natural River without Flood Control	250 to 260
#4 – Natural River with Flood Control	250 to 268

All river access facilities will be dry for all alternatives at the lower elevations (see Plates 21 and 22). At the higher elevations, water would reach the boat ramp, but it would be a seasonal effect. Except for the access by-way, the area is completely surrounded by water. Although the camping facilities will not be physically affected by the drawdown (except water for irrigation), the aesthetic feel the water provides would be lacking and may discourage people from using the park after the drawdown. The same can be said for the day-use area, but the effect due to the lack of water would be greater since the grassed area and picnic area borders the water edge. Visitation data compiled between 1994 and 1999, shows the average number of people that use this facility per month is 16,485, with highest use in the summer months, with peak use in June and lowest use in December. The yearly average is 217,415 people and is compiled between the years 1994 to 1998. Of the 15 sites in this study, Plymouth Park ranks 3rd in visitation rates. (Corps, 1999).

9.15.4. Proposed Replacement Measures

The ramp and boat docks could be relocated out into the main river channel approximately 1,000 feet from the current boat ramp (see Plates 21 or 22). This relocation may require groins and a floating breakwater or a rock breakwater to protect against river velocities and wind-wave action. The swimming area will also need to be relocated to the river, but it may not be practicable due to the previously mentioned velocities. Due to the shallow nature of the river in this area after drawdown, excavation would be required to provide the area and draft needed for boat launching and docking facilities. An engineering and archeological study will need to be performed to evaluate any proposed relocation. From examining a survey taken by the Corps in 1955, a road could easily be built to the relocated facilities.

9.16. Nugent Park (OR), Umatilla RM 1

9.16.1. Location and Access

Access is by city streets in the City of Umatilla, or by river access. Shallow draft boats from the Columbia River may access the parkway of the Umatilla River.

9.16.2. Existing Site Features

Nugent Park is a small community park with a single lane boat ramp, and a fishing access structure for persons with disabilities. The access structure was constructed with Land and Water Conservation Fund support and is on land leased by the Corps to the City of Umatilla.

A handling dock was present in 1962 but has since been removed because it is not useable at current water levels. The toe of the boat ramp is at Elev. 261. Launching is available for shallow-draft vessels with maximum of two feet of draft (i.e., canoes and flat-bottomed boats).

9.16.3. Impacts

The following table lists the water surface elevations at this site due to drawdown.

Table 17.
Water Surface Elevations, Nugent Park, U - RM 1

Condition/Alternative #	Elevation, ft
Existing WS Elevations	Up to 275
#1 - Spillway Crest without Flood Control	250 to 260
#2 - Spillway Crest with Flood Control	250 to 268
#3 - Natural River without Flood Control	250 to 260
#4 – Natural River with Flood Control	250 to 268

At drawdown, the John Day impoundment will not extend upstream to Nugent Park, thereby rendering the boat ramp unusable. Due to the low flows in the Umatilla River except during high flow events, boat access may be no longer practicable. The wheelchair access fishing structure would also be left dry (see Plates 21 and 22), making it unusable for its intended purpose.

9.16.4. Proposed Replacement Measures

Based on the extensive rock excavation required to mitigate the boat ramp and fishing structure to maintain existing use at drawdown, and the proximity of boat launching facilities at Umatilla Marina Park, it is proposed that this site not be mitigated. However, coordination with the National Park Service, the administrator of Land and Water Conservation Fund projects, will be necessary. Relocating the fishing structure to a site downstream of the park has not been evaluated for this report. This could be further evaluated if the Corps continues with Phase 2.

Section 10. Technical Requirements/Feasibility

10.1. Pile Installation

Without an engineering investigation, pile installation conditions are unknown. However, new piles would be of similar material and design as they currently exist at each site.

10.2. Boat Ramp Design

Depending on the drawdown alternative and relocation area selected for each site, the boat ramps will require either relocation or extension. See Figure 4 for a typical ramp design.

10.3. Dock Design

Segments will be 20 feet in length with widths and materials being consistent with docks used for the new treaty-fishing access sites. New docks would be concrete, and sized to match

existing facility docks. Design of concrete docks will conform to Oregon State Marine Board requirements. See Figure 5 for typical dock details. Where new dock segments are added, piles will be required and installation will be per the discussion above in Pile Installation.

Minimum draft and buffer requirements are as follows:

- Marina entrance channels must be deep enough to accommodate the deepest draft vessels currently moored plus three feet (currently 10 feet required)
- Marina interior depths must be two feet deeper than the deepest draft vessel currently moored.
- Standard handling dock area depths must be four feet minimum. It is assumed that because these are not permanently moored boats the two foot buffer is not required.

Four types of docks are found at the recreation sites. They are defined as follows:

- Handling dock: dock adjacent to a boat ramp for the purpose of temporarily tying up launched boats for loading of passengers, etc.
- Courtesy dock: dock separated from a boat ramp but connected to land by gangway or anchor block
- Floating dock: dock that is not connected to land and not adjacent to a boat ramp
- Moorage dock: dock that is intended for long-term moorage

10.4. Excavation

Any required in-river excavation would need to be done during the in-water work period in the John Day Pool. Cofferdams with dewatering could be used to allow excavation to continue beyond the in-water work period. Irrigon and Umatilla Marina Park are the two marinas that will require extensive excavation to provide for deeper-draft vessels. Although, excavation can be expected at all sites depending on the drawdown and relocation alternative selected. General excavation methods for in-water work would involve barge-mounted equipment and bottom dump barges to haul excess materials to be disposed. Dredging would not be the preferred method as there are cobble- and boulder-sized materials to be removed. Excavation equipment would include cranes with buckets, drag line, and chisels if needed, or large backhoes with the required reach length to the projected bottom of the marinas. Disposal areas have not been identified. If excavation were to occur in existing basin/ramp areas, piles for docks would be removed and replaced. All docks suitable reused should be removed or protected to avoid damage during excavation. Piles associated with docks outside of the excavation area should be protected and preserved. Silt fence barriers will be used as required for controlling turbidity during in-water excavation.

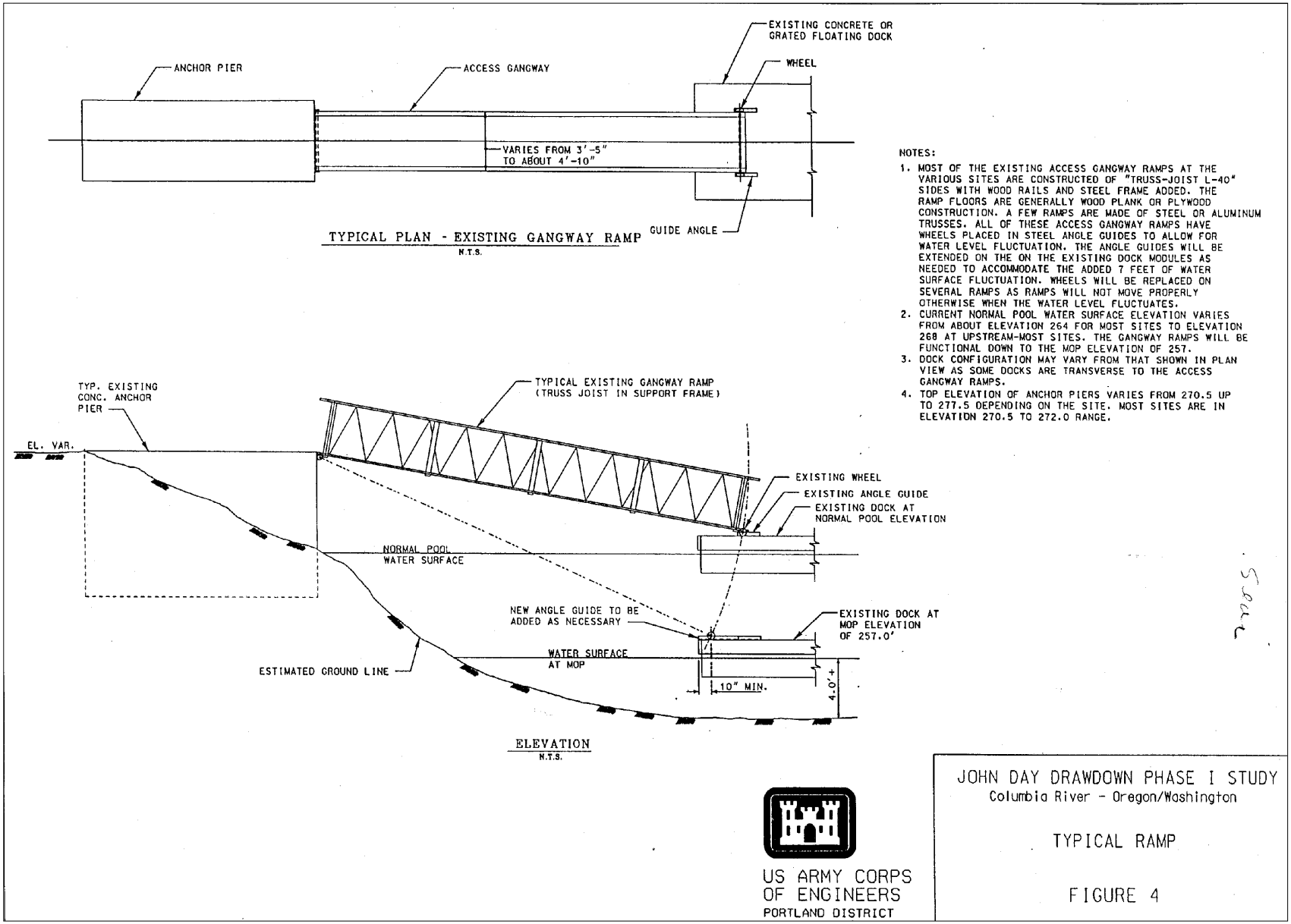
10.5. Swimming Beach Design

All swimming beaches will require some excavation to provide maximum water depths of seven feet during the normal July/August flow of 200,000 cfs. During the minimum flow periods of late August/September, the swimming areas will be designed to maintain a minimum water depth of four feet. Disposal of excavated material will be in-water if appropriate areas are available. If in-water disposal areas are not adequate to handle all disposal required, upland disposal will be used. Upland disposal site availability was

discussed with lessees during the team site reconnaissance but final disposal locations will be fully coordinated prior to completion of construction documents and award of any construction contract requiring excavation and disposal. A two-foot-deep sand cover will be required for all newly excavated areas in the swim beaches. It is assumed all swim beaches would be relocated if feasible. Beach designs would meet the minimum requirements of EM 1110-2-410.

10.6. Schedule

Every effort would be made to complete in-water work during the 1st year following drawdown. It is expected that this effort could require two years to complete due to limited in-water work periods, December 1st through March 31st. If marina excavation is not completed during the initial in-water work period, work can be extended through the following in-water work period, or coffer dams coupled with dewatering could be used to extend the construction period. This would cause extended closure of the marinas, possibly up to 18 months. Piles at all sites, except the marinas requiring extended excavation periods, will be driven or drilled during the initial in-water work period. Dock and gangway installations, and boat ramp sections above water level could be made at any time during the construction period.



4. Typical Boat Ramp

Public Recreation

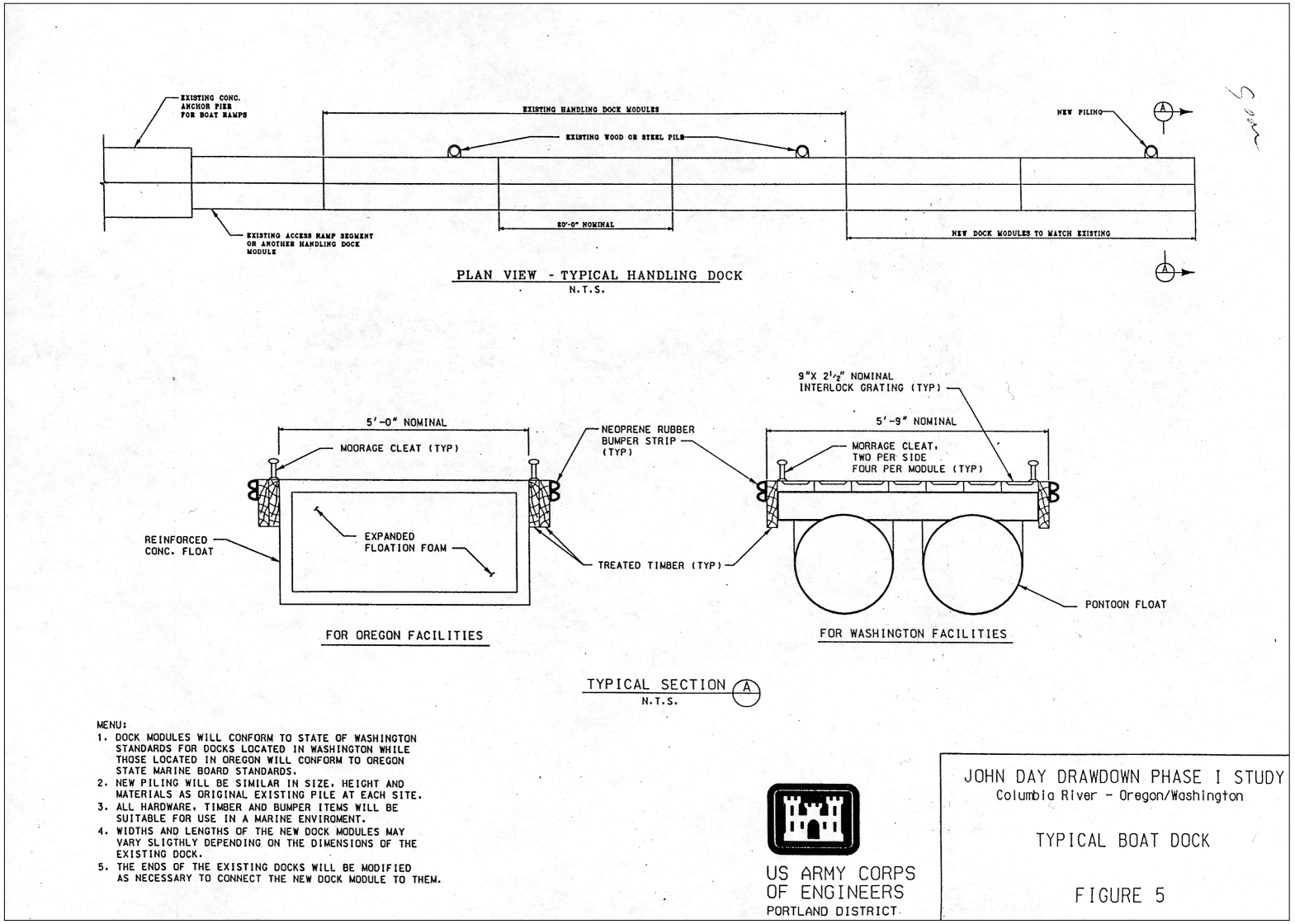


Figure 5. Typical Dock Design

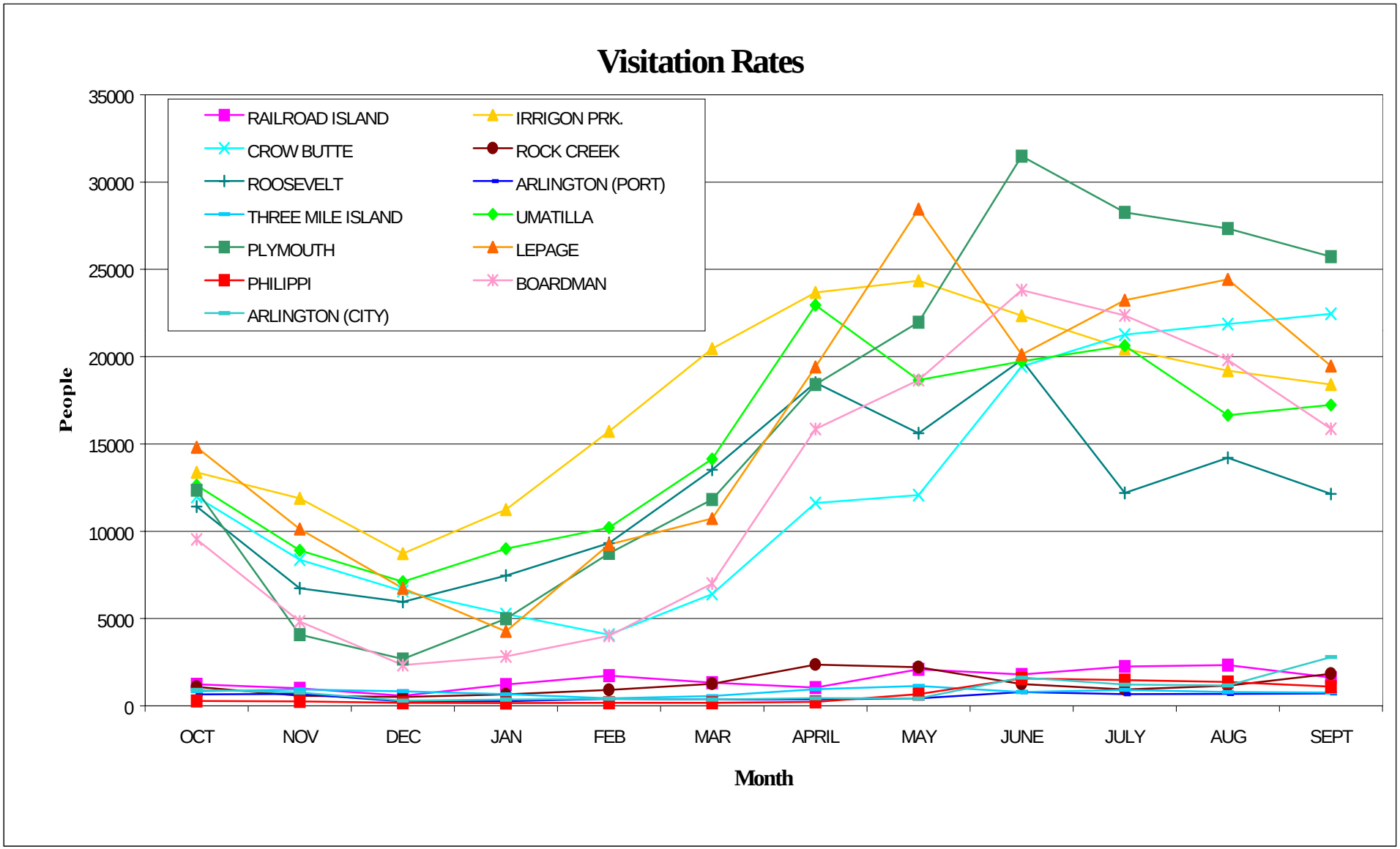


Figure 6. Visitation Rates per Month

Section 11. Federal, State, and Local Coordination

The following agencies and people were contacted and contributed to this report:

- Local entities (Boardman Parks and Recreation, Park Ranger Ted Lieurance; City of Umatilla, City Administrator Bonnie Parker; Port of Umatilla, Director of Operations Susan Daggett and Umatilla Marina and Park Manager Steve Munkers; City of Arlington, Mayor Fred Ericksen and City Recorder Kay West; Port of Arlington, Director of Operations Francie Morris)
- State agencies (Washington State Parks , Chief Environmental Coordinator, David Heiser; Park Ranger - Crow Butte, Mike Kessler; POC Chris Regan, Environmental; Andy Gerst, Civil Engineer, Engineering and Construction Dept.)
- Federal agencies (National Park Service, re: Land & Water Conservation Fund site at Nugent)
- Project staff (John Day Resource Manager, Larry South; and Portland District Operations Division Project Manager for the Columbia River projects, Patricia Williams)

Section 12. Recommendations

This appendix was intended to be used to identify impacts of the drawdown on the recreation sites and to suggest possible site relocations of affected areas. It is not intended to be used to implement the John Day Drawdown. Basic engineering judgement was used in the selection of these alternative locations. However, each of the suggested sites will require further engineering investigation if the drawdown study goes to Phase 2. The following table lists the possibility of alternatives for each site[6], and presents the conclusions of this appendix.

[6] Addressing the question: "Does it appear viable to relocate the site to the Columbia River, or excavate at the current location?"

Table 18.
Possible Relocation Alternatives

	Spillway Crest				Natural River			
	Excavation of Current Site		Relocation to Columbia River		Excavation of Current Site		Relocation to Columbia River	
	Ramp & Docks	Swimming	Ramp & Docks	Swimming	Ramp & Docks	Swimming	Ramp & Docks	Swimming
Railroad Island (North Shore)	No	NA	Yes	NA	No	NA	Yes	NA
Le Page Park	Extend Ramp	Yes	NA	NA	No	No	Yes	Yes
Philippi Park	No	No	Yes on John Day River	No	No	No	No	No
Rock Creek	No	No	Yes	Yes	No	No	Yes	Yes
Blalock Is. Boat Ramp	No	NA	Yes	NA	No	NA	Yes	NA
Roosevelt Park	No	No	Yes	Yes	No	No	Yes	Yes
Arlington Marina	No	NA	Yes	NA	No	NA	Yes	NA
Arlington (Earl Snell) Park	Build Dam	NA	NA	NA	Build Dam	NA	NA	NA
Quesnel Park	No	NA	Yes	NA	No	NA	Yes	NA
Crow Butte State Park	No	No	Yes	Yes	No	No	Yes	Yes
Boardman Park	No	No	Yes	Yes	No	No	Yes	Yes
Irrigon Park	No	No	Yes	Yes	No	No	Yes	Yes
Nugent Park	No	NA	No	NA	No	NA	No	NA
Umatilla Marina Park	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plymouth Park	No	No	Yes	No	No	No	Yes	No

Table 19.
Windsurfing Sites and Facilities on the John Day Pool

Name	State	Location	Difficulty*	Rigging**	Facilities
JT's Hideaway	WA	SR 14 @ MP 117	Adv.	Shrub-Steppe	None
Mercury Cove or T Birds	WA	SR 14 @ MP 124	Adv.	Gravel	None
Big Pipe or Number 9	WA	SR 14 @ MP 129	Adv.	Gravel	None
Blalock Canyon	OR	I84 @ Exit 129	Adv.	Rocky	None
Arlington Marina	OR	I84 @ Exit 137	Adv.	Gravel	Day Use, Camping, Gas, Food, & Lodging
Roosevelt Park	WA	SR 14 @ MP 133	Beg. to Adv.	Grass	Day Use
Alpha 23	WA	SR 14 @ MP 138	Adv. Inter. to Adv.	Gravel	None
Quesnel Park	OR	I84 @ Exit 151	Beg. to Adv.	Gravel	None
Alderdale	WA	SR 14 @ MP 149	Inter. To Adv.	Gravel	None
Barts Beach	WA	SR 14 @ MP 151	Inter. To Adv.	Shrub-Steppe	None
Crow Butte State Park	WA	SR 14 @ MP 155	Beg. to Inter.	Grass	Day Use & Camping
Boardman Park	OR	I84 @ Exit 164	Beg. to Adv.	Grass	Day Use
Paterson	WA	SR 14 @ MP 167	Adv. Beg. to Adv.	Gravel	None
Plymouth Park	WA	SR 14 @ MP 179	Adv. Inter. to Adv.	Grass	Day Use & Camping

Information supplied by Columbia Gorge Windsurfing Association.

*Refers to the skill level required by the windsurfer to utilize the site.

Beg. = Beginning Ability (For Beginners)

Inter. = Intermediate Ability

Adv. = Advanced Ability

**Refers to the general site conditions at the rigging (board setup) location.

Section 13. References

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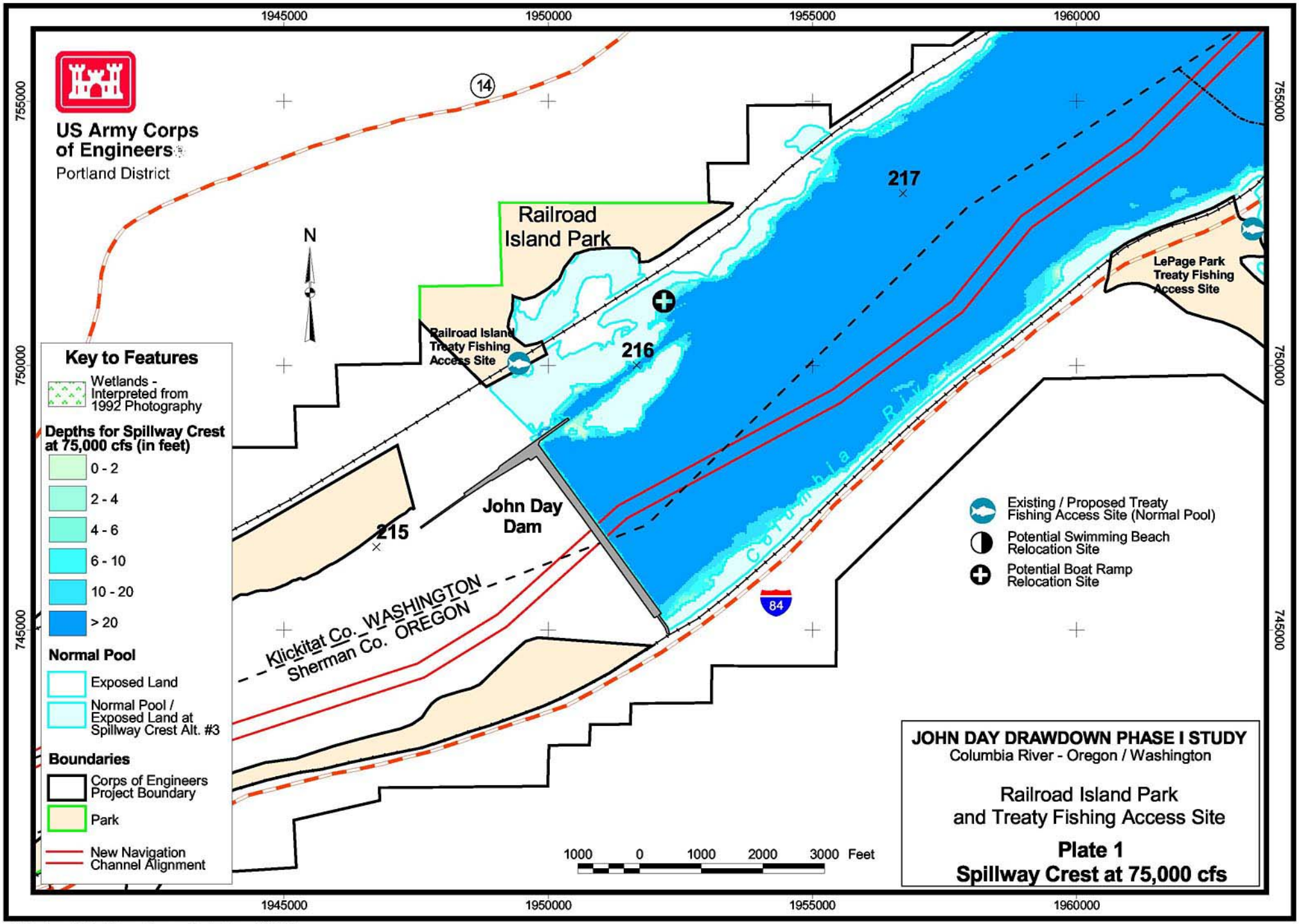
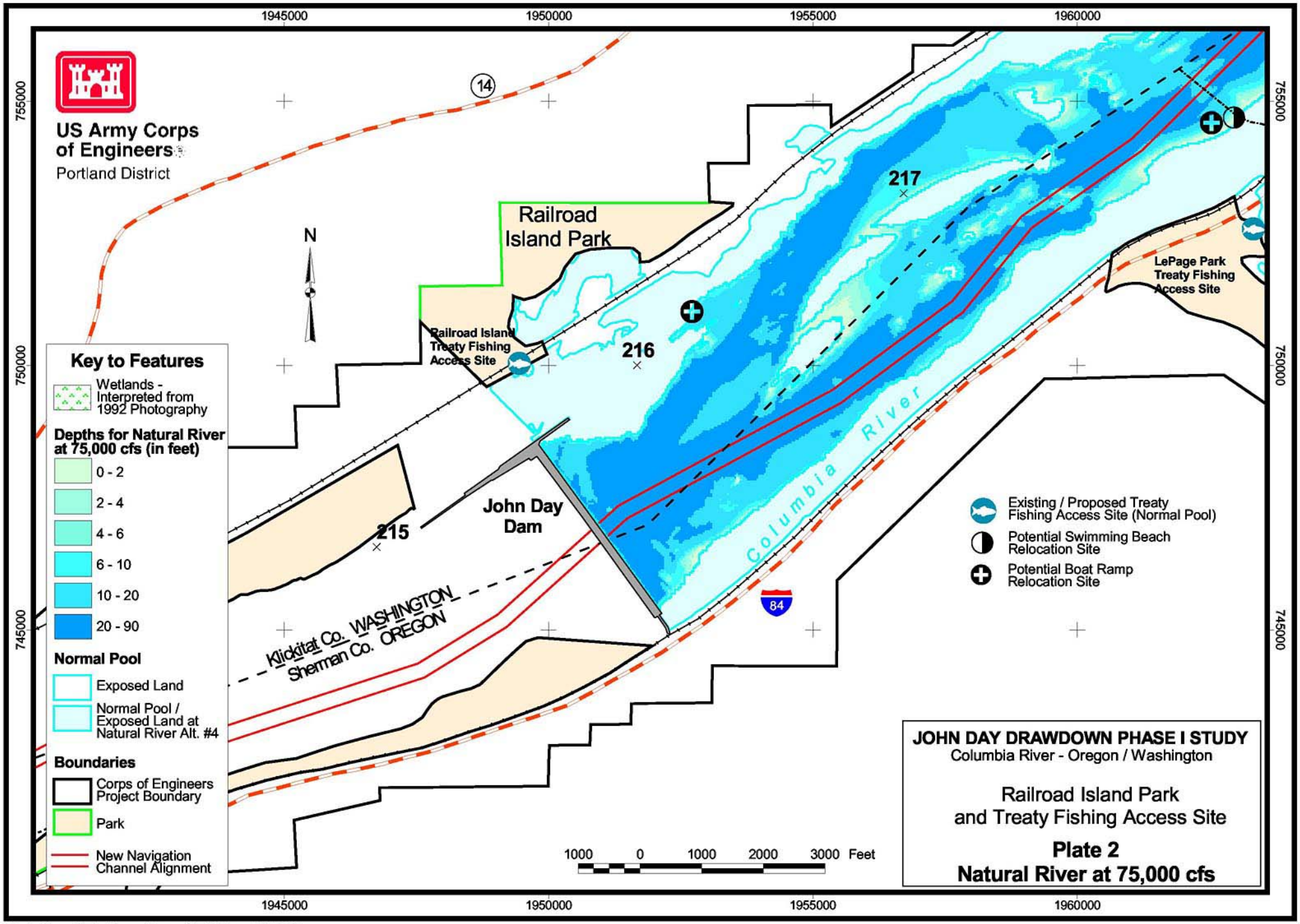
Section 14. Plates

Plates show extent of drawdown at each recreation site.

Plates



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



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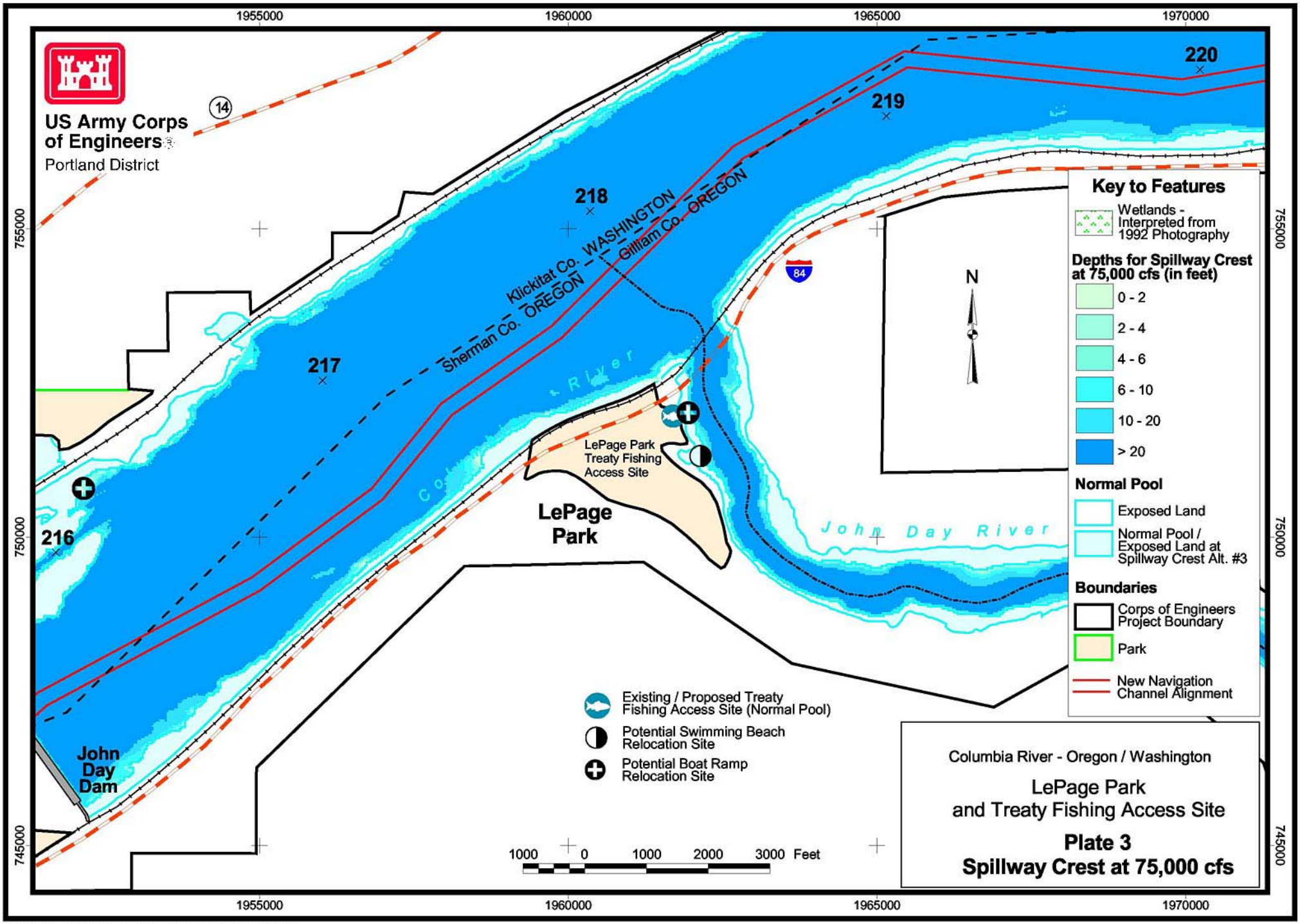

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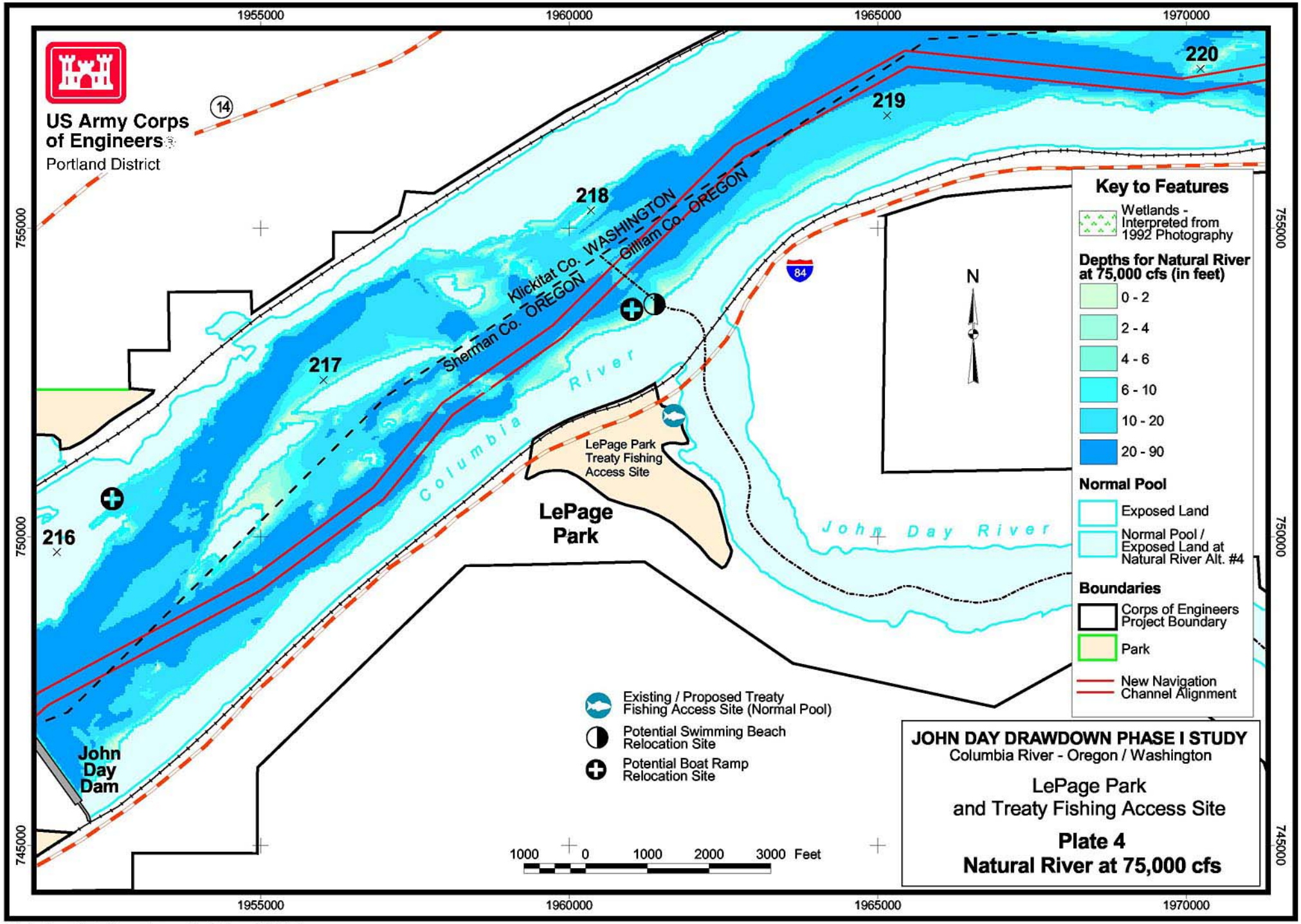

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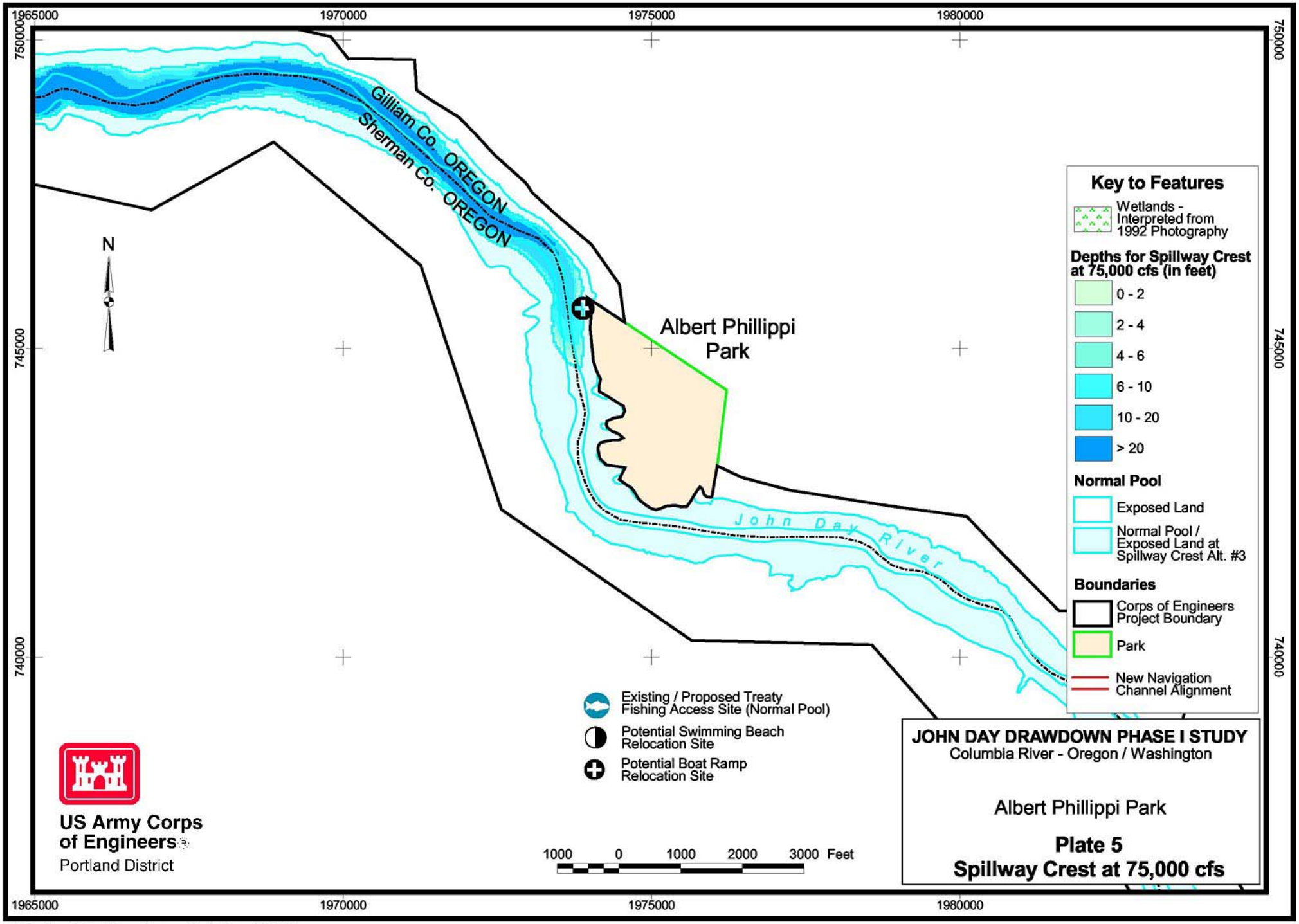
Depths based on Corps of Engineers Hydrosurveys, 1994
Produced by GIS, Survey and Mapping Section
US Army Corps of Engineers, Portland District



Projection: State Plane, Oregon North Zone, NAD 27
Depths based on Corps of Engineers Hydrosurveys, 1994
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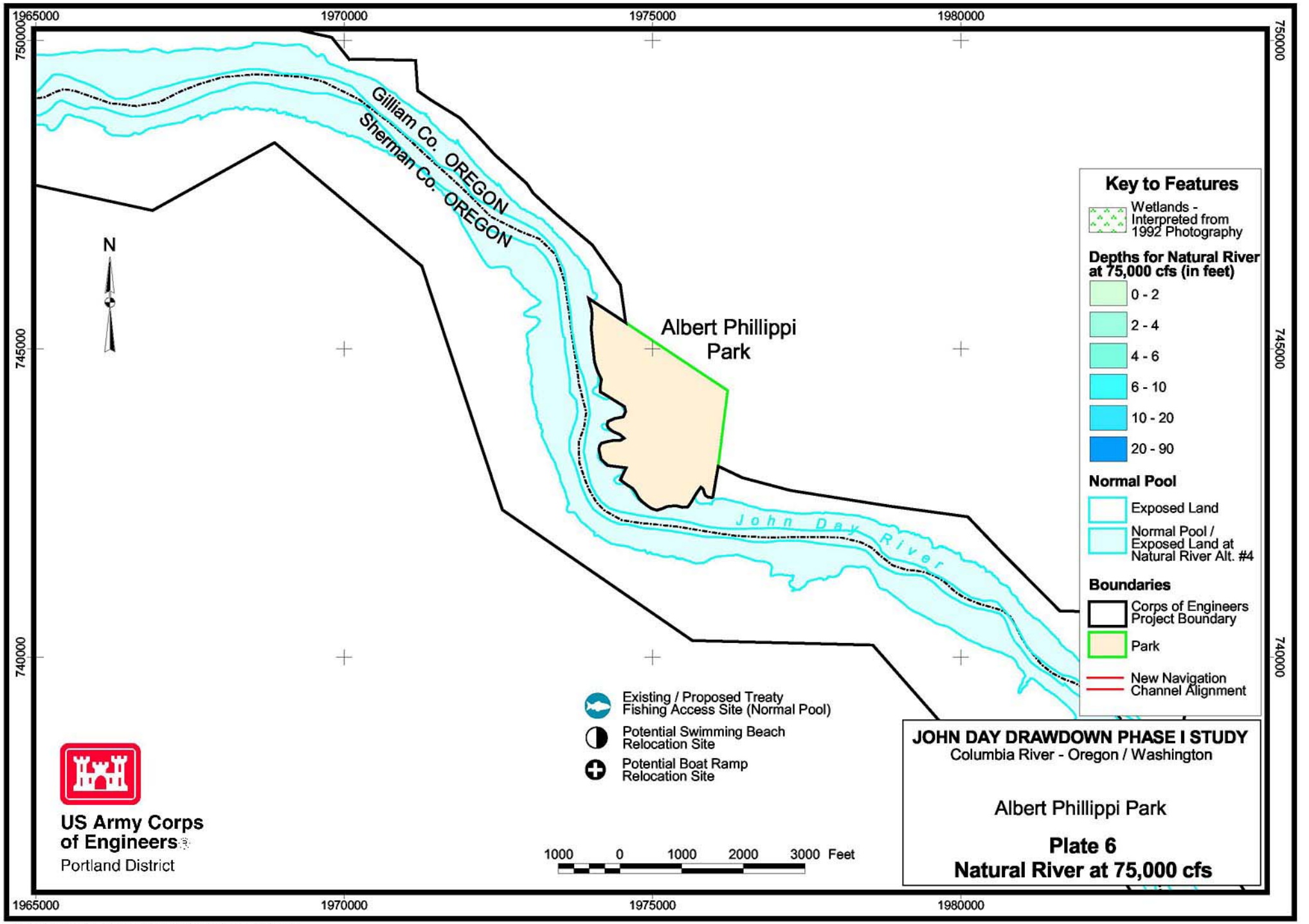

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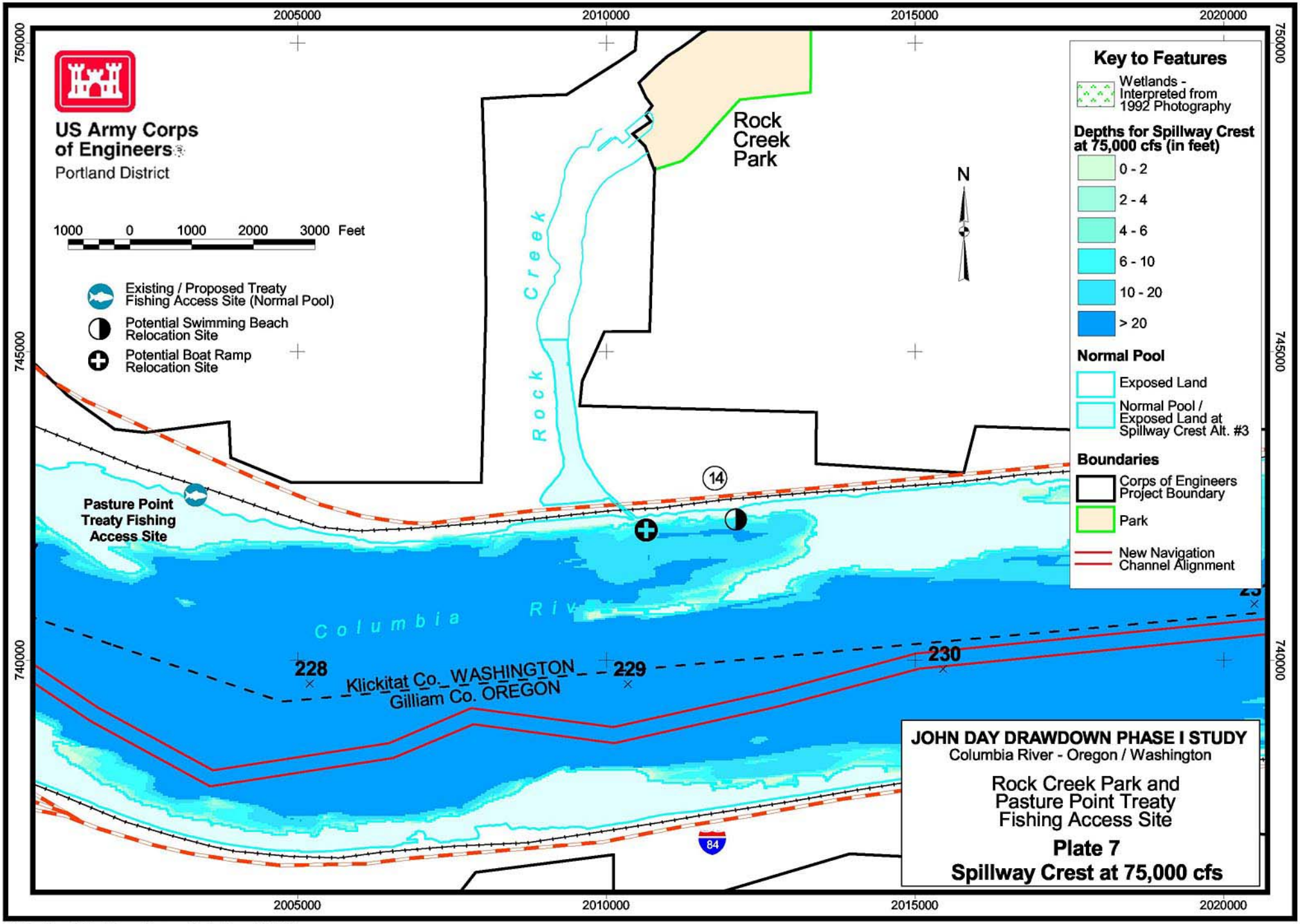

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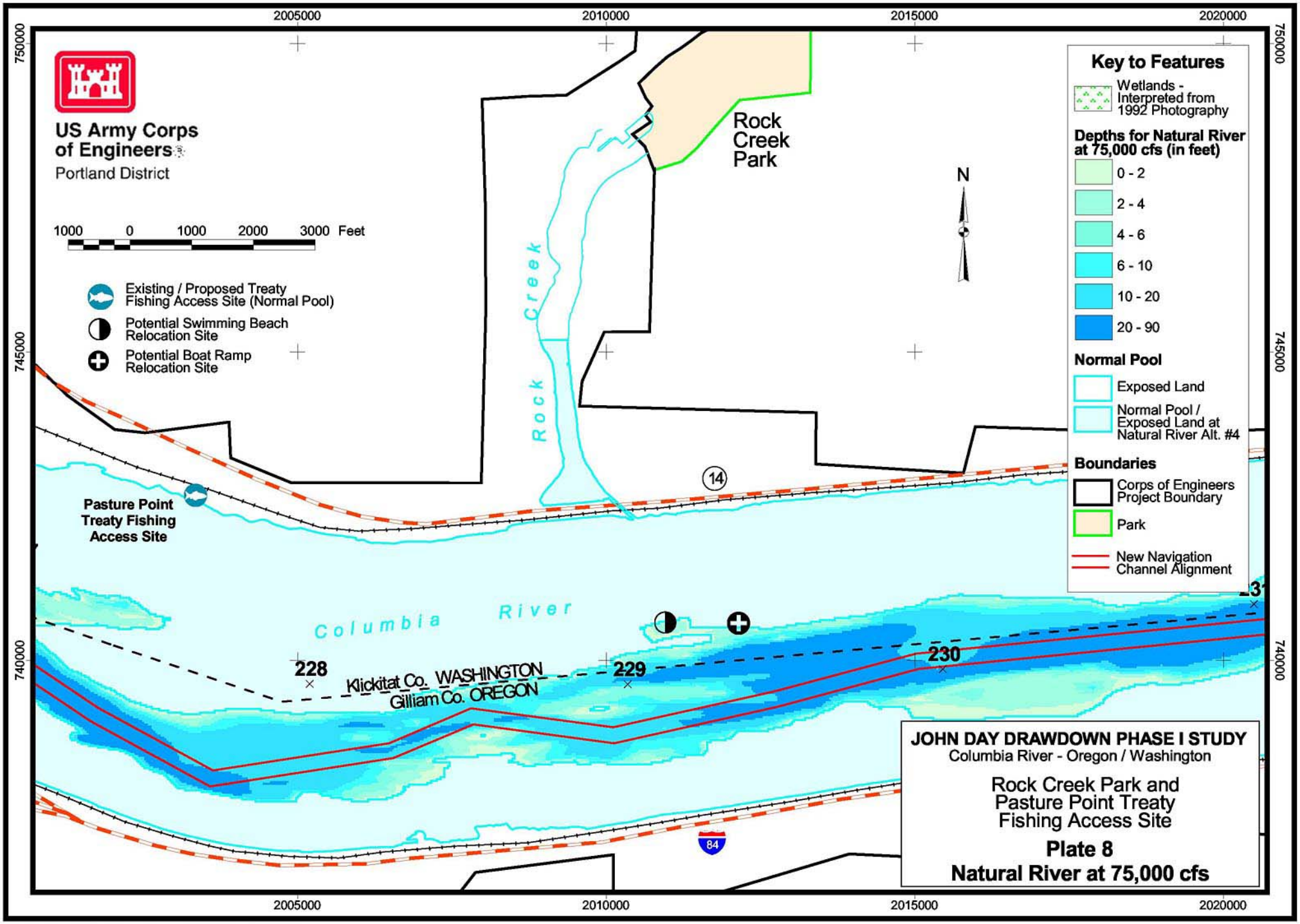

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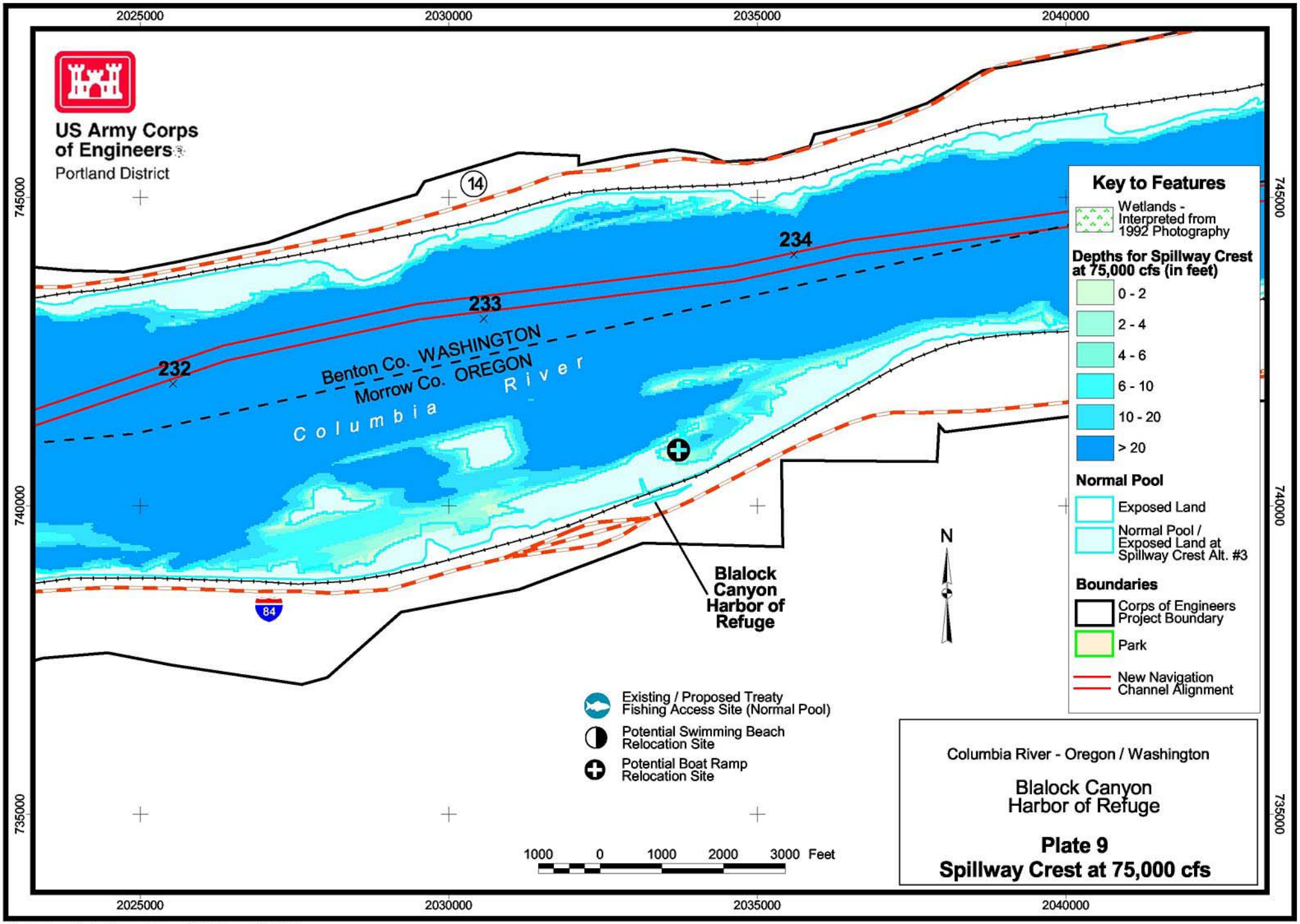

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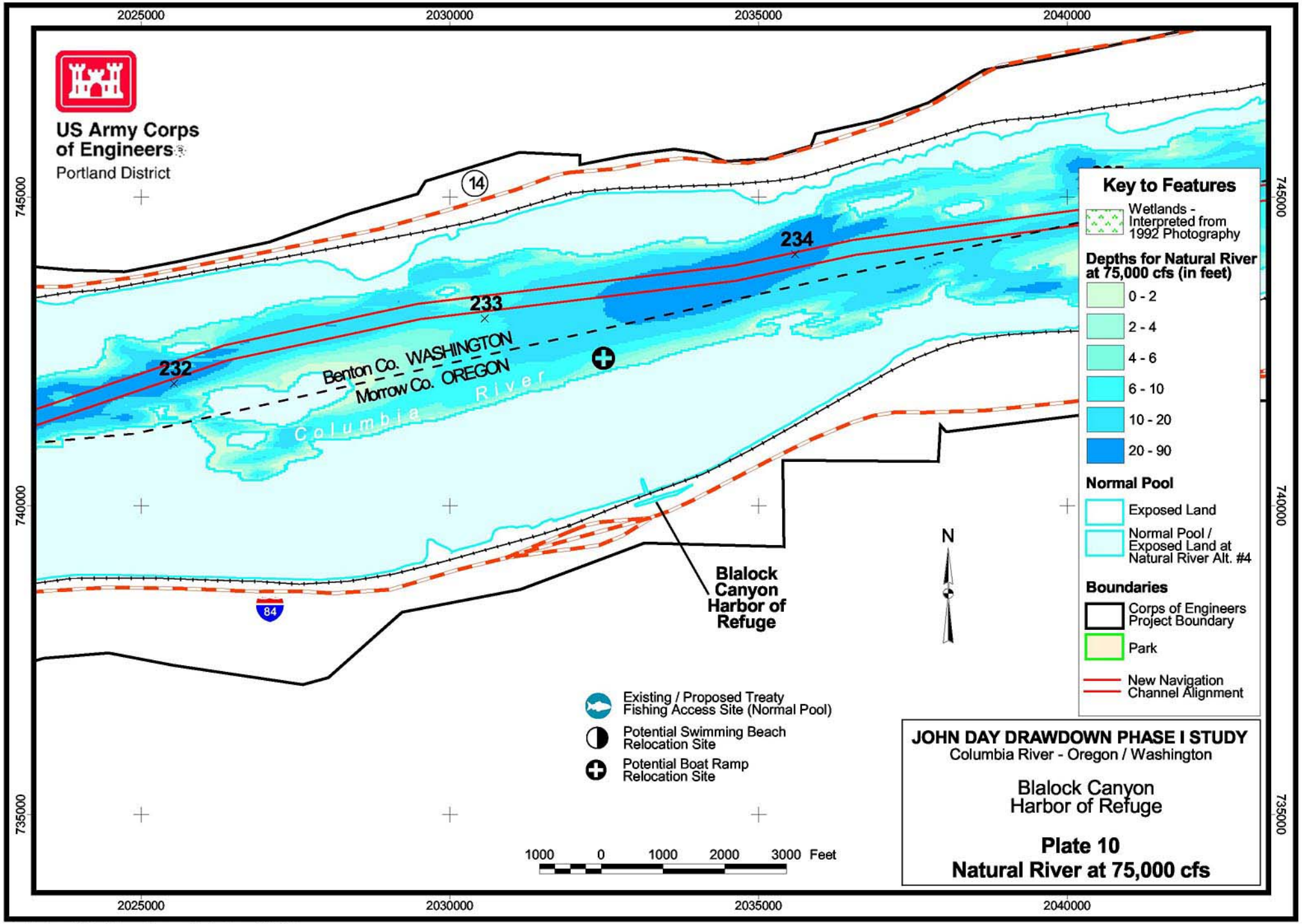

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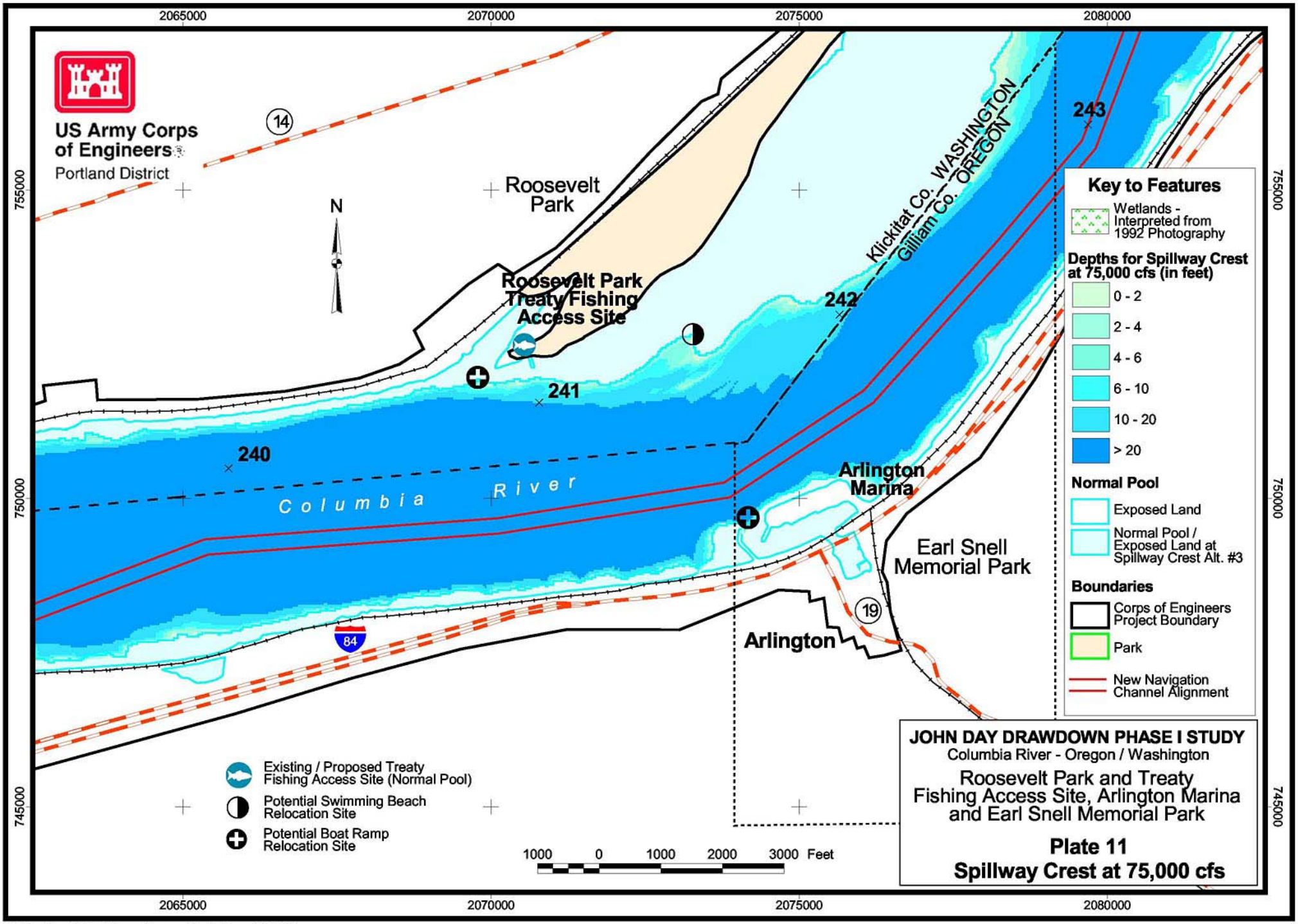

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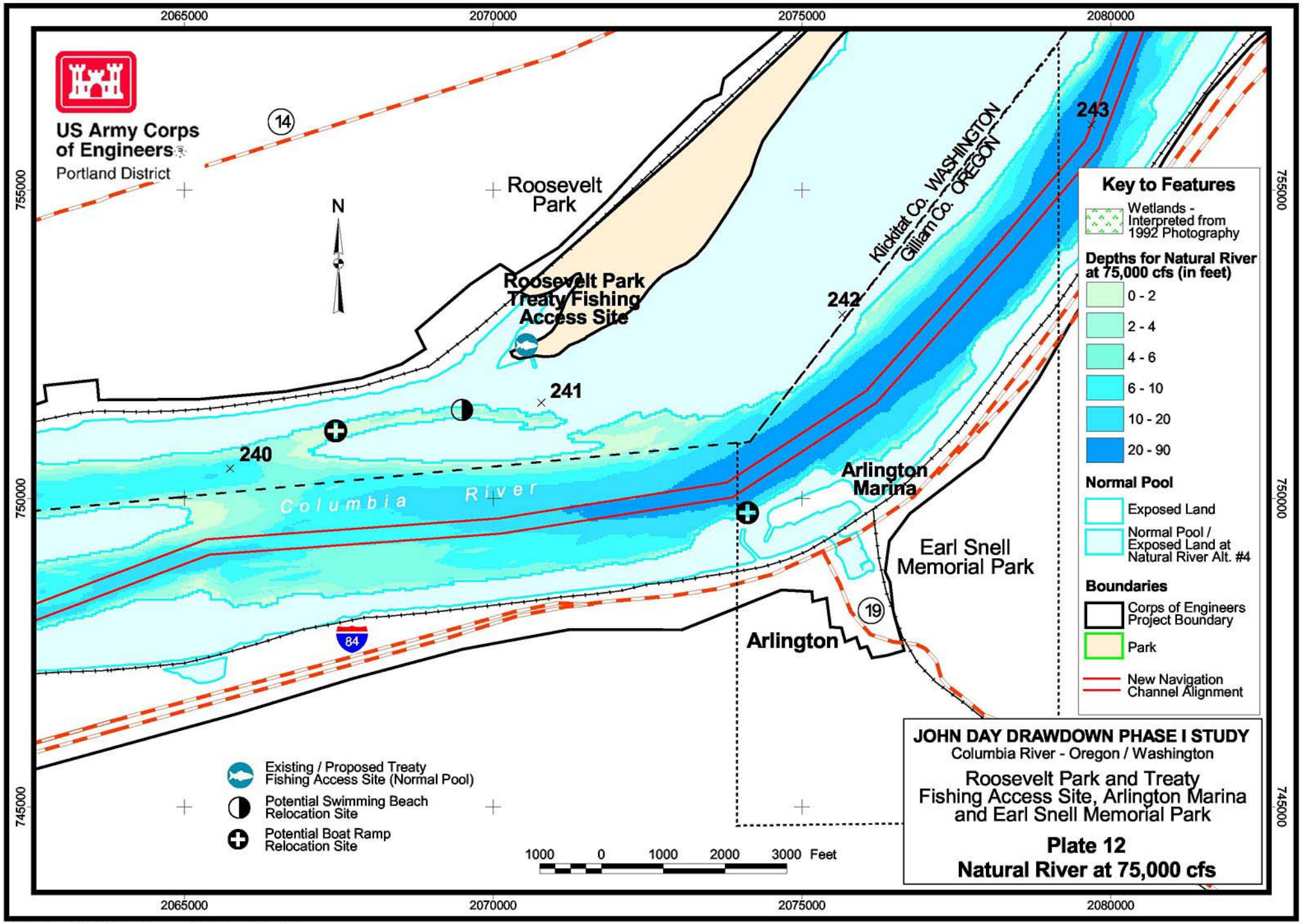

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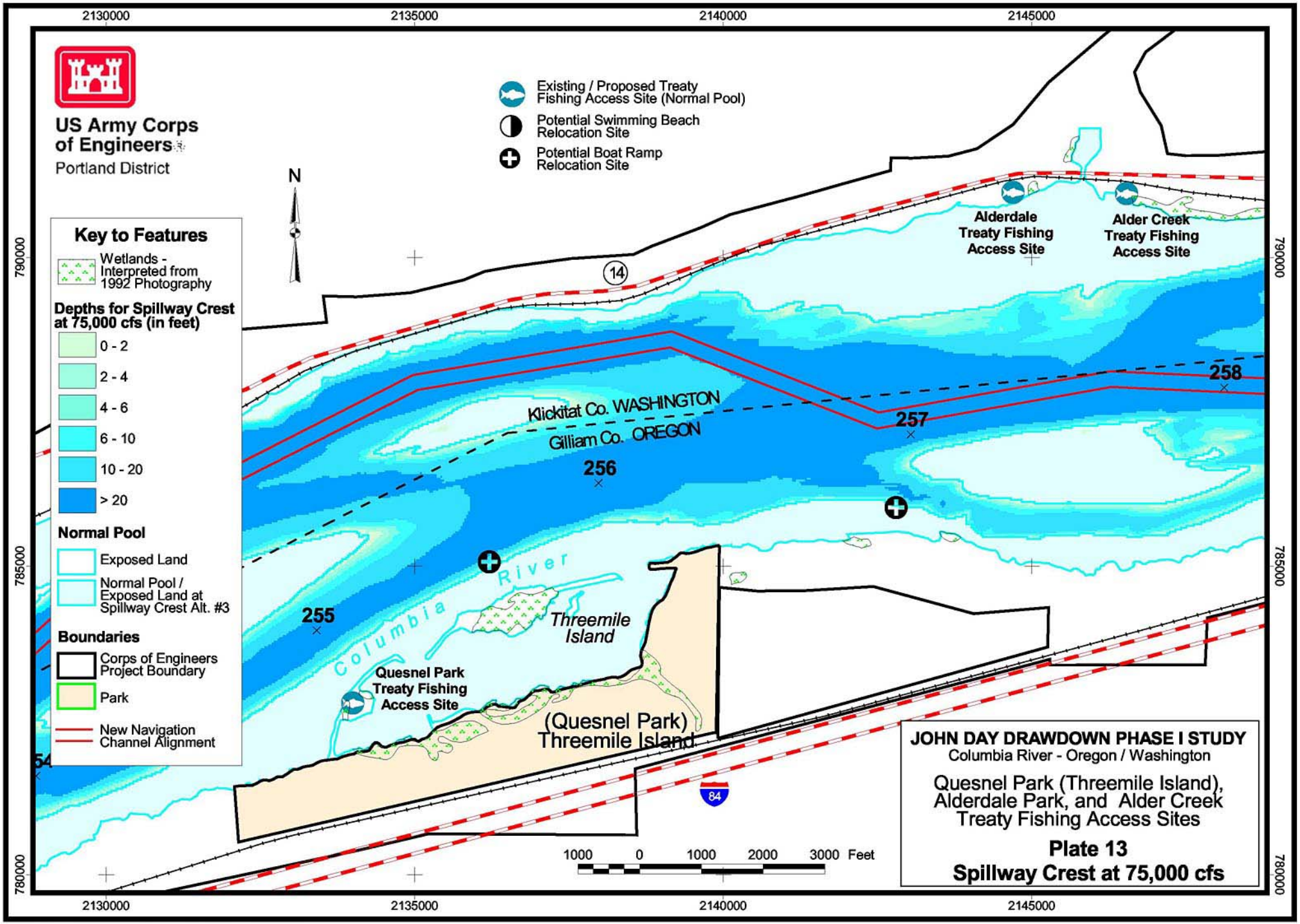

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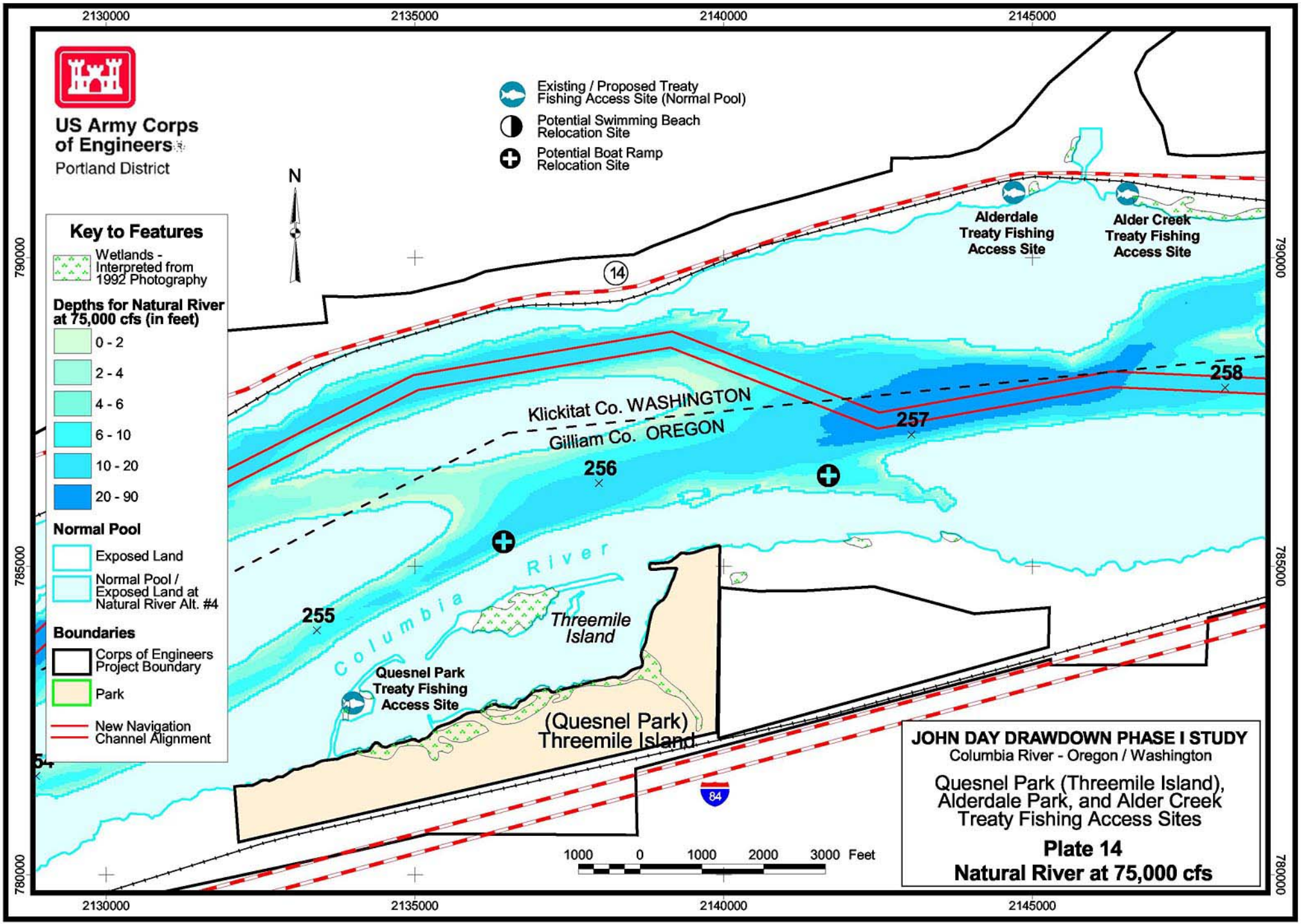

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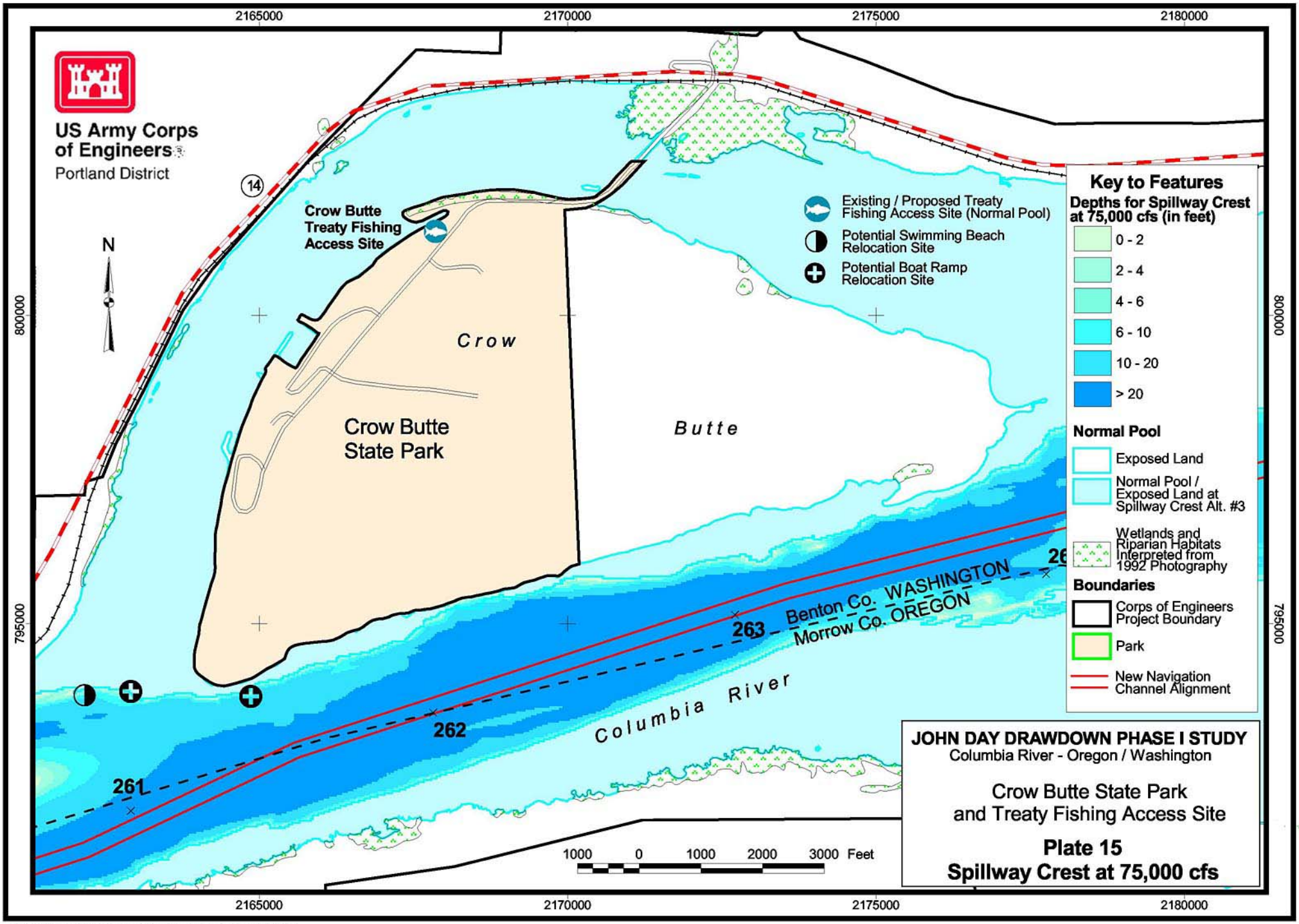

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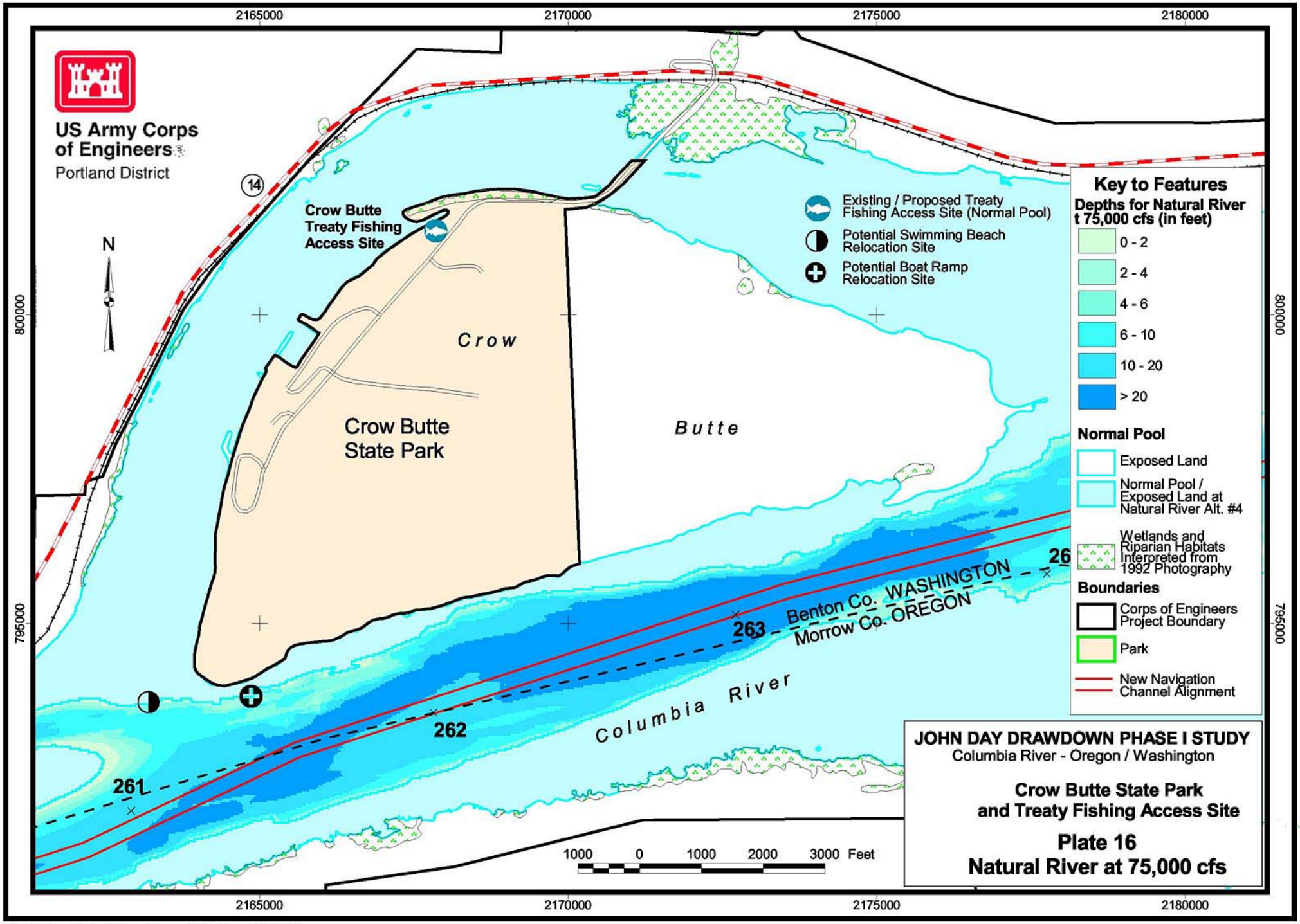

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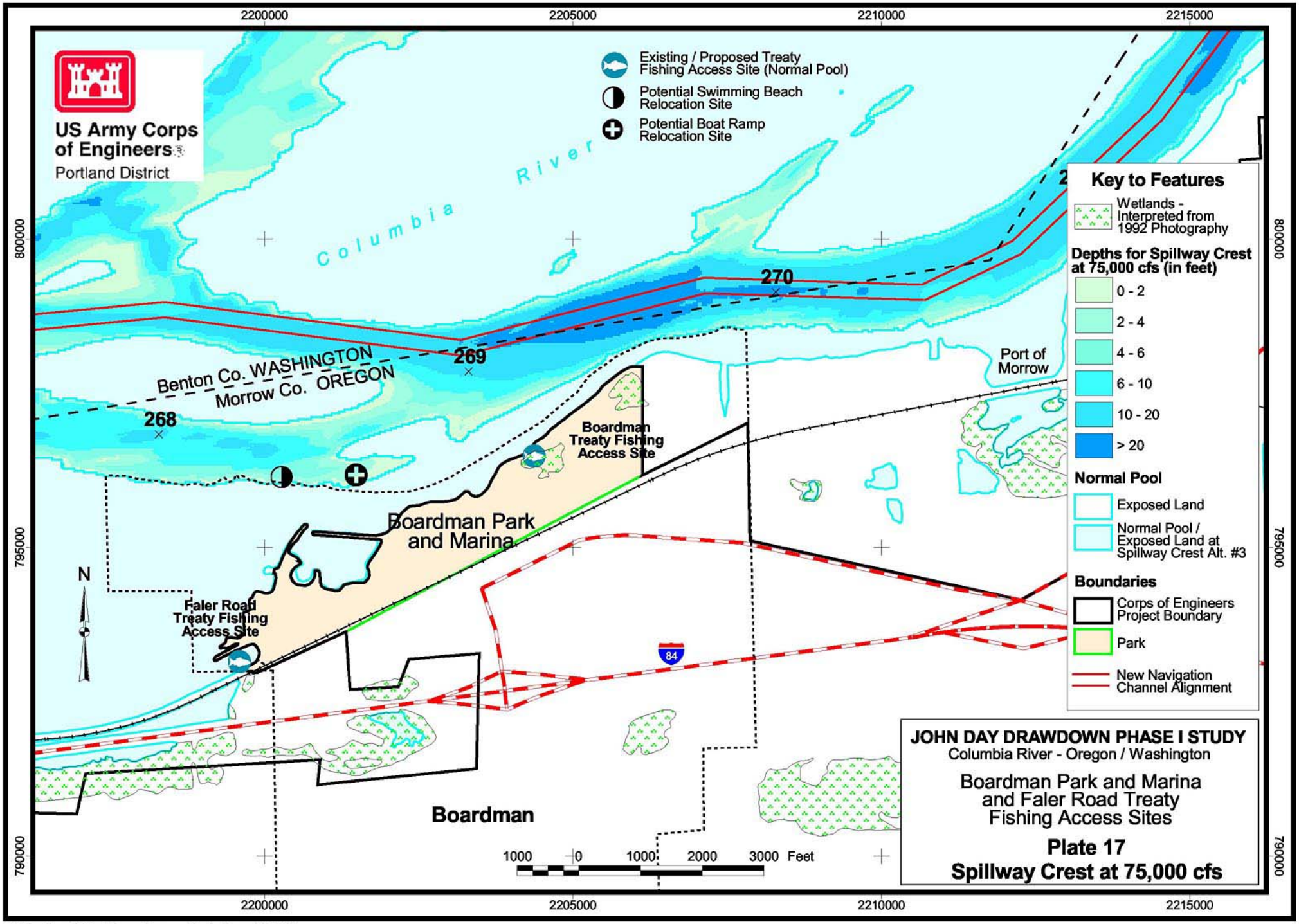

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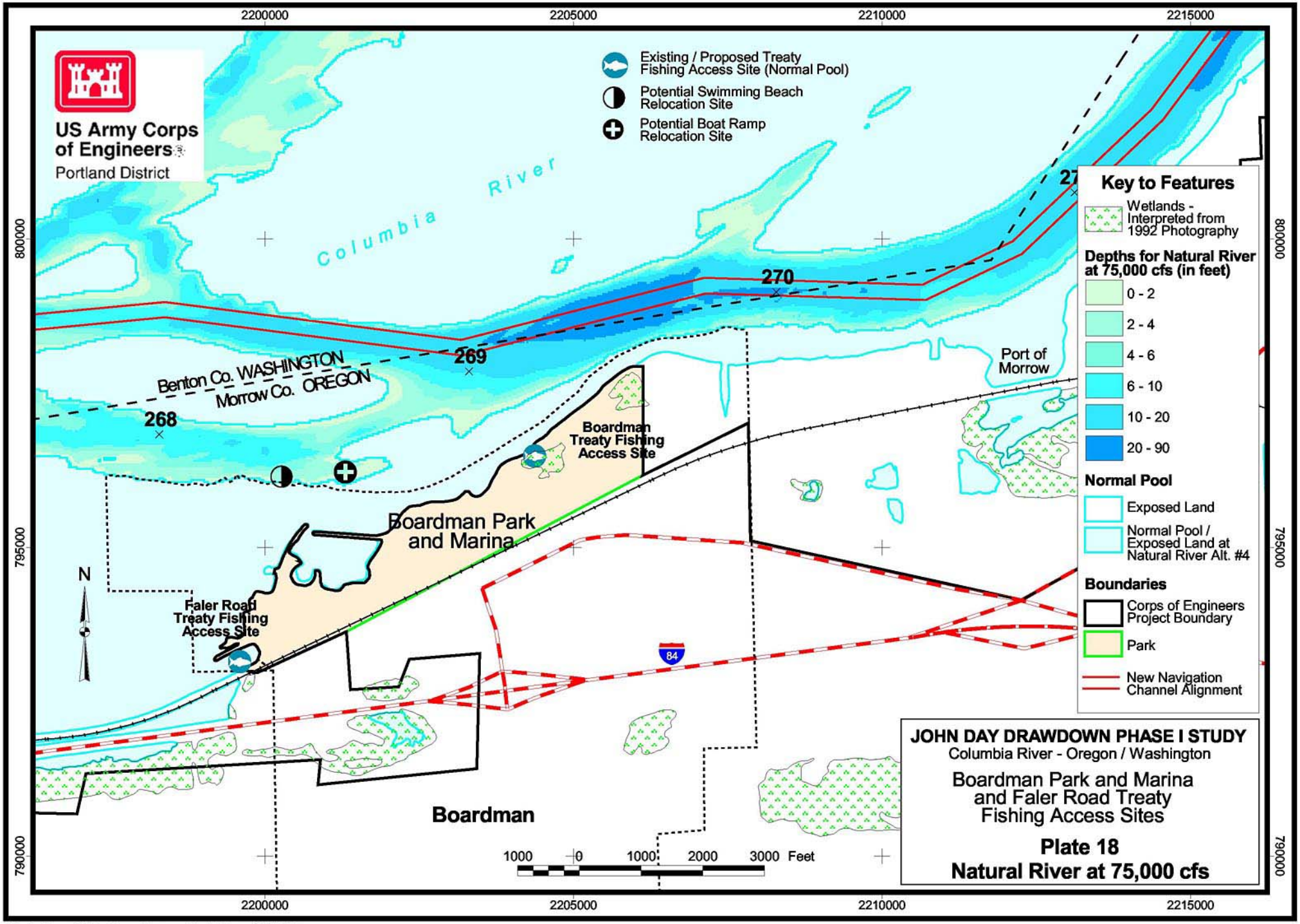

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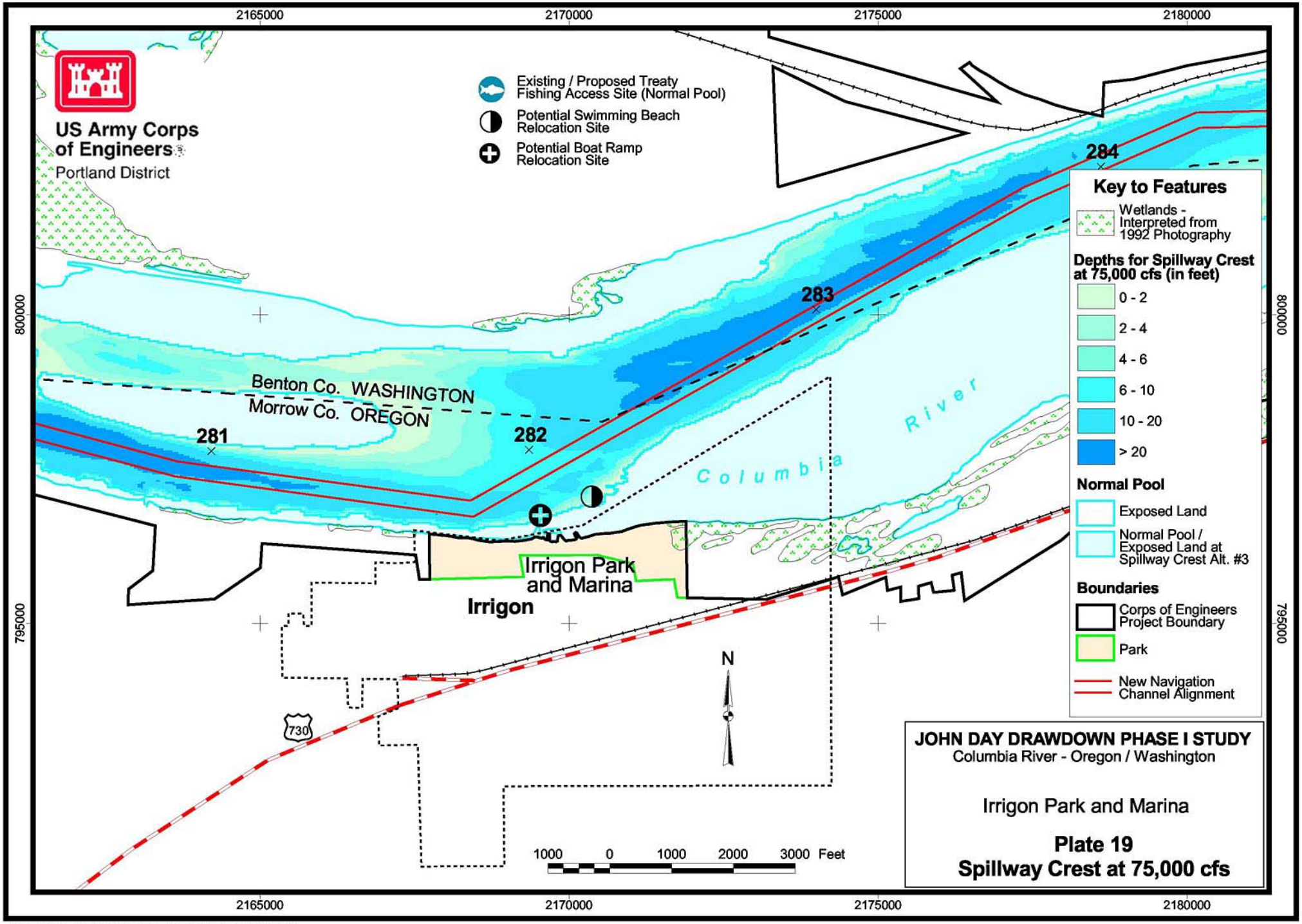

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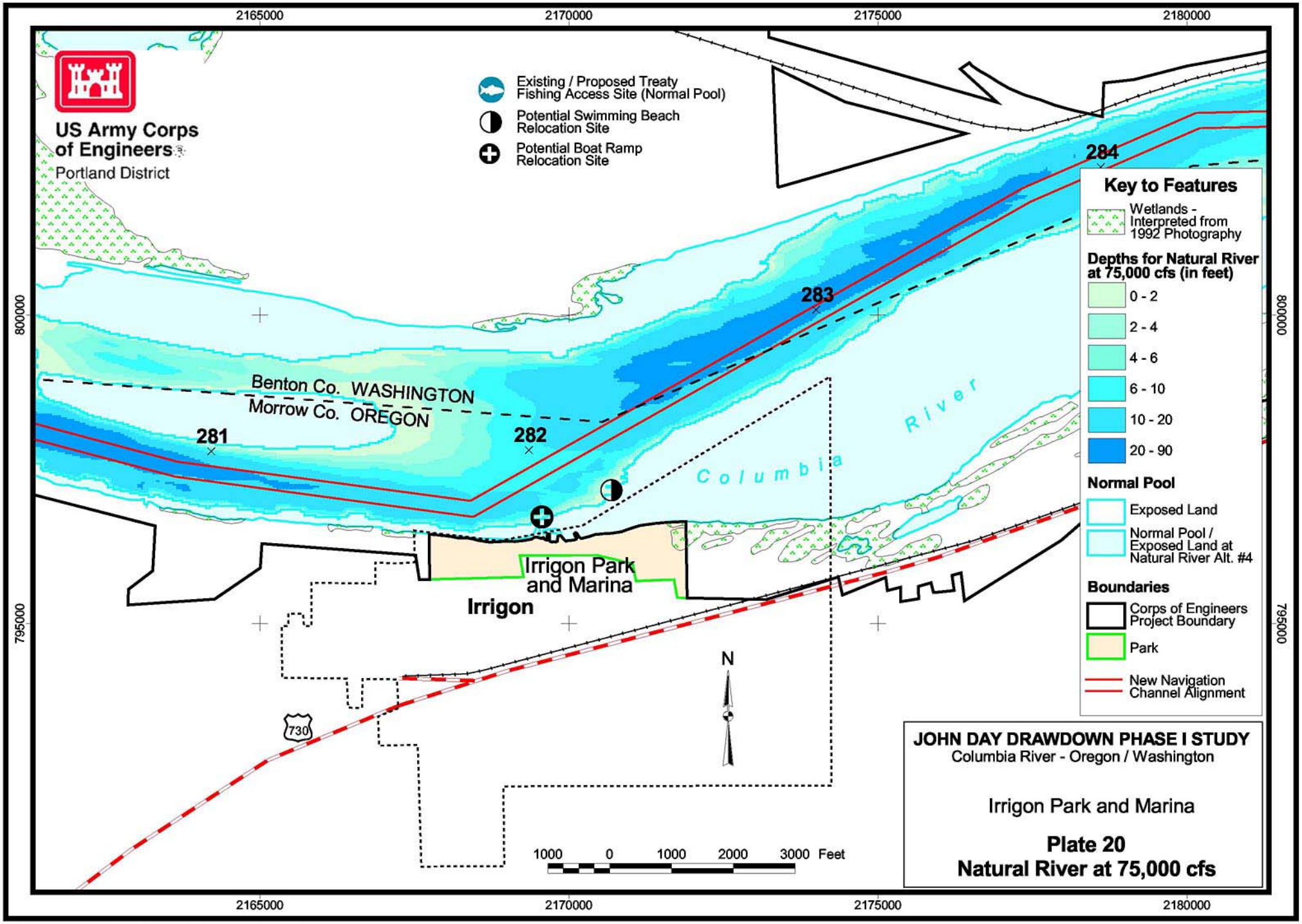

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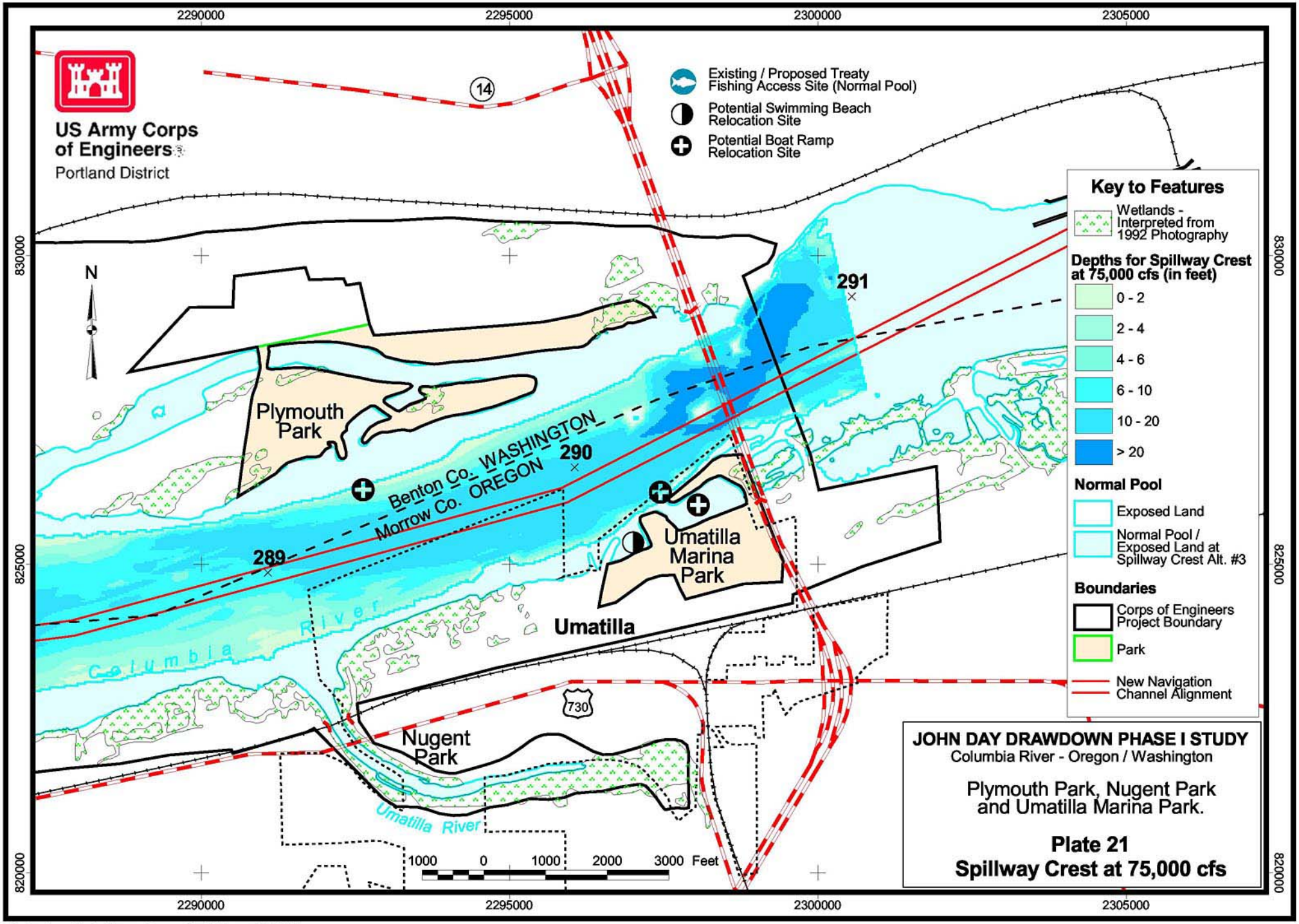

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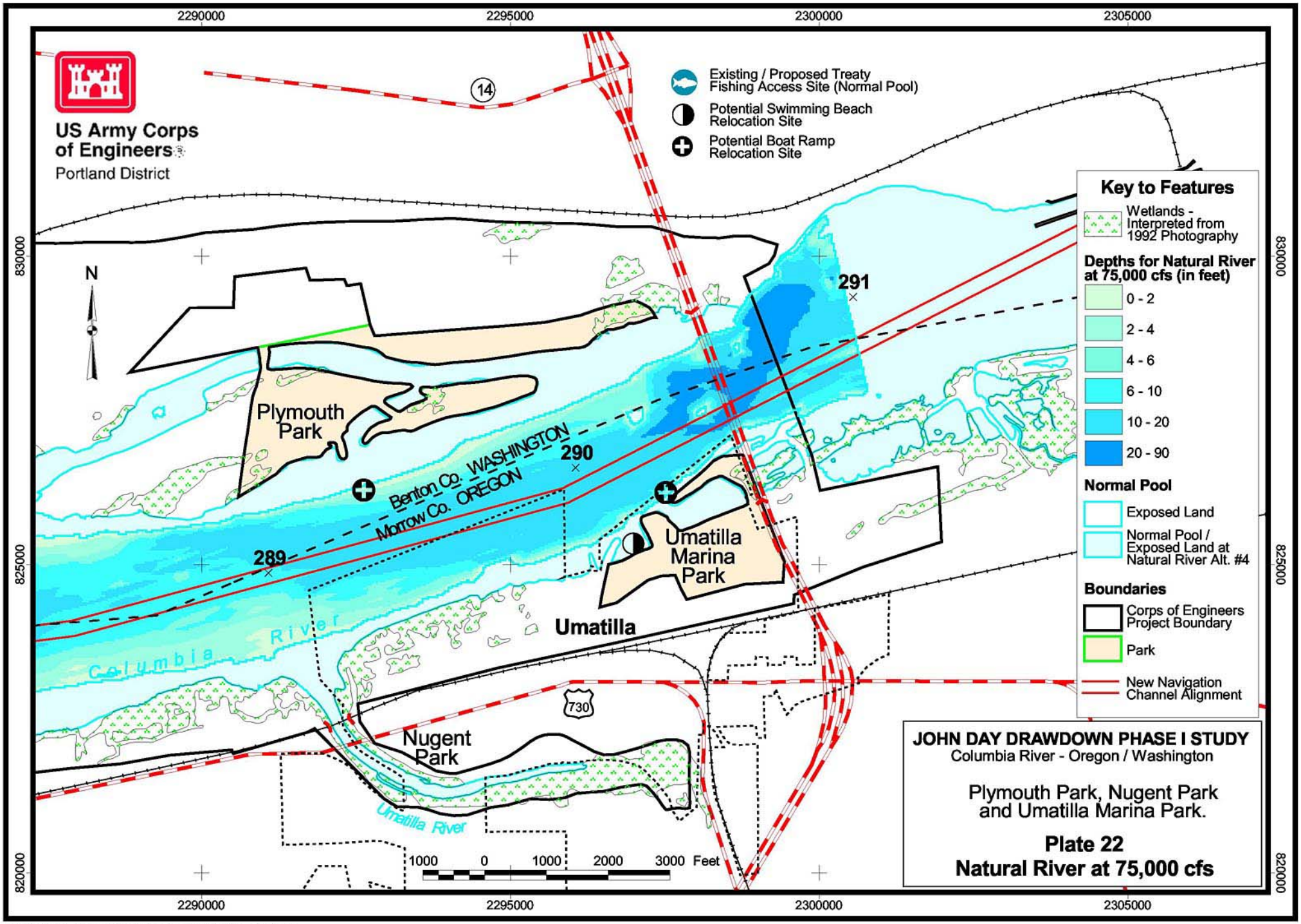

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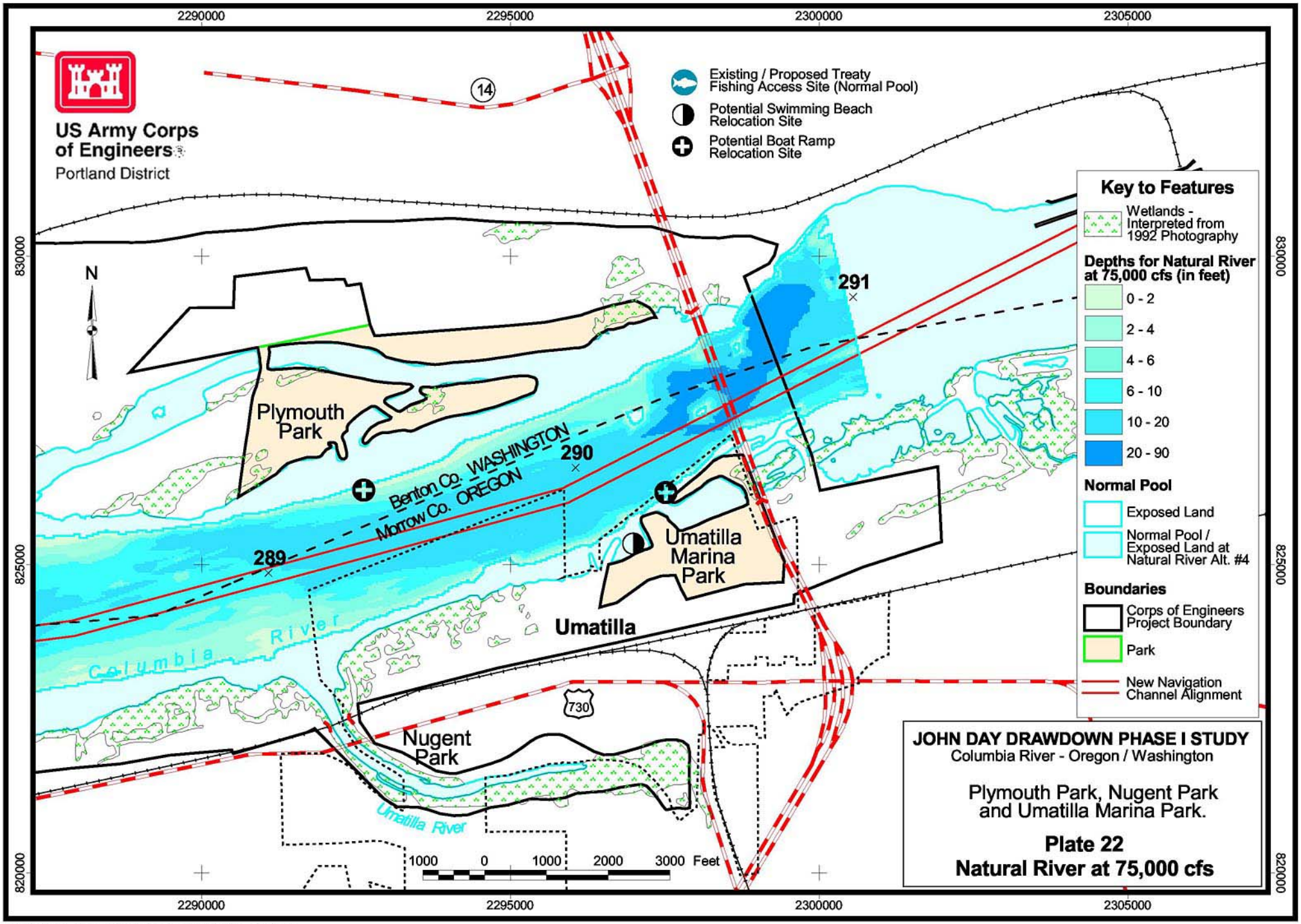

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