UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
2002/00480

October 25, 2002

Mr. Lawrence C. Evans
U.S. Army Corps of Engineers
Chief, Environmental Resources Branch
P.O. Box 2946
Portland, OR 97208-2946

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Act Essential Fish Habitat Consultation for Culvert Maintenance in Dry, Tumalt, and Viento Creeks along the Columbia River, Multnomah and Hood River Counties, Oregon (Corps No. 2002-00298).

Dear Mr. Evans:

Enclosed is a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) on the effects of the proposed Culvert Maintenance in Dry, Tumalt, and Viento Creeks in Multnomah and Hood River Counties, Oregon. In this Opinion, NOAA Fisheries concluded that the proposed actions are not likely to jeopardize the continued existence of ESA-listed Snake River (SR) sockeye salmon (*Oncorhynchus nerka*), SR fall-run chinook salmon (*O. tshawytscha*), SR spring/summer chinook salmon, Upper Columbia River (UCR) spring-run chinook salmon, Lower Columbia River (LCR) chinook salmon, Columbia River (CR) chum salmon (*O. keta*), SR steelhead (*O. mykiss*), UCR steelhead, Middle Columbia River (MCR) steelhead, and LCR steelhead, or destroy or adversely modify designated critical habitats for SR fall-run chinook salmon, SR spring/summer-run chinook salmon or SR sockeye salmon. As required by section 7 of the ESA, NOAA Fisheries included reasonable and prudent measures with non-discretionary terms and conditions that NOAA Fisheries believes are necessary to minimize the impact of incidental take associated with this action.

The enclosed biological opinion contains an analysis of the effects of the proposed action on designated critical habitat. A Federal court has vacated the rule designating critical habitat for the LCR chinook salmon, CR chum salmon, SR steelhead, UCR steelhead, MCR steelhead, and LCR steelhead considered in this opinion. Critical habitat remains designated for SR fall-run chinook salmon, SR spring/summer-run chinook salmon, and SR sockeye salmon. Analysis of the effects of the proposed action on critical habitat is for these three species.

This Opinion also serves as consultation on essential fish habitat pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and implementing regulations at 50 CFR Part 600.

If you have any questions regarding this consultation, please contact Art Martin of my staff in the Oregon Habitat Branch at 503.231.6848.

Sincerely,

For Michael R Crouse

D. Robert Lohn
Regional Administrator

cc: Molly Cary, ODOT
Randy Reeve, ODFW
Diana Hwang, USFWS

Endangered Species Act - Section 7 Consultation & Magnuson-Stevens Act Essential Fish Habitat Consultation

BIOLOGICAL OPINION

Culvert Maintenance in Dry, Tumalt, and Viento Creeks,
Columbia River, Multnomah and Hood River Counties, Oregon
Corps No.: 2002-00208

Agency: Army Corps of Engineers, Portland District

Consultation Conducted By: NOAA Fisheries, Northwest Region

Date Issued: October 25, 2002

Issued by: For Michael R Crouse
D. Robert Lohn
Regional Administrator

Refer to: **2002/00480**

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1. ENDANGERED SPECIES ACT

1.1 Background

On May 10, 2002, the National Oceanic and Atmospheric Administration (NOAA) Fisheries received a letter from the U.S. Army Corps of Engineers (COE) requesting formal consultation on the permitting of proposed culvert maintenance in Dry, Tumalt, and Viento Creeks along the Columbia River in Multnomah and Hood River Counties, Oregon. The proposed action includes the routine maintenance of culverts, trash racks, detention basins, and stream channels under and adjacent to the three stream crossings under Interstate 84 (I-84). The project applicant is the Oregon Department of Transportation (ODOT).

In the May 12, 2002, letter and the accompanying biological assessment (BA), the COE requested formal consultation for Lower Columbia River (LCR) steelhead (*Oncorhynchus mykiss*) and LCR chinook salmon (*O. tshawytscha*). NOAA Fisheries has determined that the following 10 listed evolutionarily significant units (ESUs) of Columbia Basin salmonids may occur within the project area, and that the proposed projects are "likely to adversely affect" (LAA) these species or their designated critical habitats: Snake River (SR) sockeye salmon (*O. nerka*), SR spring/summer-run chinook salmon (*O. tshawytscha*), SR fall-run chinook salmon, LCR steelhead (*O. mykiss*), Upper Columbia River (UCR) steelhead, SR steelhead, Middle Columbia River (MCR) steelhead, Columbia River (CR) chum salmon (*O. keta*), LCR chinook salmon, and UCR spring-run chinook salmon. References and dates for the listing status, critical habitat designations and ESA section 4(d) take prohibitions of these 10 species are provided in Table 1.

The objective of this consultation is to determine whether the proposed action is likely to jeopardize the continued existence of the 10 listed ESUs of Columbia basin salmonids described above, or destroy or adversely modify designated critical habitats.

1.2 Proposed Action

The proposed action is the routine maintenance of I-84 stream crossings at Dry Creek, (I-84 Mile Point (MP) 45.11), Tumalt Creek (MP 36.18), and Viento Creek (MP 56.16). These routine maintenance activities include cleaning culverts and trash racks, dredging detention basins, and stream channels under and adjacent to I-84 as necessary.

The project BA includes a set of conservation measures or best management practices (BMPs) designed to minimize adverse effects on listed species and their habitats. These BMPs are described on pages 44-48 of the BA. Specific BMPs for in-water work, culvert cleaning, detention basin dredging, channel maintenance, erosion control, hazardous materials, and site-

Table 1. References for Additional Background on Listing Status, Biological Information, and Critical Habitat Elements for the Listed and Proposed Species Considered in this Biological Opinion.

Species	Listing Status	Critical Habitat	Protective Regulations	Biological Information, Historical Population Trends
Columbia River chum salmon	March 25, 1999; 64 FR 14508, Threatened	NA[1]	July 10, 2000; 65 FR 42422	Johnson *et al.* 1997; Salo 1991
Lower Columbia River steelhead	March 19, 1998; 63 FR 13347, Threatened	NA	July 10, 2000; 65 FR 42422	Busby *et al.* 1995; 1996
Middle Columbia River steelhead	March 25, 1999; 64 FR 14517, Threatened	NA	July 10, 2000; 65 FR 42422	Busby *et al.* 1995; 1996
Upper Columbia River steelhead	August 18, 1997; 62 FR 43937, Endangered	NA	July 10, 2000; 65 FR 42422	Busby *et al.* 1995; 1996
Snake River Basin steelhead	August 18, 1997; 62 FR 43937, Threatened	NA	July 10, 2000; 65 FR 42422	Busby *et al.* 1995; 1996
Snake River sockeye salmon	November 20, 1991; 56 FR 58619, Endangered	December 28, 1993; 58 FR 68543	November 20, 1991; 56 FR 58619	
Lower Columbia River chinook salmon	March 24, 1999; 64 FR 14308, Threatened	NA	July 10, 2000; 65 FR 42422	Myers *et al.*1998; Healey 1991
Upper Columbia River spring-run chinook salmon	March 24, 1999; 64 FR 14308, Endangered	NA	July 10, 2000; 65 FR 42422	Myers *et al.*1998; Healey 1991
Snake River spring/summer-run chinook salmon	April 22, 1992; 57 FR 14653, Threatened	December 28, 1993; 58 FR 68543	April 22, 1992; 57 FR 14653	Matthews and Waples 1991; Healey 1991
Snake River fall-run chinook salmon	April 22, 1992; 57 FR 14653, Threatened	December 28, 1993; 58 FR 68543	April 22, 1992; 57 FR 14653	Waples *et al.* 1991b; Healey 1991

[1]Shortly before the issuance of this opinion, a Federal court vacated the rule designating critical habitat for the LCR chinook salmon, CR chum salmon (*O. keta*), SR steelhead (*O. mykiss*), UCR steelhead, MCR steelhead, and LCR steelhead ESUs considered in this opinion. The analysis and conclusions regarding critical habitat remain informative for our application of the jeopardy standard even though they no longer have independent legal significance for these ESUs.

specific conservation measures are included. NOAA Fisheries regards these BMPs as integral components of the project and considers them to be part of the proposed action.

Direct effects to listed species would occur at the project site and may extend upstream or downstream based on the potential for impairing fish passage, hydraulics, bedload transport, sediment and pollutant discharge, and the potential for slight riparian habitat modifications. Indirect effects to listed species may occur throughout the watershed where action described in this biological opinion (Opinion) lead to additional activities or affect ecological functions contributing to stream degradation. As such, the action area for the proposed activities includes the immediate watersheds where the proposed actions would occur, and those areas upstream and downstream that may reasonably be affected, temporarily or in the long-term. For the purposes of this Opinion, the action area is defined as the streambed, streambank and riparian corridors of Dry, Tumalt and Viento Creeks, extending to the upstream project disturbance limits, and downstream to the Columbia River. Other areas of the Columbia River watershed would not be directly affected. There would be temporary indirect effects (temperature modification and sedimentation) to Dry, Tumalt and Viento Creeks within the action area, caused by the culvert maintenance action, and general riparian and bank disturbance within the project area.

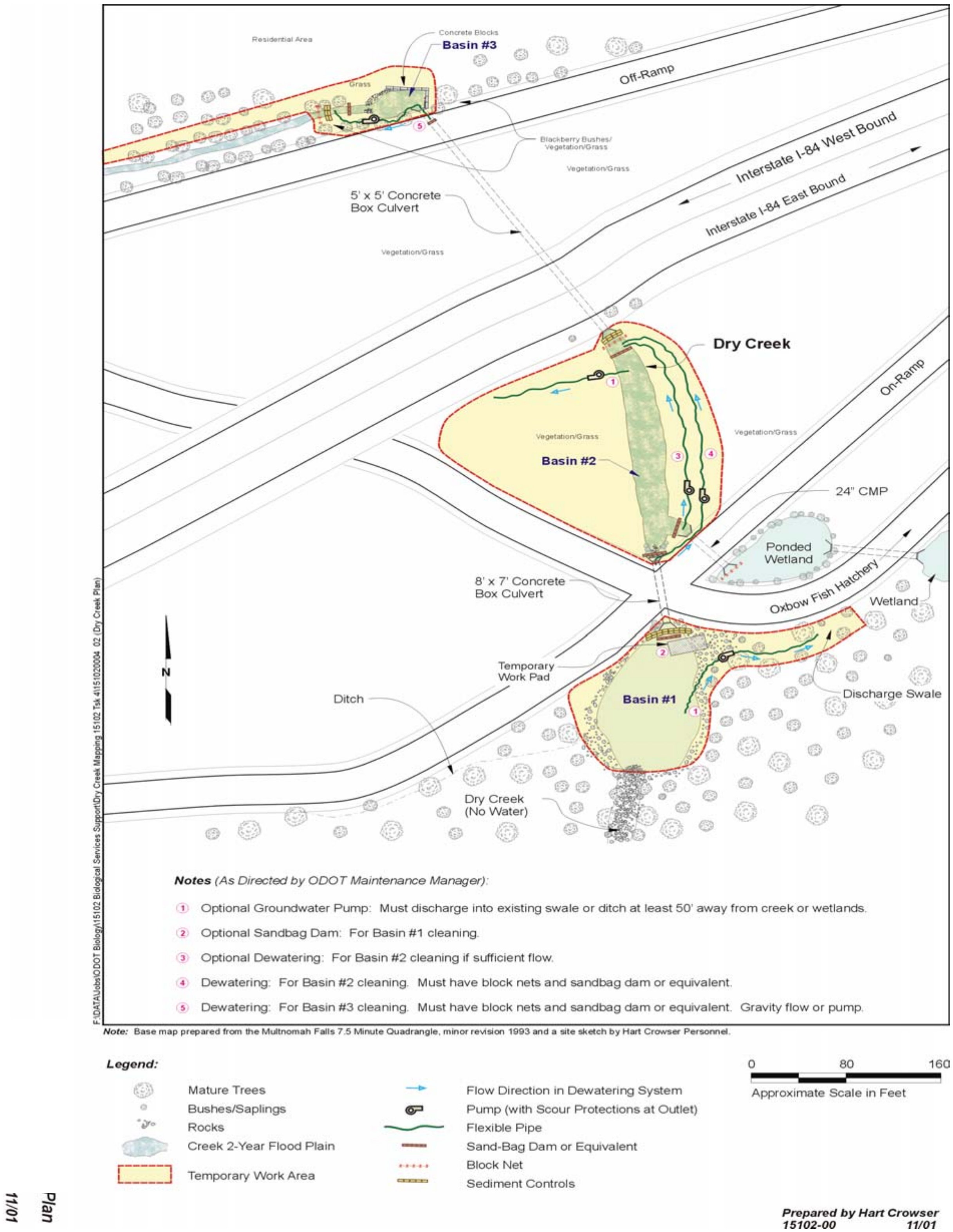
All in-water work activities would occur during the standard in-water work timing guideline[2] of July 1 through September 30 for Dry and Viento Creeks and July 15 through August 31 for Tumalt Creek. Any extensions or alterations to the standard in-water work timing would require the approval of a NOAA Fisheries biologist (on a case by case basis). In-water work outside the standard in-water work window is only anticipated to be necessary when maintenance is deemed necessary by the best professional judgement of the ODOT maintenance manager prior to the next wet season but after the dry season in-water timing has past.

1.2.1 Dry Creek Culvert Crossings

Potential dredging activity may occur at any, or all, of the three sediment detention basins (Basin #1, Basin #2, or Basin #3), and/or the two culverts under the I-84 and the I-84 frontage road as shown on Figure 1. The magnitude and extent of dredging would vary depending on need as described in detail below. Past experiences have demonstrated that when the various basins and culverts are not periodically cleaned and dredged, bedload has accumulated at the I-84 culvert outlet causing aggradation of the stream channel and extensive flooding of downstream neighborhoods. This flooding has endangered the I-84 highway infrastructure as culvert capacity is restricted by the accumulated beadload.

[2]Oregon Department of Fish and Wildlife, *Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, 12 pp (June 2000)(identifying work periods with the least impact on fish)(http://www.dfw.state.or.us/ODFWhtml/InfoCntrHbt/0600_inwtrguide.pdf).

Figure 1. Dry Creek Site Plan



Dredging Activities.

The proposed action consists primarily of routine dredging in Basin #1. The goal is to keep bedload from accumulating in either the culvert or the lower basins by managing sediment in Basin #1 and working only in that basin. The extent of dredging from the culverts and basins below this basin depends on seasonal hydrologic conditions and resultant bedload accumulations. To minimize the need to work outside of the in-water work period, grates would be installed at the inlet end of both culverts to retain bedload until work can occur during the next in-water work period. Basin #2 is likely to need cleaning within the next few years. It is unlikely that Basin #3 would require cleaning within the next 5 years, but has been included as part of the proposed action in the event that it does require dredging to protect downstream properties.

The Oregon Department of Transportation (ODOT) maintenance office would dredge any or all of the basins when trigger elevations have been reached, or are anticipated to be reached before the next in-water work period. Trigger elevations are shown on Figure 2, Sheets 1 and 2. The exact determination of when the basin needs cleaning would be based on the best professional judgement of the maintenance manager, taking into account existing bedload, weather predictions (snow pack and rain precipitation), flow rate, history of the system, and potential downstream impacts to the community and lower parts of the system. Public safety is the main concern and ultimately the only reason for dredging. Each year, dredged amounts would range between as high as 1,530 meters ^{3} (m) or as low as 229 m^3 depending on need, when dredging becomes necessary. Only bedload material would be routinely removed.

Metal grates would be installed at the upper end of each culvert to retain most of the rocks and large gravel. The grates would be permanent and would be installed during the in-water work period. Each grate would have 3-inch vertical spacing between the bars to allow for downstream passage of resident fish, and also to allow the smaller sediment to pass downstream. Upstream salmonid passage is already blocked during all flows by the pre-existing Dry Creek culvert under I-84. The goal is to catch the majority of the sediment and debris before it goes through the culverts, thereby minimizing the need for culvert cleaning. As such, only Basin #1 should require routine dredging.

A temporary access pad is necessary for dredging in Basin #1. It would be built up from the existing rock turn-out at the shoulder of the frontage road, and would extend into the basin (Figure 1). The base of the pad would be constructed by excavating the existing bedload in the basin and creating a ramp from the bottom of the basin to the top of the bank. Steel plates would be installed over the top of the work pad, as needed, for equipment stability. Geotextile would not be installed under the base, because the bedload material used for the pad is part of the material that was going to be dredged. An average of 271 m^2 of material would be removed from Basin #1 to reach the target bed elevation of 57.4 m (Figure 2, Sheets 1). The basin would be excavated to no wider than the existing width, and with slopes of no greater than 1V:1.5H and shaped according to Figure 2, Sheets 3 and 4 using an excavator and

Figure 2a. Dry Creek Dredging Contours.

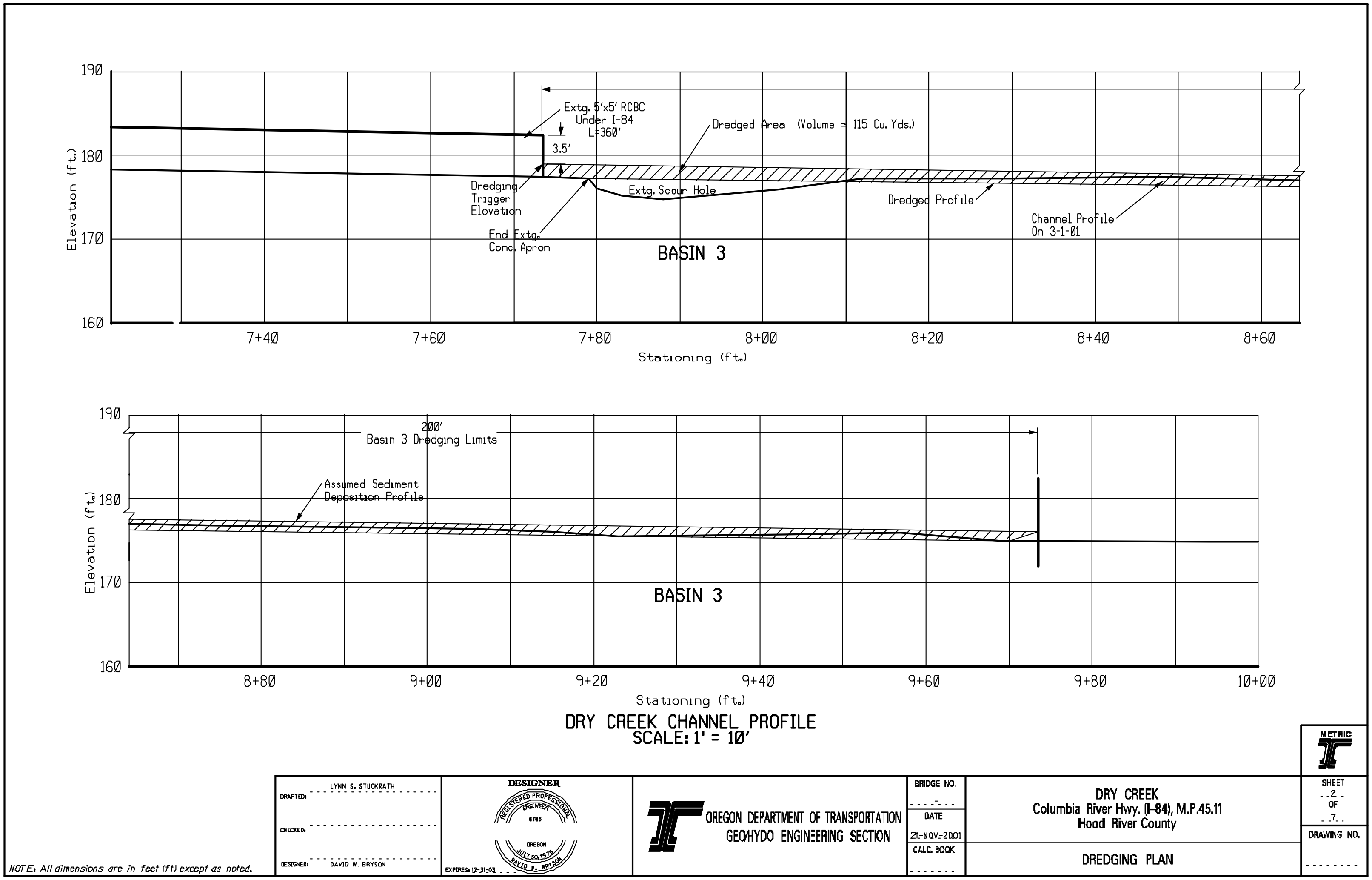


Figure 2b. Dry Creek Dredging Contours.

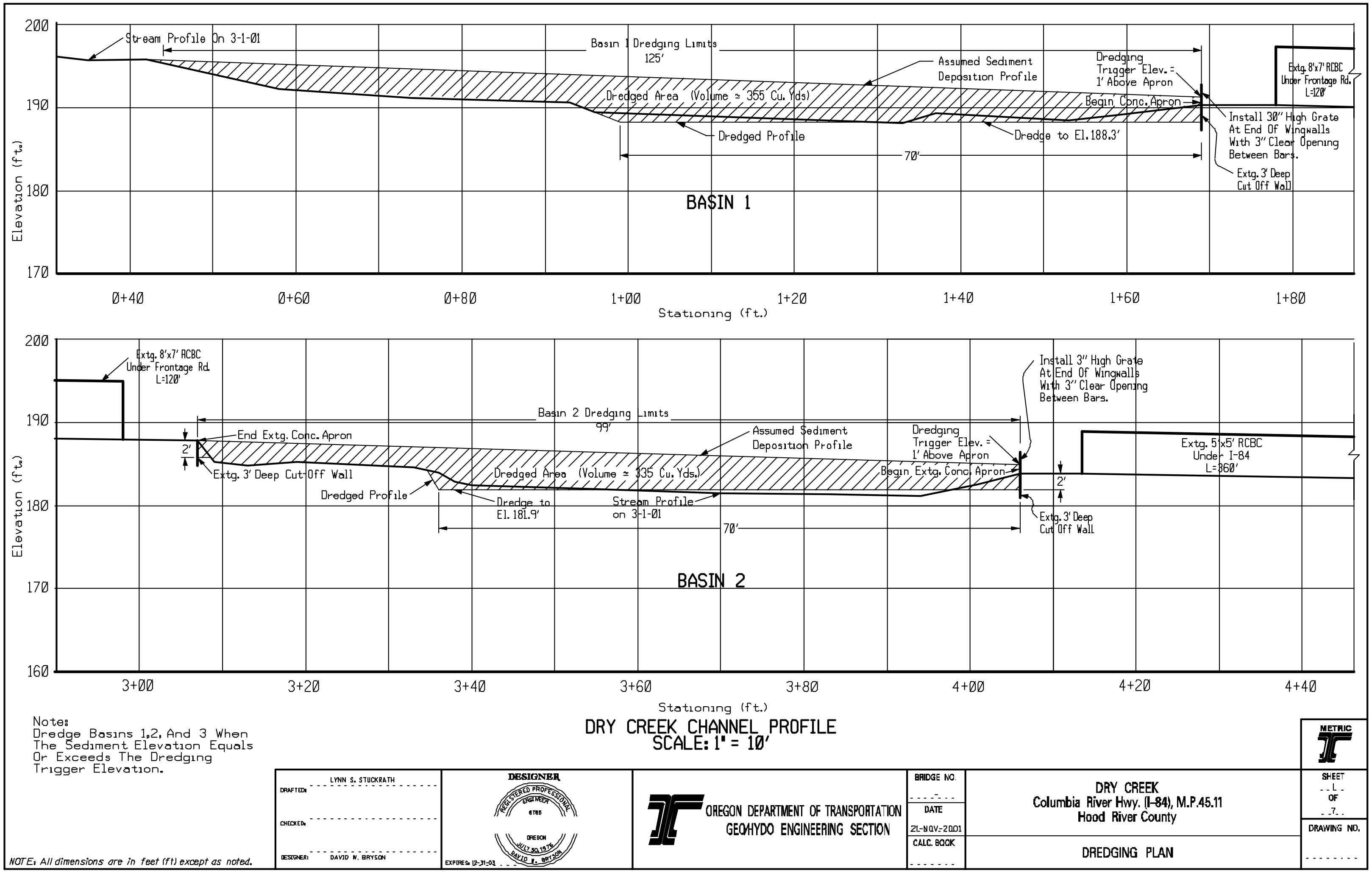


Figure 2c. Dry Creek Dredging Contours.

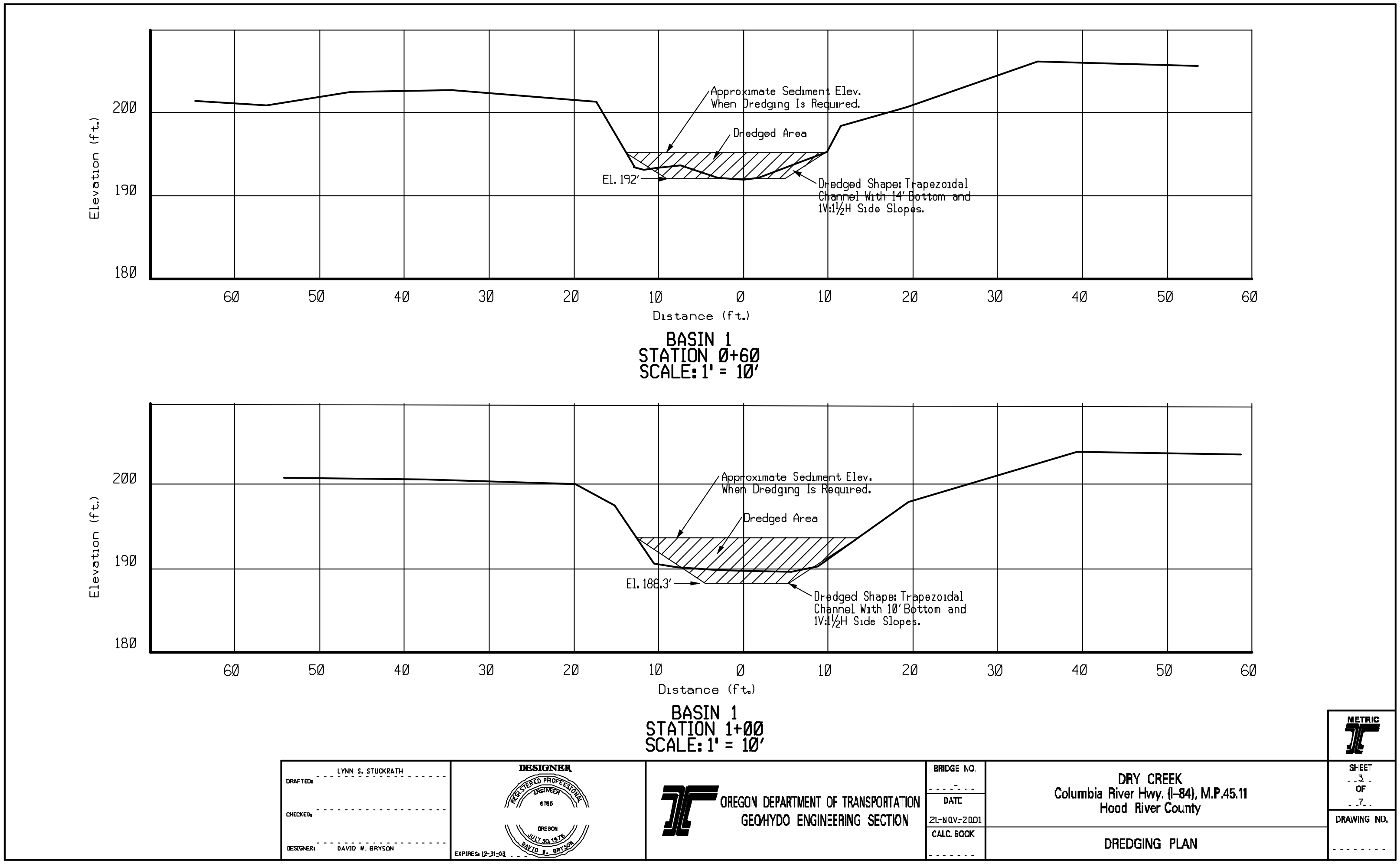


Figure 2d. Dry Creek Dredging Contours.

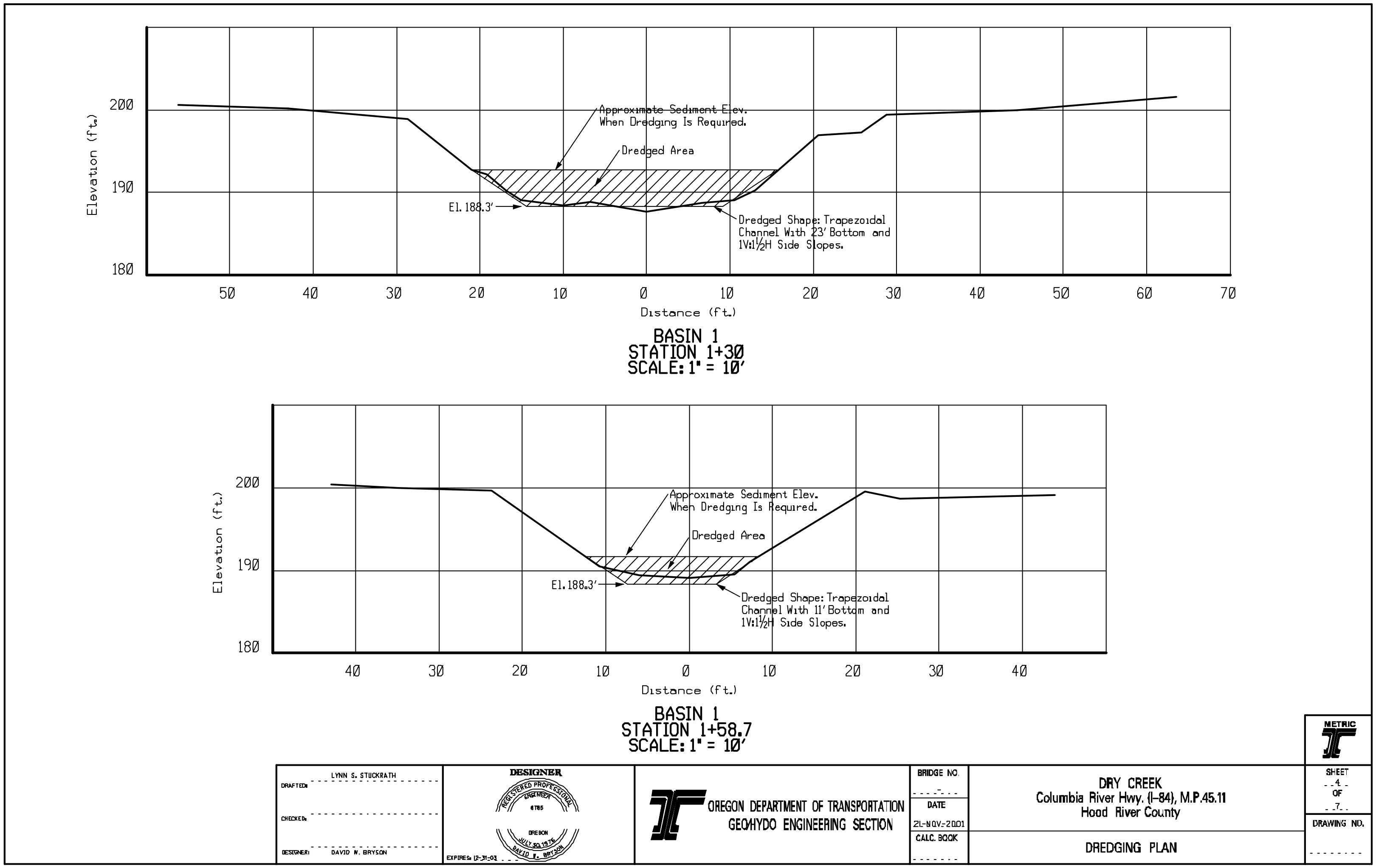


Figure 2e. Dry Creek Dredging Contours.

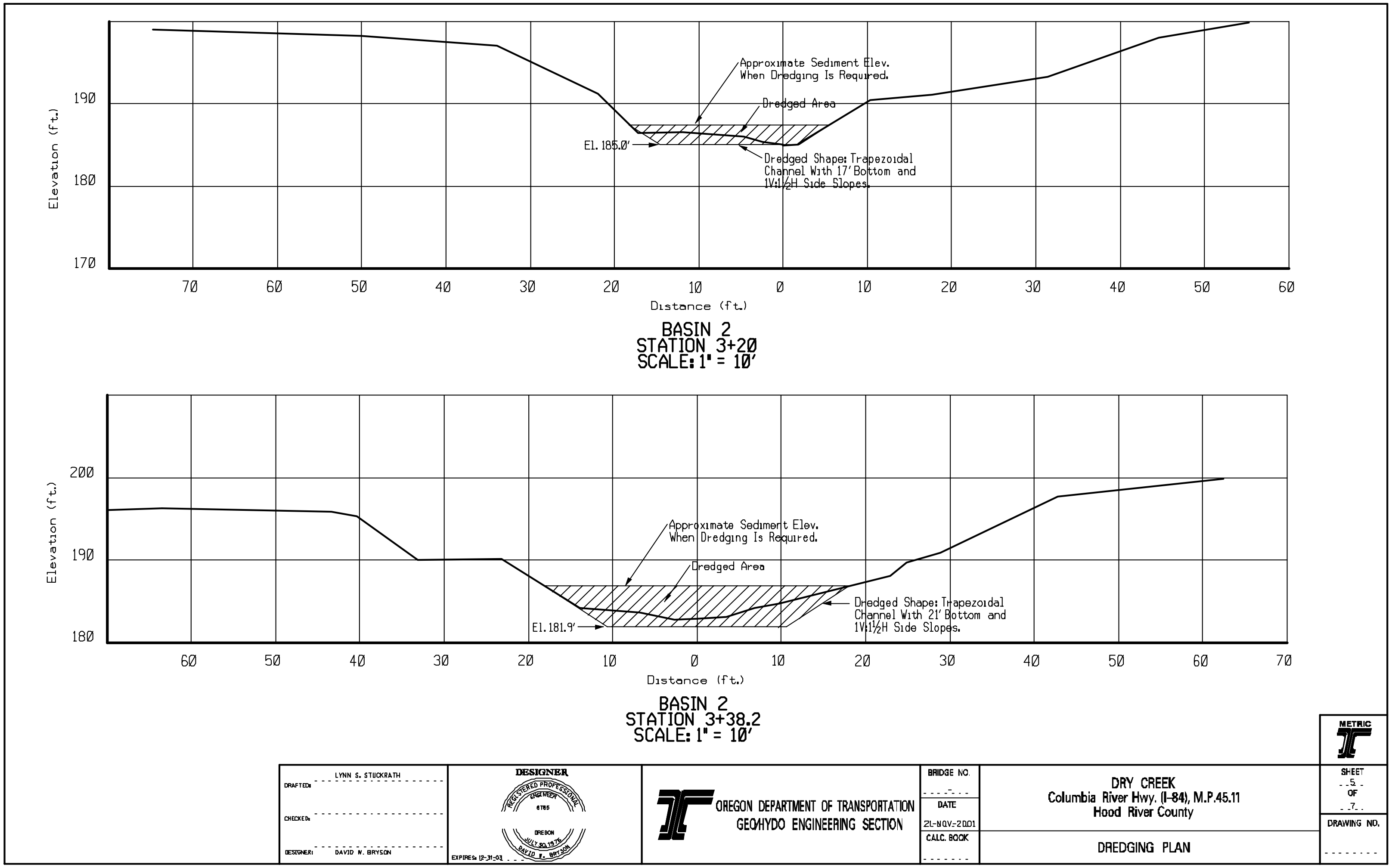


Figure 2f. Dry Creek Dredging Contours.

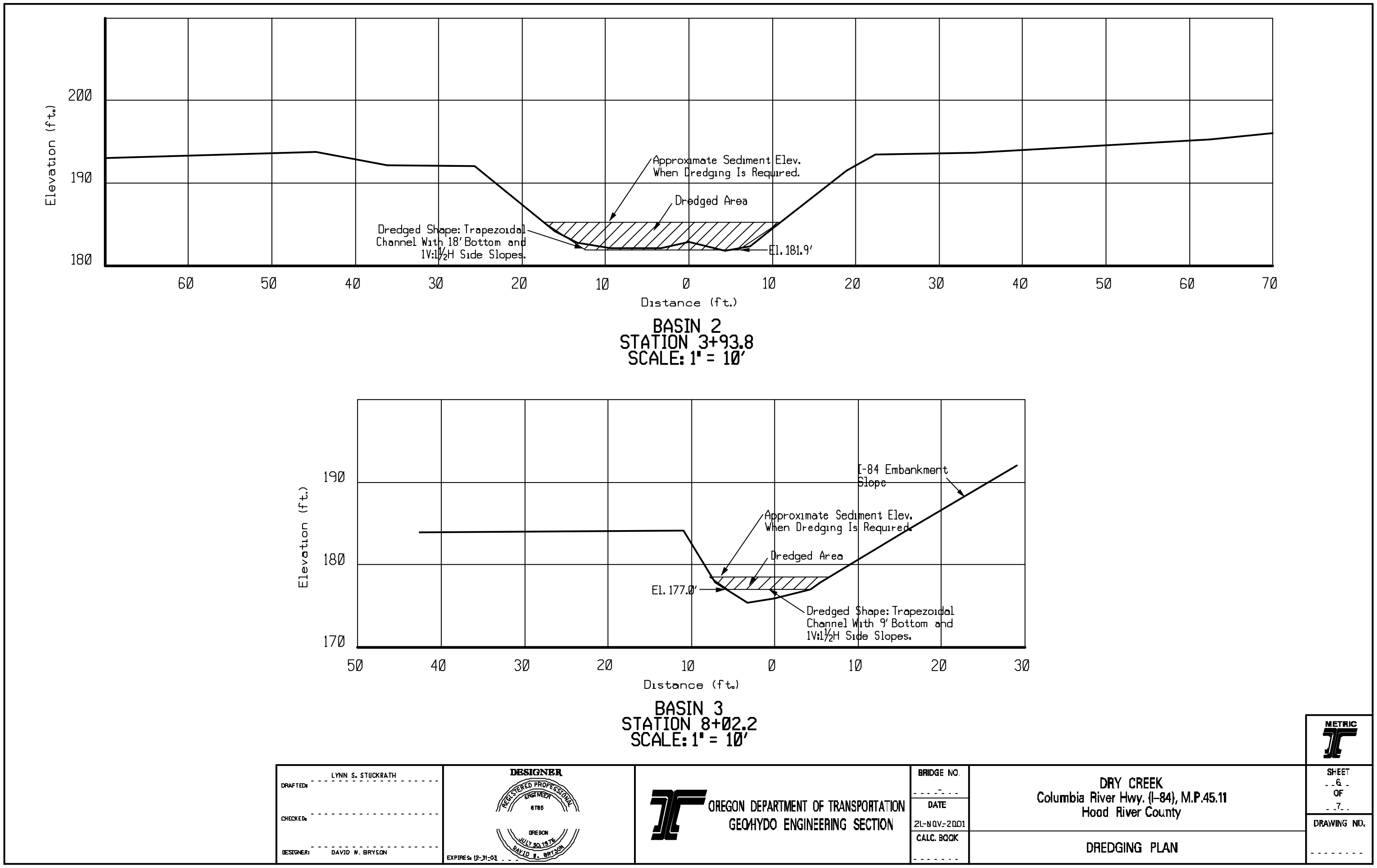
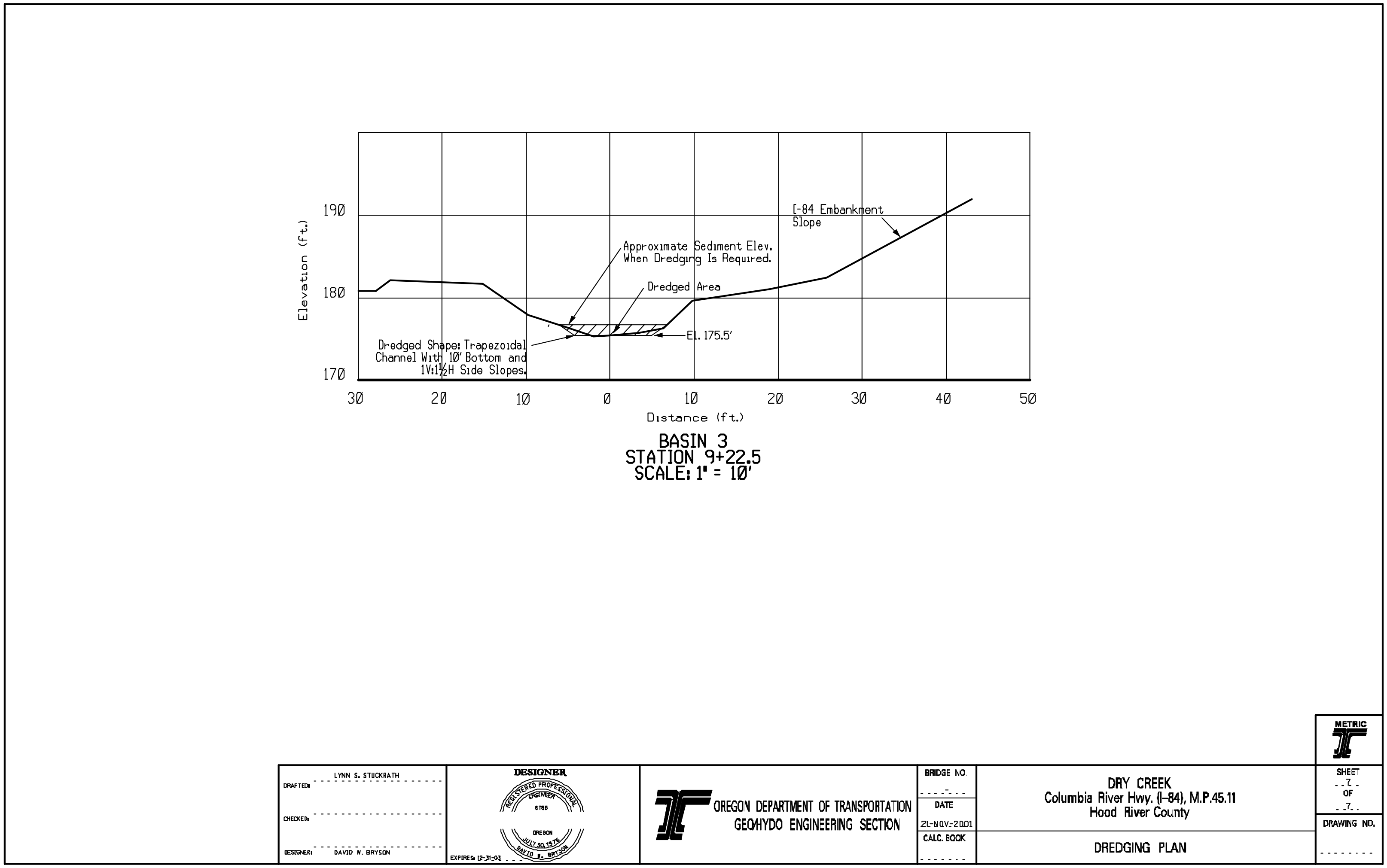


Figure 2g. Dry Creek Dredging Contours.



back-hoe. Material would be transferred directly to a dump truck and disposed of at an off-site area. After the basin has been excavated, the work pad would be removed. The finished streambank would be sloped to 1V:1.5H.

When dredging is required from Basin #2, the existing road shoulder and existing disturbed areas are sufficient for access. A temporary access pad would not be needed for this basin, although the entire disturbed grassy slope west of the basin would be used as a temporary work area (Figure 1). The excavator would move along west bank, removing approximately 256 m^3 of material to reach the target bed elevation of 55.4 m (Figure 2, Sheet 1). The basin would be excavated to no wider than the existing width and with slopes of no greater than 1V:1.5H and shaped, according to Figure 2, Sheets 5 and 6, using an excavator and back-hoe. Material would be transferred directly to a dump truck and disposed of at an off-site area.

If dredging is required from Basin #3, the existing access road and turn-out would be used (Figure 1). The work would be conducted from the north side of the basin, with an excavator extending over the bank and reaching into the basin. A small front end loader may also be used if trees are in the way of the excavator. It would be lowered into the stream with a crane and would transfer material directly into the dump truck located on the existing access road. No access ramp would be needed. Approximately 90 m^3 of material would be removed, down to the target bed elevation of 54.1 m. Approximately 61 m of stream would be impacted (Figure 2, Sheets 5 and 6). Dredge material would be hauled away and disposed of at an off-site disposal area.

<u>Work Area Isolation and Fish Removal.</u>
Work area isolation and dewatering would be conducted if there is sufficient flow in the work areas such that stream flow would present a problem during the work, or if stream flow is high enough that sedimentation might be a concern, or if fish may be present. During most years, water levels are low enough in the project area that dewatering would not be necessary. Water in the creek usually goes subsurface during the summer months before reaching the ODOT culverts or basins. If the stream is flowing immediately above or below the work area, block nets would be installed, and an Oregon Department of Fish and Wildlife (ODFW), ODOT, or other qualified fish biologist would determine if fish may be present, using electrofishing, netting, or best professional judgement based on water levels. If fish are present, the biologist would move all of the fish to a suitable up or downstream location, using electrofishing and following NOAA Fisheries' guidelines[3].

If water is present in Basin #1, the work area may be isolated with blocknets, coffer dam(s), and sediment and erosion control devices, as shown on Figure 1. It would be dewatered only if necessary for the work or to minimize downstream sedimentation. Sediment and erosion controls would be installed to minimize sedimentation (Figure 1). Subsurface flow would also be pumped out of the work area, as needed, and discharged into a nearby swale so that it is completely filtered before it re-enters the stream. Although fish are not expected to occur in

[3]National Marine Fisheries Service, *Backpack Electrofishing Guidelines* (December 1998) (http://www.nwr.noaa.gov/1salmon/salmesa/pubs/electrog.pdf).

Basin #1, ODOT would consult with an ODFW, ODOT, or another qualified fish biologist to determine if block nets and fish salvage are needed.

Work area isolation would be necessary when Basin #2 is dredged. Most of the flow into this basin is from a side channel located near the southeastern corner of the basin (Figure 1). Block nets would be installed up and downstream of the work area (as needed, depending on flow). An ODFW, ODOT, or other qualified fish biologist would check to see if fish are present, using electrofishing. If any fish are present, the biologist would move all of the fish to a suitable location with appropriately sized pools and adequate water quality. The channel would be diverted around the basin and returned at the inlet to the I-84 culvert, just above the block nets, via flexible pipe (Figure 1). Pumps would be utilized as necessary. Flow would be cut off with sand bags located in the side channel just above Dry Creek. The lower end of Basin #2 would also be blocked with sand bags if there is sufficient flow below the work area. Subsurface flow would be pumped out of the work area and discharged into a nearby swale so that it is completely filtered before it re-enters the stream.

The proposed action is unlikely to involve work in the I-84 culvert or Basin #3. The grates and upstream basin dredging are expected to result in negligible bedload accumulation in Basin #3. However, a dewatering plan has been prepared in case there is a need for cleaning this basin (Figure 1). The work area would be isolated from between the lower end of the I-84 culvert to approximately 91 m downstream of the culvert outlet at the end of the work area. Block nets would be installed up and downstream of the work area. An ODFW, ODOT, or other qualified fish biologist would check for fish presence using electrofishing per NOAA Fisheries guidelines. If any fish are present, the biologist would move all of the fish to a suitable downstream or upstream location (depending on current stream flow conditions). A temporary diversion dam would be installed within the culvert with flexible pipe to divert water from the dam back into the stream just upstream of the block nets. Pumps would be utilized as necessary. Sediment controls would be installed to minimize downstream sedimentation.

1.2.2 Tumalt Creek Culvert Crossings

Potential dredging and culvert cleaning activity may occur at any or all of the two culverts under the I-84 and the I-84 frontage road and/or channel maintenance locations at each culvert outlet as shown in Figure 3. The magnitude and extent of dredging would vary depending on need as described in detail below.

A steel grate was installed above the inlet of the upper culvert crossing (I-84) in the summer of 2001. The grate functions like a trash rack, preventing large rocks and debris from moving downstream. ODOT would clean out the debris that is retained by the grate on a regular basis. The amount and timing of cleaning directly above the grate cannot be predicted because bedload accumulation in this stream is high and event driven. However, based on past ODOT experience, it may have to be cleaned out yearly or more than once a year, depending on severity of events. With this regular maintenance of the creek above the grate, ODOT does not expect that the I-84 culvert would require cleaning every year, but more likely every couple of years. The grate would reduce bedload accumulation in the lower culvert, but smaller cobbles and sediment would pass through the grate and upper culvert, accumulating above the railroad culvert. Since the railroad culvert is over half-full with debris, it would undoubtedly continue to cause a back-up of sediment and debris in the channel below the lower culvert and into the lower culvert. As such, the lower culvert and its outlet may require cleaning every year.

The accumulated bedload in the both culverts would be removed as needed to protect the highway road prism and the integrity of the culverts. The proposed action involves cleaning out both culverts and the creek channel between the two culverts, as well as a portion of the creek channel immediately below the north culvert, in the event that sediment accumulation in the culverts is higher than anticipated. The work would be similar to cleaning that has occurred over the past two years.

Culvert Cleaning and Repairs.
Prior to any culvert or channel maintenance, the work areas would be isolated, as shown in Figure 3. However, the lower culvert appears to require cleaning every year due to back up from the railroad culvert. The trigger for cleaning both culvert would be when they are half-full, or expected to be half-full or higher with the next year. The work would be conducted during the in-water work period or as approved by a NOAA Fisheries biologist (on a case by case basis).

A bobcat, or other suitable equipment, would be used to clean out sediment and debris from both culverts. Entry into the upper I-84 culvert would be accomplished by creating a temporary work pad extending from the eastern bank and into the creek just below the culvert outlet (Figure 3). It would essentially function like a ramp leading into the culvert. It would be built up on top of existing large rocks and logs located on site and less than 10 cubic yards of additional rock. Large vinyl or heavy plastic drop cloths shall be draped over the rock approach and stream bottom to minimize sedimentation. A minimum of two metal plates, strong enough to support the culvert cleaning equipment would be placed on the rock base to permit safe entry into the lower end of the culvert. The bobcat would dig its way up the culvert removing material and dumping it into the bucket of a larger front end loader located on the existing gravel work pad on the eastern bank (Figure 3). The loader would dump the material into a dump truck parked in the adjacent roadway, and haul it away to an ODOT facility. The temporary work pad would be removed and the channel would be returned to its prior shape, using photographs to match pre-construction conditions.

The lower culvert under the north frontage road would be cleaned from its outlet end. The creek channel immediately below the culvert outlet typically has so much material that a trench must be excavated from the stream channel to access the culvert. The track hoe, or other suitable equipment, would excavate an entry trench extending approximately 3 to 6 m from the downstream culvert outlet. The trench would be entirely in the stream channel and would be wide enough to accommodate a bobcat but not wider then the channel at the ordinary high water elevation. The depth of the entry channel would be at the bottom elevation of the culvert. Metal plates would be installed at the base of the entry channel in the creek to facilitate access into the culvert, essentially creating a temporary in-stream work pad. A bobcat, or other suitable equipment, would be lowered into the culvert from the north frontage road. Material excavated from the culvert would be removed from the channel through a "bucket to bucket" transfer. This process would continue until all material is excavated from the lower culvert. When excavation is completed the steel plates would be removed, and the bobcat would be lifted out of the culvert. The final shape of the creek banks and channel bottom would be U-shaped, to simulate the prior-existing channel morphology. Natural stream flow would be returned to the channel after work is complete.

Sediment mats and/or straw bales would be placed in the stream bottom below the work area and below the I-84 culvert to minimize sedimentation during channel maintenance. They would be carefully removed after construction has been completed and before stream flow has been returned. All banks would be reshaped, seeded, and mulched at the end of the work. Both culverts would be cleaned during the low flow and ODFW in-water work period (July 15 to August 31). If not, ODOT would request an extension to the in-water work period from ODFW, USFWS and NOAA Fisheries, and conduct the work as soon as Corps/DSL permits are obtained. Approximately 153 m^3 would be removed each year from the two culverts, directly upstream of the grate at the upper culvert inlet, and the channel directly downstream of the lower culvert outlet.

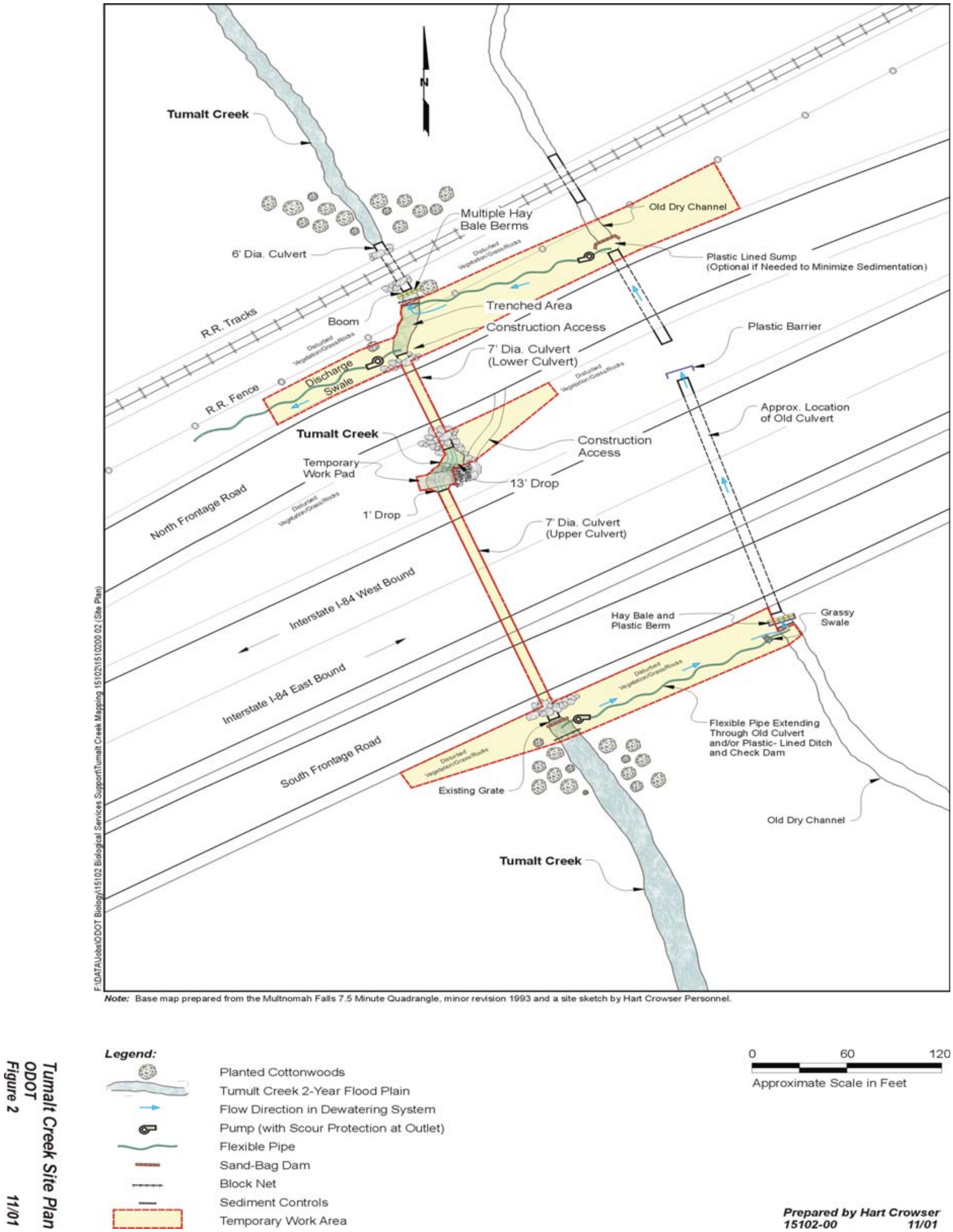
Channel Maintenance.
The creek channel immediately above the upper culvert would be cleaned out as needed. The trigger for cleaning would be when the grate is filled approximately .6 m above the bottom of the culvert. The grate may be cleaned earlier if the maintenance manager believes the trigger would be reached within the next year. The portion of the creek that would be impacted would be 3 to 6 m upstream of the culvert inlet. The work area would not be isolated because this portion of the channel is inaccessible to anadromous fish. Access would be from the top of bank by using an extended backhoe. The top of bank that would be used for accessing the channel during cleaning consists of a gravel and weedy roadside turn out. It does not contain riparian vegetation. The channel is also barren rock and gravel, so no vegetation removal would be required.

Work Area Isolation and Fish Removal.
When culvert or channel cleaning is required, Tumalt Creek would be diverted to dewater the work area and minimize erosion and sedimentation. For the proposed action, the entire work area (starting at the I-84 inlet and extending to the channel between the lower culvert and the railroad culvert) would be isolated and the existing abandoned culverts would be used to convey diverted water to a point below the work area (Figure 3).

ODOT would coordinate with ODFW to remove fish within the isolation area and to evaluate whether block nets should be installed. The latter would depend on the stream conditions and potential presence of fish, as determined by a qualified fish biologist. If fish presence is confirmed or anticipated, block nets would be installed just above the upstream diversion and just below the downstream diversion (Figure 3). If fish are present, pumps be fitted with fish screens as per NOAA Fisheries' fish screen criteria[4].

[4] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

Figure 3. Tumalt Creek Site Plan



The work area would not be dewatered until a fish biologist has inspected and moved all fish out of the work area, using electrofishing according to NOAA Fisheries' guidelines. Fish would be moved to a suitable location downstream in Tumalt Creek. The biologist would periodically check for fish presence above and below the diversion and in the diversion, channel throughout the period that the work area is dewatered.

Details of the diversion are shown on Figure 3. It would start at the inlet just above the upper culvert using a sandbag and plastic dam. An appropriately sized pump and flexible hose would be used to convey water directly into a roadside ditch paralleling the south frontage road that leads to the abandoned upper culvert. If feasible (depending on stream flow), a longer pipe would be used that extends all the way to the old channel, eliminating the need for lining and using the roadside ditch.

If necessary, another pump and flexible pipe would be used to convey the water back to the existing channel of Tumalt Creek just upstream of the inlet of the railroad culvert. A backup pump would be set up and ready at the downstream return point as a precaution. Sediment check dams and sediment mats would be installed in the stream channel between the lowest work area and the diversion outlet to minimize downstream sedimentation. Pumps would be run continuously (24 hours) from start of culvert cleaning until all in-stream work is finished. The upstream pump and discharge swale pump would be screened as per the NOAA Fisheries screening criteria, unless the area is completely isolated from fish access with block nets or other suitable methodologies.

After the culvert cleaning and repairs are completed, water would be slowly returned to the pool below the lower culvert while the work area is still completely isolated. This would prevent dewatering of the stream channel while the pool is re-watered. If there is not enough flow to maintain both the diversion and fill the pool, water would be imported to fill the pool. The untreated water would be obtained from a well at Multnomah Creek and trucked over to Tumult Creek or from a municipal supply. Regardless of the water source, the water would be free of chlorine or other chemical concentrations harmful to fish. The diversion would be removed after this pool is full. Block nets would be removed after flow in Tumalt Creek has been reestablished.

During channel cleaning, groundwater or seepage would be pumped using a screened pump, as necessary. The water would be pumped to a vegetated discharge swale located between the railroad embankment and the northern frontage road (Figure 3). At least two sandbag and straw bale sediment check dams would be constructed in the existing channel just downstream of the work area. Sediment mats, or other suitable controls, would also be used to minimize downstream sedimentation. The sediment controls would be removed from the work area at the end of the cleaning operation.

1.2.3 Viento Creek Culvert Crossing

Dredging activity may occur within the culvert or at the culvert outlet under the I-84 and the I-84 frontage roads as shown in Figure 4. The magnitude and extent of dredging would vary depending on need as described in detail below.

Typically, bedload is transported down to the first bend in the creek about 31 m below the culvert, and it aggrades upstream from there. The current bedload on the culvert apron was deposited during the major flood events in 1996. It must be removed to restore stream flow capacity through the culvert. The goal of culvert maintenance at Viento Creek is to remove material initially from the culvert apron and culvert outlet, then maintain the system by cleaning only the apron, as needed to prevent aggradation downstream and in the culvert.

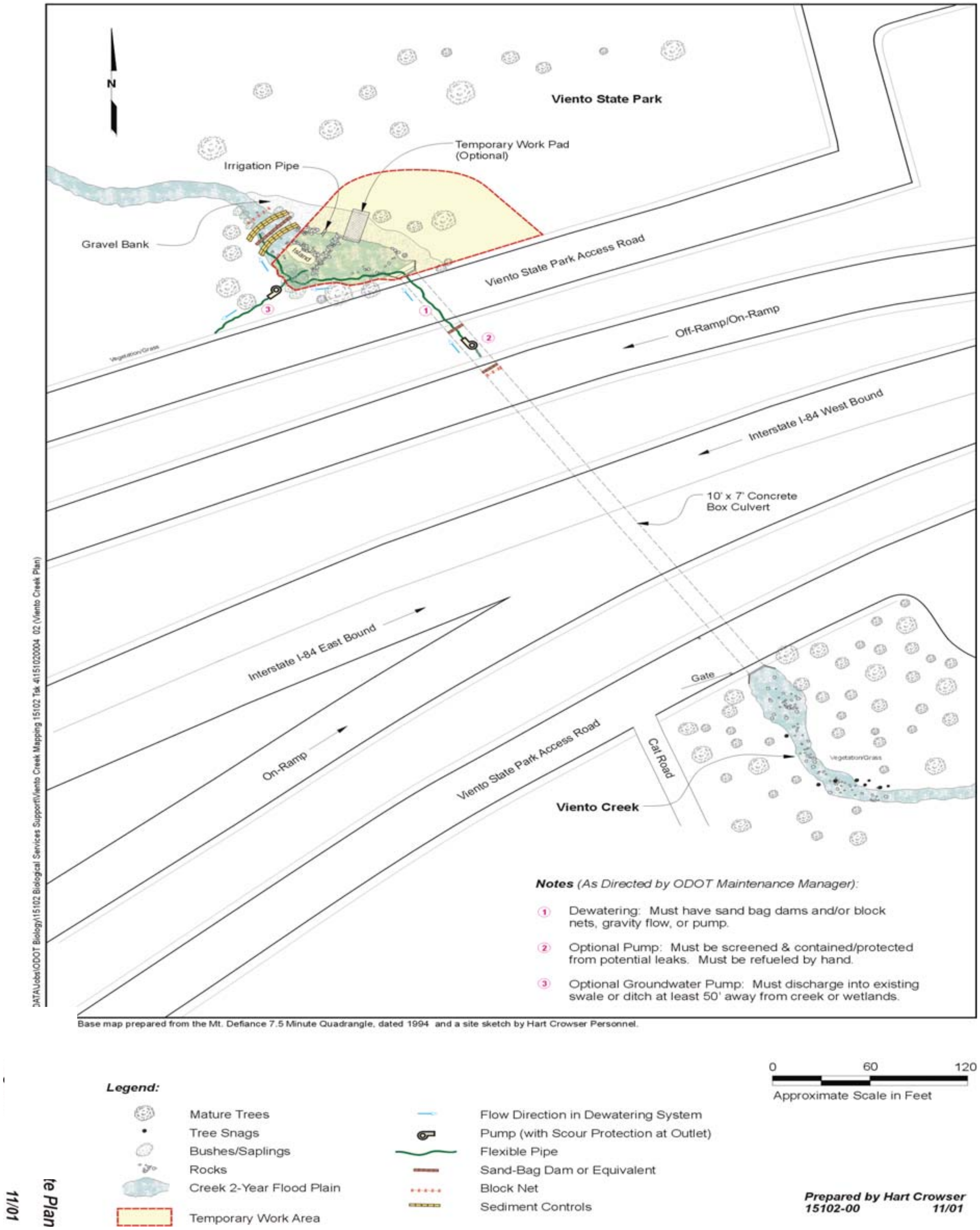
Culvert and Apron Cleaning.
The bedload would be removed after the material accumulates in the outlet of the culvert up to the dredging trigger 1 m below the ceiling of the culvert (Figure 5, Sheet 1 of 1). It may be cleaned prior to this point if that trigger is expected to be reached before the next ODFW recommended in-water work period (July 1 - September 30), according to the best professional judgement of the maintenance manager. Timing of dredging would depend on the rate of bedload accumulation. Only material within, at, and downstream of the culvert outlet would be removed. The apron extends approximately 17 m below the culvert outlet, and creek dredging would extend only to the end of the culvert apron (Figure 5, Sheet 1). It is estimated that 130 m^3 of substrate would be removed from the culvert, culvert outlet, and apron. The width of channel dredging would be no wider than the ends of the culvert wingwalls, and the depth would be no deeper than the lower end of the channel apron. As described below, the stream channel along the culvert apron would be reshaped after it has been cleaned to restore spawning habitat.

The culvert cleaning activities are expected to take approximately three days. Culvert and culvert apron cleaning adjacent to the roadway would be conducted primarily from the roadway with an excavator reaching down into the creek. A temporary access pad may be necessary to access portions of the apron that cannot be reached from the roadway above. The pad would be constructed on the eastern bank where there is an existing clearing that is utilized by Viento Park maintenance staff for accessing the pump house and irrigation pipe. The creek bank would be built-up and reshaped using imported material, as necessary, to create a stable temporary access ramp extending into the creek. Steel plates would be installed over the top of the work pad, as needed, for equipment stability. Geotextile would be installed under the base on the streambank, but not within the channel because the portion of the access pad within the stream would eventually be excavated as part of the dredging operations.

A bucket-to-bucket method would be used to transfer material from the excavator to a larger front end loader parked on the bank adjacent to the creek. The material would be loaded into a dump truck stationed on the road shoulder. Most of the dredge material would be hauled away and disposed of at an off-site disposal area. After the work has been completed, the temporary access pad (if utilized) would be removed and the bank would be restored to pre-construction contours.

The culvert apron would either be dredged down to the culvert apron, or down to the target elevation .6 m above the apron, depending on ability to locate the apron during culvert cleaning. If it is not feasible to locate the target elevation during the work, excess material would be temporarily removed from the culvert apron and replaced after the work has been completed to restore .6 m of gravel over the culvert apron for spawning habitat.

Figure 4. Viento Creek Site Plan



ODOT would coordinate with ODFW at the end of the dredging work to determine the optimum final shape for fish use. The final shape would be similar to the channel profiles shown on Figure 5, Sheet 1, with channel slopes no steeper than 1V:2H.

Sediment mats and/or straw bales would be placed in the stream bottom below the work area to minimize sedimentation during channel maintenance. They would be carefully removed after construction has been completed and before stream flow has been returned. All banks would be reshaped, seeded, and mulched at the end of the work.

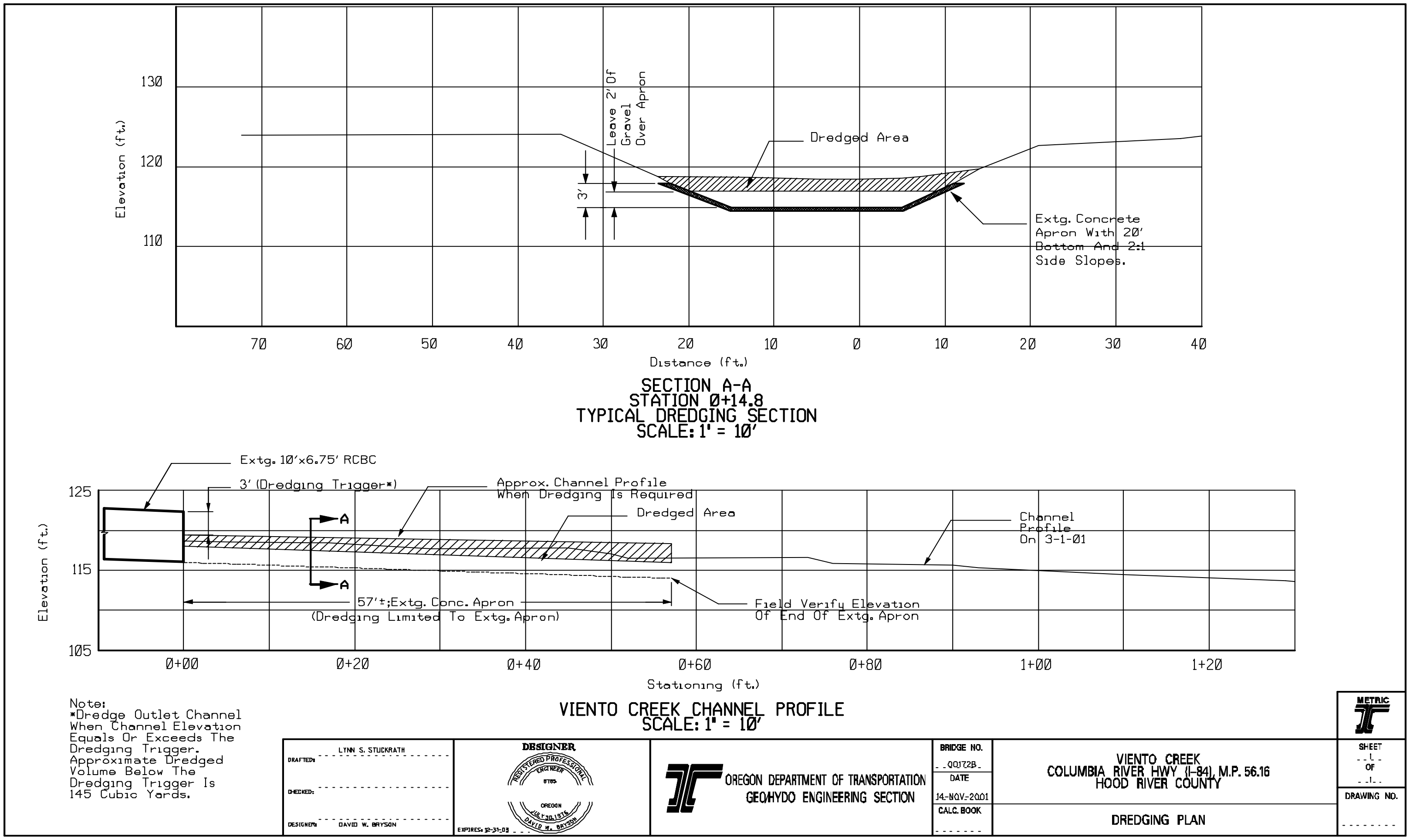
<u>Work Area Isolation and Fish Removal.</u>
Randy Reeve, ODFW fisheries biologist, Nancy Munn, NOAA Fisheries biologist, and Art Martin, NOAA Fisheries/ODOT Liaison, worked with ODOT Maintenance managers to determine the most appropriate method of protecting fish during in-stream work. Fish passage would be blocked from moving into the work area during the approximate three days of dredging activities.

The work area would be isolated by installing sand bag dams at the upper and lower ends of the work area (Figure 4). The upper sandbag dam would be within the culvert. An ODFW, ODOT, or other qualified fish biologist would remove any fish trapped in the work area and move them to a suitable upstream or downstream location, using electrofishing, following NOAA Fisheries' guidelines. Block nets would be installed, as needed and as recommended by the fish biologist. Flexible hosing would be used to divert the flow. The hose would be laid on the floor of the culvert and extend out of the culvert along the side of the creek to the end of the work area. The hose would be moved around, as needed, for access during dredging. A pump may be used if necessary, and would be appropriately screened for fish passage if block nets are not used. If a pump is used, it would be placed in the culvert, between parallel sandbag dams, and with an appropriate oil and fuel containment system.

1.2.4 Compensatory Monitoring

ODOT would evaluate the effects of the basin cleaning activities on channel morphology and streambed material in Dry and Viento Creeks with pre-construction and annual monitoring for the five-year duration of this Opinion. Channel shape would be measured at three permanent sampling locations in each stream, at 50, 100, and 150 feet downstream of the I-84 culverts, and substrate sizes would be measured at 100 random points within a 50-foot section of each stream downstream of the I-84 culverts. Pre-construction measurements would be taken prior to the 2002 in-water work season. Identical channel shape and pebble count measurements would be taken at the same time of year for the following four years (2003-2006) at the same locations.

Figure 5. Viento Creek Dredging Contours



The results will be submitted to NOAA Fisheries and USFWS in an annual monitoring report, along with a narrative evaluation of the change in channel morphology and streambed material. ODOT would coordinate with ODFW, NOAA Fisheries, and USFWS to revise the dredging plans if the results of the pebble counts indicate that ODOT's maintenance activities in Dry and Viento Creeks are reducing the amount and quality of potential spawning gravels to downstream waters. The annual report would also describe culvert and basin dredging activities that took place during the preceding year, dewatering and fish salvage operations, and any proposed changes to the proposed action or best management practices.

1.3 Biological Information and Critical Habitat

Essential features of critical habitat[5] required for the survival and recovery of listed species are water quality, water quantity, water temperature, water velocity, substrate, cover/shelter, food, space, and safe passage conditions (NMFS 1996). Together, these factors determine the biotic composition, structure, function, and stability of aquatic and riparian ecosystems and their ability to support the biological requirements of the species (Spence 1996). Designated critical habitat for Snake River stocks includes a 300-foot riparian strip along this portion of the Columbia River. The critical habitat would partially overlap the lower reaches of these creeks and thus the action area of Tumalt and Viento Creeks.

The processes that produce critical habitat, which are represented by the essential features of salmonid habitat listed above, depend largely on the hydrologic regime (Junk *et al.* 1989, Poff and Ward 1990, National Research Council 1996, Sparks 1992, ISG 2000). Moreover, natural variation in hydrologic conditions, which drive habitat-forming processes, often plays a major role in the population dynamics of aquatic species through influences on reproductive success, life-stage survival, natural disturbance regimes, and biotic interactions (Poff and Ward 1996, Poff *et al.* 1997).

Pacific anadromous salmonid populations in the Pacific Northwest have evolved under the unimpaired flow regimes historically provided by their natal streams. The flow regimes reflect the dynamic character of flowing water systems, which is determined by the quantity, timing and natural variability of stream flow (Reiser 1989). These characteristics drive many of the physical processes in watersheds that are important to salmonid survival and conservation. Unimpaired flow regimes benefit salmonids in two critical ways: (1) They provide temporally and spatially appropriate water quantities to support specific life stages, and (2) they ensure self-sustaining ecosystem processes by which salmonid habitat is created and maintained over time.

[5] A Federal court has vacated the rule designating critical habitat for the LCR chinook salmon, CR chum salmon (*O. keta*), SR steelhead (*O. mykiss*), UCR steelhead, MCR steelhead, and LCR steelhead ESUs considered in this opinion. The analysis and conclusions regarding critical habitat remain informative for our application of the jeopardy standard even though they no longer have independent legal significance for these ESUs. Also, if critical habitat is redesignated for these species before this action is fully implemented, the analysis would be relevant when determining whether a reinitiation of consultation would be necessary at that time.

Flowing water has the same function across the many different stream channel shapes and sizes and across the climatic regimes: (1) To shape the channel through the movement of sediment; (2) to provide habitat diversity through sufficient depth, velocity and pool-riffle structure; and (3) to maintain and support riparian vegetation along streambanks (Rosgen 1996, Leopold 1979, NRC 1996). Streamflow can be considered a "master variable" that limits the distribution and abundance of riverine species and regulates the ecological function of flowing water systems (Power *et al.* 1995).

Dynamic hydraulic, geomorphic, and ecologic processes must be maintained to provide salmonids a high probability of access to sufficient quantities of quality habitats for timely and successful completion of each and every life stage in freshwater (Bisson *et al.* 1997). However, given interannual hydrologic variability, even under an unimpaired flow regime the quantity and quality of freshwater habitat necessary to obtain food and grow, escape predation, resist disease, migrate, and survive extreme environmental events is highly variable and can readily become limiting (Bjornn and Reiser 1991). Stream-rearing salmonids must survive extended periods in freshwater through winter- and summer-rearing bottlenecks (Bjornn and Reiser 1989). In addition, environmental conditions during extensive downstream and upstream migrations during juvenile and smolt life stages and again during adult and pre-spawning life stages can also significantly limit survival (NMFS 2001).

1.4 Evaluating Proposed Action

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations). NOAA Fisheries must determine whether the actions are likely to jeopardize the listed species and/or whether the action are likely to destroy or adversely modify designated critical habitats. This analysis involves the initial steps of defining the biological requirements and current status of the listed species, and evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of mortality attributable to: (1) Collective effects of the proposed or continuing action, (2) the environmental baseline, and (3) any cumulative effects. If NOAA Fisheries finds that the action is likely to jeopardize the listed species, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

Furthermore, NOAA Fisheries evaluates whether the action, directly or indirectly, is likely to destroy or adversely modify the listed species' designated critical habitat. NOAA Fisheries must determine whether habitat modifications appreciably diminish the value of critical habitat for both survival and recovery of the listed species. NOAA Fisheries identifies those effects of the action that impair the function of any essential element of critical habitat. If NOAA Fisheries concludes that the action would destroy or adversely modify critical habitat, it must identify any reasonable and prudent measures available.

For the proposed action, a jeopardy analysis by NOAA Fisheries considers direct or indirect mortality of fish attributable to the action. A critical habitat analysis by NOAA Fisheries considers the extent to which the proposed action impair the function of essential elements necessary for migration, spawning, and rearing salmon under the existing environmental baseline.

1.4.1 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed salmonids is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list the species for ESA protection and also considers new data available that is relevant to the determination.

The relevant biological requirements are those necessary for the listed species to survive and recover to a naturally-reproducing population level, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance its capacity to adapt to various environmental conditions, and allow it to become self-sustaining in the natural environment.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful spawning, rearing and migration. The current status of the listed species, based upon their risk of extinction, has not significantly improved since the species were listed.

1.4.2 Environmental Baseline

The most recent evaluation of the environmental baseline for the Columbia River is part of NOAA Fisheries' Opinion for the Federal Columbia River Power System (FCRPS) issued in December 2000. This Opinion assessed the entire Columbia River system below Chief Joseph Dam and downstream to the farthest point (the Columbia River estuary and nearshore ocean environment) at which listed salmonids are influenced. For a detailed evaluation of the environmental baseline of the Columbia River basin, please refer to the FCRPS Opinion (NMFS 2000).

The quality and quantity of freshwater habitats in much of the Columbia River basin have declined dramatically in the last 150 years. Forestry, farming, grazing, road construction, hydrosystem development, mining, and urbanization have radically changed the historical habitat conditions of the basin. Depending on the species, they spend from a few days to one or two years in the Columbia River and its estuary before migrating out to the ocean and another one to four years in the ocean before returning as adults to spawn in their natal streams.

Water quality in streams throughout the Columbia River basin has been degraded by human activities such as dams and diversion structures, water withdrawals, farming and grazing, road construction, timber harvest activities, mining activities, and urbanization. Tributary water quality problems contribute to poor water quality where sediment and contaminants from the tributaries settle in mainstem reaches and the estuary. Temperature alterations also affect salmonid metabolism, growth rate, and disease resistance, as well as the timing of adult migrations, fry emergence, and smoltification. Many factors can cause high stream temperatures, but they are primarily related to land-use practices rather than point-source discharges. Loss of wetlands and increases in groundwater withdrawals have contributed to lower base-stream flows, which in turn contribute to temperature increases. Channel widening and land uses that create shallower streams also cause temperature increases.

Pollutants also degrade water quality. Salmon require clean gravel for successful spawning, egg incubation, and emergence of fry. Fine sediments clog the spaces between gravel and restrict the flow of oxygen-rich water to the incubating eggs. Excess nutrients, low levels of dissolved oxygen, heavy metals, and changes in pH also directly affect the water quality for salmon and steelhead.

Water quantity problems are also a significant cause of habitat degradation and reduced fish production. Withdrawing water for irrigation, urban, and other uses can increase temperatures, smolt travel time, and sedimentation. Return water from irrigated fields can introduce nutrients and pesticides into streams and rivers. On a larger landscape scale, human activities have affected the timing and amount of peak water runoff from rain and snowmelt. Many riparian areas, flood plains, and wetlands that once stored water during periods of high runoff have been developed. Urbanization paves over or compacts soil and increases the amount and pattern of runoff reaching rivers and streams.

The Columbia River estuary has also been changed by human activities. Historically, the downstream half of the estuary was a dynamic environment with multiple channels, extensive wetlands, sandbars, and shallow areas. The mouth of the Columbia River was about four miles wide. Today, navigation channels have been dredged, deepened and maintained, jetties and pile-dike fields have been constructed to stabilize and concentrate flow in navigation channels, marsh and riparian habitats have been filled and diked, and causeways have been constructed across waterways. These actions have decreased the width of the mouth of the Columbia River to two miles and increased the depth of the Columbia River channel at the bar from less than 20 to more than 55 feet.

The action area includes the tributary junctions of Dry, Tumalt, and Viento Creeks with the Columbia River near RM 157,141.5, and 160.7, respectively. The environmental baseline in these areas has been further degraded by human activity. This area consists of constructed highway embankments in various states of failure along the Oregon shore. The riparian area in this reach of the Columbia River contains little cover and vegetation. The development of this area contributes to the degraded conditions of the Columbia River, including reduced water quality, increased water temperature, altered timing and quantity of runoff, and decreased riparian cover and habitat refugia.

Dry Creek.

Dry Creek is a small tributary that drains directly into the Columbia River near river mile 157. The entire stream is approximately 4.88 kilometers (km) in length and the watershed drainage area is 8.08 km^2. Most of the watershed is densely forested, dominated by mature Douglas-fir (*Pseudotsuga menziesii*) coniferous forest plant communities. The upper watershed is undeveloped, but was probably logged in the 1940s (R. Larson, U. S. Forest Service, pers. comm., 2001). A large, natural waterfall is located approximately 3.5 km upstream from the Columbia River. It is a natural, year-round fish passage barrier.

Dry Creek is not listed for any parameter on the DEQ 303(d) list. Baseline water quality is presumed to be in good condition for most of the basin, although the lower portion of the creek passes through a residential neighborhood of Cascade Locks. As such, the lower creek is impacted by an increase of stormwater runoff and pollutants, artificial channelization, and additional road crossings, which hinder the movement of fish. There are at least two culverted crossings downstream of I-84. Development in the watershed is restricted to the vicinity of I-84 and Cascade Locks.

The project area in Dry Creek is a high gradient reach with large amounts of bedload transport that occurs during large and medium sized rain and snow events. The energy from these events causes periodic debris torrents. Dry Creek has a number of alternating transport and depositional zones. In the upper watershed a transport zone exists above the waterfall. Below the waterfall, a zone of deposition occurs, followed downstream by a natural transport zone and then a large alluvial fan, where sediment and debris accumulate. The extreme channel dynamics create instability in the system. Severe bank erosion is prevalent upstream of the ODOT structures. The erosion is a natural part of this system.

Both upstream and downstream reaches of Dry Creek are shaded with a full cover of riparian trees (mainly alder (*Alnus rubra*) and cottonwood (*Populus trichocarpa*)). Within the immediate project area, Dry Creek is significantly modified. Basins #1 and #2 are man-made, excavated from the existing channel (Figure 1). The stream channel below I-84 in Basin #3 consists of a channel change that was constructed in 1951 (Dave Bryson, pers. comm. 2002). The upper basin (#1) has mature riparian trees (mainly alder) along a portion of the banks, but is devoid of vegetation closer to the culvert inlet. The center basin (#2), located between I-84 and the frontage road has scattered herbaceous plants along the banks and a few shrubs and trees on the adjacent road shoulder that provide some shade, but little to no riparian vegetation along the banks. Routine dredging further prevents accumulation of soil and vegetation growth. Basin #3 has alder trees and riparian shrubs and herbaceous plants growing along the north bank near I-84, but the outlet is completely armored with concrete blocks along the other bank. Both banks up and downstream of the project area have a narrow border of deciduous trees.

The Unites States Forest Service (USFS) (1997) conducted a habitat inventory of the first 3.5 km of Dry Creek, determining that 45% of the stream consisted of pools, 52% of riffles, and 3% of side channels. There was a low abundance of large woody material, and the inner riparian zone width was 8 m. These factors indicate that Dry Creek contains suitable habitat to support salmonids. However, the combination of natural and constructed environmental parameters greatly limit the abundance and distribution of salmonids.

A United States Geological Survey (USGS) stream gauging station existed at Dry Creek in Cascade Locks from 1951 to 1958. Peak annual discharge at Dry Creek ranges from 7 to 186 cubic feet per second (cfs) according to the data. The peak discharge modeled for a 50-year recurrence interval is 185 cfs. The median particle size (D-50) in Dry Creek ranges from 6.4 centimeters (cm) in Basin #1, to 6.9 cm in Basin #3. Both are considered small cobbles. Since the D-50 is slightly larger downstream, it could indicate that the I-84 and frontage road culverts are retaining smaller material and allowing larger material to pass downstream. However, the differences in particle size between Basins #1 and #3 are minor and probably do not indicate any particular trend.

Tumalt Creek.
Tumalt Creek is a small tributary that drains directly into the Columbia River, near river mile 140.8. The entire stream is just under approximately 3 km in length and the watershed drainage area is approximately 1.3 km^2. It is located in the portion of the Columbia River Gorge that is subject to heavy rainfall and harsh winter storms. The creek has a very steep gradient upstream of I-84 that grades to a shallow alluvial fan at the highway crossing, and continuing down to the Columbia River. The project area is within the natural depositional floodplain of the Columbia River Gorge. Tumalt Creek is an extremely dynamic system and is subject to changing channels during high water events. The creek has a history of substantially changing course. The most recent major event was in 1996 when the channel moved at least 150 feet to the west and new culverts were installed under I-84 to convey the new main channel.

Most of the watershed is dominated by mature Douglas-fir coniferous forest plant communities. The alluvial floodplains contain primarily young deciduous riparian trees and shrubs, including black cottonwood, red alder, ocean spray (*Holodiscus discolor*), and red-osier dogwood (*Cornus stolonifera*). Only the lower floodplains of the watershed have been developed, although the mountains were probably heavily logged in the past. No irrigation withdrawals are known within this system (R. Larson, U. S. Forest Service, pers. comm., 2001).

Tumalt Creek is not listed for any parameter on the DEQ 303(d) list. Baseline water quality is presumed to be in good condition. The railroad culvert is the only other culverted crossing aside from the I-84 culverts. Rural residential development occurs along both I-84 frontage roads. The main source of water pollution in Tumalt Creek is sediment caused by harsh scouring floods.

The stream flow in the lower reaches of Tumalt Creek, including the project area, is perennial. The stream channel contains primarily short riffles and small pools. A 13-foot cascade occurs below the I-84 culvert. Most of the stream flow is from surface runoff, although there may be seeps and springs higher in the canyon. Tumalt Creek would probably be classed a D3 channel using Rosgen's Stream Classification System (Rosgen 1996). The channel morphology and substrate are a function of the dynamic nature of this system. The stream has a poorly defined, braided channel, although the project reach appears to be have been channelized for the I-84 and railroad crossings. The creek channel and adjacent floodplains are extremely rocky. Within the project reach, the substrate is highly variable, ranging from fine sand to medium boulders. The average pebble size is 254 millimeter (mm) (small boulder) below the I-84 culvert, and 51 mm (very coarse gravel) below the lower culvert. The bankfull width ranges from 3 to 5 m, and the depth varies from 0 to 559 mm, with an average width-to-depth ratio of 20 in the open portions of the creek channel between the I-84 culvert and the railroad culvert.

There is almost no woody vegetation growing within the creek channel or on the immediate banks within the project area, although a few black cottonwood and alder saplings are growing on the upper creek banks below the lower culvert. Seed germination is restricted by the lack of soil development and harsh scouring floods along the channel. The upper banks upstream of the I-84 culvert and downstream of the railroad culvert have a more dense cover of young riparian vegetation.

Viento Creek.

Viento Creek is a small tributary that drains directly into the Columbia River near river mile 160.7. The watershed drainage area is approximately 6.8 km^2 and the entire stream is only about 4 km in length. Below I-84, Viento Creek forms an alluvial fan, flowing through the flat historical floodplain of the Columbia River and into a small pond, impounded by the railroad tracks and I-84. Above the highway, the terrain becomes very steep and rugged with many rock outcroppings and talus fields. Several small waterfalls are located in the upper reaches that are natural barriers to fish passage.

This terrain produces a large amount of bedload material that erodes into the stream. Upstream bank erosion and rockslides are naturally-occurring features in the Viento Creek watershed. The steep gradient in the creek above I-84 results in high velocity stream flows and bedload transport. There is a clear division between transport and deposition within the I-84 culvert. The flatter channel gradient at the I-84 culvert causes aggradation of bedload in the lower end of the culvert and in the stream below the culvert. Since the channel is not well equalized and the alluvial channel is confined, channel aggradation downstream of the culvert would continue in the future.

Alder-dominated riparian vegetation borders the banks of most of Viento Creek, providing shade and a substantial amount of forested area for wildlife. Within the vicinity of Viento State Park, the riparian habitat is disturbed by scouring floods and human activities. Viento State Park has a day-use picnic area located on the north side of I-84 adjacent to Viento Creek. It consists of landscaped lawns, scattered ornamental trees, picnic benches, and a paved parking area. There is no riparian cover along Viento Creek in this area (between the culvert outlet and approximately 46 m downstream). A few sapling deciduous trees are growing on a small island just downstream of the culvert (Figure 4), but are too small to provide an appreciable amount of shade. Oregon State Parks owns an irrigation water intake in Viento Creek directly below the I-84 culvert, although it appears to be abandoned.

A large railroad causeway blocks the small bay at the mouth of Viento Creek, creating Viento Pond. The I-84 crossing is about 335 m upstream of Viento Pond. A backwater marshy area is located near the mouth of Viento Creek. The pond is the only off-channel habitat in Viento Creek, and provides a popular site for warm-water sport fishery. This may expose smolts in Viento Creek to a high level of predation before entering the Columbia River. During summer periods, the pond and mouth of Viento Creek are probably exposed to higher water temperatures than salmon prefer. This may negatively impact productivity in this system. However, there are several areas between the I-84 culvert and the mouth of Viento Creek that provide suitable spawning habitat for salmonids.

No stream-gauging information for Viento Creek is available. The peak discharge for a 50-year recurrence interval is moderate, at 16.8 cubic meters per second. No water quality information is available for Viento Creek. It is not listed for any parameter on the DEQ 303 (d) list. Baseline water quality is presumed to be in good condition for most of the basin. Development in the watershed is restricted to the vicinity of I-84 and Viento State Park.

1.5 Analysis of Effects

1.5.1 Effects of Proposed Action

Creeks and rivers are dynamic systems that naturally alter their courses in response to many physical processes. Roadways and other structures constructed along waterways are subject to flooding and undercutting as a result of these natural changes in the stream course. Structural hardening of embankments is the traditional means of protecting these structures along waterways. The structural hardening also results in impacts to the waterway.

Impacts to waterways from installation of hardened embankments are simplification of stream channels, alteration of hydraulic processes, and prevention of natural channel adjustments (Spence *et al*. 1996). Moreover, embankment hardening may shift the erosion point either upstream or downstream of the project site, and may contribute to stream velocity acceleration. As amplified erosive forces attack different locations and landowners respond with more bank hardening, the creek eventually attains a continuous fixed alignment lacking habitat complexity (USACE 1977).

Fish habitats are enhanced by the diversity of habitats at the land-water interface and adjacent bank (USACE 1977). Streamside vegetation provides shade that reduces water temperature. Overhanging branches provide cover from predators. Insects and other invertebrates that fall from overhanging branches may be preyed upon by fish, or provide food sources for other prey organisms. Immersed vegetation, logs, and root wads provide points of attachment for aquatic prey organisms, shelter from swift currents during high flow events, retain bedload materials, and reduce flow velocity.

Although the proposed actions do not include the construction of new culvert crossings, stream simplification through channelization, or associated bank hardening, the necessity of the actions has resulted from the construction and maintenance of these structures. The chronic disturbance of the stream channels at the various dredging locations would result in repeated, short-term adverse effects to listed salmonids as described in detail below.

Sedimentation.

Potential impacts to listed salmonids from the proposed actions include both direct and indirect effects. Potential direct effects include mortality from exposure to suspended sediments (turbidity) and contaminants resulting for construction. Potential indirect effects include behavioral changes resulting from elevated turbidity level (Sigler *et al.* 1984, Berg and Northcote 1985, Whitman *et al.* 1982, Gregory 1988) during river bank habitat alterations.

Suspended sediment and turbidity influences on fish reported in the literature range from beneficial to detrimental. Elevated total suspended solids (TSS) conditions have been reported to enhance cover conditions, reduce piscivorus fish/bird predation rates, and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental effects of TSS on fish are the frequency and the duration of the exposure, not just the TSS concentration.

Behavioral avoidance of turbid waters may be one of the most important effects of suspended sediments (DeVore *et al.* 1980, Birtwell *et al.* 1984, Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (McLeay *et al.* 1984, 1987, Sigler *et al.* 1984, Lloyd 1987, Scannell 1988, Servizi and Martens 1991). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, unless the fish need to traverse these streams along migration routes (Lloyd *et al.* 1987). In addition, a potentially positive reported effect is providing refuge and cover from predation (Gregory and Levings 1988).

Fish that remain in turbid, or elevated TSS, waters experience a reduction in predation from piscivorus fish and birds (Gregory and Levings 1998). In systems with intense predation pressure, this provides a beneficial trade off (*e.g.*, enhanced survival) to the cost of potential physical effects (*e.g.*, reduced growth). Turbidity levels of about 23 Nephalometric Turbidity Units (NTU) have been found to minimize bird and fish predation risks (Gregory 1993). Exposure duration is a critical determinant of the occurrence and importance of physical or behavioral effects (Newcombe and MacDonald 1991). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such high pulse exposures. Adult and larger juvenile salmonids may be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjornn and Reiser 1991). However, research shows that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991).

Turbidity, at moderate levels, has the potential to adversely affect primary and secondary productivity, and at high levels, has the potential to injure and kill adult and juvenile fish, and may also interfere with feeding (Spence *et al.* 1996). Newly emerged salmonid fry may be vulnerable to even moderate amounts of turbidity (Bjornn and Reiser 1991). Other behavioral effects on fish, such as gill flaring and feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985). Fine, redeposited sediments also have the potential to adversely affect primary and secondary productivity (Spence *et al.* 1996), and to reduce incubation success (Bell 1991) and cover for juvenile salmonids (Bjornn and Reiser 1991). Because the potential for turbidity should be localized and brief, the probability of direct mortality is negligible.

Chemical Contamination.
As with all construction activities, accidental release of fuel, oil, and other contaminants may occur. Operation of the back-hoes, excavators, and other equipment requires the use of fuel, lubricants, etc., which, if spilled into the channel of a water body or into the adjacent riparian zone, can injure or kill aquatic organisms. Petroleum-based contaminants (such as fuel, oil, and some hydraulic fluids) contain poly-cyclic aromatic hydrocarbons (PAHs), which can be acutely toxic to salmonids at high levels of exposure and can also cause chronic lethal and acute and chronic sublethal effects to aquatic organisms (Neff 1985). Similarly, exposure to herbicides can have lethal and sublethal effects on salmonids, aquatic invertebrates, aquatic vegetation, and target and non target riparian vegetation (Spence *et al.* 1996). The proposed actions include BMPs to reduce the risk of chemical contamination.

Loss of Primary Productivity.
The proposed actions would likely result in a short-term reduction in primary productivity in the newly cleaned or dredged channel locations. As creek flow is reintroduced into these dredged locations, redistribution of aquatic vegetation and benthic invertebrates would result in a temporary reduction in availability of food for rearing juvenile salmonids.

Bedload Transport.
The objective of the proposed actions is to remove part or all of the total annual bedload migration at the Dry, Tumalt and Viento Creek crossings. Because no monitoring data exists to determine what portion of the total annual bedload is removed, ecosystem connectivity in the form of adequate bedload transport to downstream channel reaches may be compromised as a result of the culvert cleaning and dredging activities. This may result in adverse effects to formation and maintenance of habitat features such as salmonid spawning gravels. As part of the proposed actions, the COE shall ensure that bedload transport is monitored an annual basis to determine the magnitude of any effects to salmonid habitat downstream of the culvert cleaning and dredging activities.

Fish Rescue, Salvage and Relocation.
As a result of the proposed actions, cleaning and dredging activities would be isolated from flowing water, and fish would be relocated as described above in section 1.2. The COE has estimated the lethal and non-lethal take of listed salmonids likely to be captured and released, from the following ESUs: (1) CR chum salmon, (2) LCR chinook salmon, (3) LCR steelhead, and (4) MCR steelhead. Rescue, salvage, and relocation of fish and other aquatic species would

result in the potential capture and handling of up to 480 juvenile listed salmonids at all sites, annually. Assuming a 5% direct or delayed mortality rate from capture and relocation stress, up to 24 juvenile or adult salmonids may be killed at all sites, annually.

1.5.2 Effects on Critical Habitat

NOAA Fisheries designates critical habitat based on physical and biological features that are essential to the listed species. Essential features for designated critical habitat include substrate, water quality, water quantity, water temperature, food, riparian vegetation, access, water velocity, space and safe passage. Potential effects on critical habitat would occur along the lower reaches of Tumalt and Viento Creeks from and potential adverse modifications would be avoided or minimized through implementation of the proposed conservation measures as discussed above in section 1.5.1.

1.5.3 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as those effects of "future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation". Future Federal action, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities, are being (or have been) reviewed through separate section 7 consultation processes. Therefore, these actions are not considered cumulative to the proposed actions.

NOAA Fisheries is not aware of any specific future non-federal activities within the action area that would cause greater impacts to listed species than presently occurs. However, development of structures and vegetation clearing along the streams is likely to continue. NOAA Fisheries assumes that future private and state action would continue at similar intensities as in recent years.

1.6 Conclusion

NOAA Fisheries has determined, based on the available information, that the proposed action covered in this Opinion are not likely to jeopardize the continued existence of listed salmonids or adversely modify critical habitats. NOAA Fisheries used the best available scientific and commercial data to apply its jeopardy analysis, when analyzing the effects of the proposed action on the biological requirements of the species relative to the environmental baseline, together with cumulative effects. NOAA Fisheries believes that the proposed action would cause a minor, short-term degradation of anadromous salmonid habitat due to turbidity, risk of chemical contamination, loss of primary productivity caused by fill and excavation below the 2-year flood elevation. NOAA Fisheries believes that the proposed action potentially may cause long-term degradation of anadromous salmonid habitat due to reduced ecosystem connectivity associated with loss of downstream bedload transport within the creek channels. Additionally, direct mortality may occur as a result of work area isolation and fish removal efforts to reduce take.

1.7 Reinitiation of Consultation

Consultation must be reinitiated if: (1) The amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or (3) a new species is listed or critical habitat is designated that may be affected by the action (50 C.F.R. 402.16).

If the COE fails to provide specified monitoring information by the required date, NOAA Fisheries would consider that a modification of the action that causes an effect on listed species not previously considered and would cause this Opinion to expire. Consultation also must be reinitiated 5 years after the date this Opinion is signed. To reinitiate consultation, contact the Habitat Conservation Division (Oregon Habitat Branch) of NOAA Fisheries.

2. INCIDENTAL TAKE STATEMENT

Section 9 and rules promulgated under section 4(d) of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. "Harass" is defined as action that create the likelihood of injuring listed species by annoying it to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. "Incidental take" is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

2.1 Amount or Extent of the Take

NOAA Fisheries anticipates that the action covered by this Opinion are reasonably certain to result in incidental take of SR sockeye salmon, SR fall-run chinook salmon, SR spring/summer chinook salmon, UCR spring-run chinook salmon, LCR chinook salmon, CR chum salmon, SR steelhead, UCR steelhead, MCR steelhead, and LCR steelhead because of adverse effects from increased sediment levels and chemical contamination. Handling of juvenile CR chum salmon, LCR chinook salmon, LCR steelhead, or MCR steelhead during the work isolation process may result in incidental take of individuals due to the likelihood of rearing juveniles in the action area. NOAA Fisheries anticipates non-lethal incidental take of up to 480 individuals, from work area isolation and fish removal, of which, lethal take of up to 24 juvenile CR chum salmon, LCR chinook salmon, LCR steelhead, or MCR steelhead could occur as a result of the fish rescue, salvage and relocation activities covered by this Opinion at all sites, annually. The effects of the other activities on population levels are largely unquantifiable, and NOAA Fisheries does not expect them to be measurable in the long term. The extent of authorized take is limited to SR sockeye salmon, SR fall-run chinook salmon, SR spring/summer chinook salmon, UCR spring-run chinook salmon, LCR chinook salmon, CR chum salmon, SR steelhead, UCR steelhead, MCR steelhead, and LCR steelhead in Dry, Tumalt, or Viento Creeks, and is limited to that take caused by the proposed actions within the action area.

2.2 Reasonable and Prudent Measures

The measures described below are non-discretionary. They must be implemented so that they become binding conditions in order for the exemption in section 7(a)(2) to apply. The COE has the continuing duty to regulate the activities covered in this incidental take statement. If the COE fails to adhere to the terms and conditions of the incidental take statement through enforceable terms added to the document authorizing this action, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(a)(2) may lapse.

NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of the above species. The COE shall:

1. Minimize the likelihood of incidental take from activities involving culvert cleaning and dredging or that may otherwise involve in-water work or affect fish passage by directing ODOT to avoid or minimize disturbance to riparian and aquatic systems.

2. Minimize the likelihood of incidental take from in-water work activities by ensuring that in-water work activities (culvert cleaning and dredging) are isolated from flowing water when necessary.

3. Complete a comprehensive monitoring and reporting program to ensure implementation of these conservation measures are effective in minimizing the likelihood of take from permitted activities.

2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the COE must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for each category of activity.

1. To implement Reasonable and Prudent Measure #1 (culvert cleaning or dredging), the COE shall ensure that:
    a. Project design. Alteration or disturbance of the stream banks and existing riparian vegetation would be minimized.
    b. In-water work. All in-water work activities would occur during the standard in-water work timing guideline[6] of July 1 through September 30 for Dry and Viento Creeks and July 15 through August 31 for Tumalt Creek. Any extensions or alterations to the standard in-water work timing would require the approval of a NOAA Fisheries biologist (on a case-by-case basis).
    c. Pollution and erosion control plan. A pollution and erosion control plan (PECP) would be developed for the project to prevent point-source pollution related to construction operations. The PECP would contain the pertinent elements listed below and meet requirements of all applicable laws and regulations:
        i. Methods that would be used to prevent erosion and sedimentation associated with access roads, construction sites, equipment and material storage sites, fueling operations and staging areas.
        ii. A description of the hazardous products or materials that would be used, including inventory, storage, handling, and monitoring.
        iii. A spill containment and control plan with notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that would be available on site, proposed methods for disposal of spilled materials, and employee training for spill containment.
        iv. Measures that would be taken to prevent construction debris from falling into any aquatic habitat. Any material that falls into a stream during construction operations would be removed in a manner that has a minimum impact on the streambed and water quality.
    d. Pre-construction activities. Prior to significant alteration of the action area, the following action would be accomplished:
        i. Boundaries of the clearing limits associated with site access and construction are flagged to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.
        ii. A supply of erosion control materials (*e.g.*, silt fence and straw bales) is on hand to respond to sediment emergencies. Sterile straw or hay bales would be used when available to prevent introduction of weeds.
        iii. All temporary erosion controls (*e.g.*, straw bales, silt fences) are in place and appropriately installed downslope or downstream of project activities within the riparian area. Effective erosion control measures would be in

[6]Oregon Department of Fish and Wildlife, *Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, 12 pp (June 2000)(identifying work periods with the least impact on fish)(http://www.dfw.state.or.us/ODFWhtml/InfoCntrHbt/0600_inwtrguide.pdf).

place at all times during the contract, and would remain and be maintained until such time that permanent erosion control measures are effective.

e. Earthwork. Earthwork, including excavation, filling and compacting, is completed in the following manner:

   i. Material removed during excavation would only be placed in locations where it cannot enter streams or other water bodies.

   ii. All exposed or disturbed areas would be stabilized to prevent erosion.

      (1) Areas of bare soil within 150 feet of waterways, wetlands or other sensitive areas would be stabilized by native seeding,[7] mulching, and placement of erosion control blankets and mats, if applicable, quickly as reasonable after exposure, but within 7 days of exposure.

      (2) All other areas would be stabilized as quickly as reasonable, but within 14 days of exposure.

      (3) Seeding outside of the growing season would not be considered adequate for permanent stabilization.

f. Heavy Equipment. Heavy equipment use would be fueled, maintained and stored as follows:

   i. Vehicle staging, maintenance, refueling, and fuel storage areas would be a minimum of 150 feet horizontal distance from any stream.

   ii. All vehicles operated within 150 feet of any stream or water body would be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected would be repaired before the vehicle resumes operation.

   iii. When not in use, vehicles would be stored in the vehicle staging area.

g. Site restoration. Site restoration and clean-up, including protection of bare earth by seeding, planting, mulching and fertilizing, would be done in the following manner:

   i. Disturbed areas would be planted with native vegetation specific to the project vicinity or the region of the state where the project is located.

   ii. No herbicide application would occur as part of this permitted action. Mechanical removal of undesired vegetation and root nodes is permitted.

   iii. No surface application of fertilizer would be used within 50 feet of any stream channel as part of this permitted action.

2. To implement Reasonable and Prudent Measure #2 (in-water work area activities), the COE shall ensure that the in-water work activities are isolated from flowing water and fish are removed from the isolated work areas, when fish are present, as necessary to minimize take, control erosion and sediment transport within the action area.

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[7] By Executive Order 13112 (February 3, 1999), Federal agencies are not authorized to permit, fund or carry out action that are likely to cause, or promote, the introduction or spread of invasive species. Therefore, only native vegetation that is indigenous to the project vicinity, or the region of the state where the project is located, shall be used.

3. To implement Reasonable and Prudent Measure #3 (monitoring and reporting), the COE shall ensure that:

   a. Within 120 days of completing culvert cleaning or dredging activities, the COE shall ensure submittal of a monitoring report to NOAA Fisheries describing the COE's success meeting their permit conditions. This report would consist of the following information:

      i. <u>Project identification</u>.
         (1) Project name.
         (2) starting and ending dates of work completed for this project.
         (3) the COE contact person.

      ii. <u>Isolation of in-water work area</u>. All projects involving isolation of in-water work areas must include a report of any seine and release activity including:
         (1) The name and address of the supervisory fish biologist;
         (2) methods used to isolate the work area and minimize disturbances to fish species;
         (3) stream conditions prior to and following placement and removal of barriers;
         (4) the means of fish removal;
         (5) the number of fish removed by species;
         (6) the location and condition of all fish released; and
         (7) any incidence of observed injury or mortality.

      iii. <u>Pollution and erosion control</u>. A summary of all pollution and erosion control inspection reports, including descriptions of any failures experienced with erosion control measures, efforts made to correct them and a description of any accidental spills of hazardous materials.

      iv. <u>Site restoration</u>. Documentation of the finished grade slopes and elevations of any dredged areas.

      v. A narrative assessment of the effects of the project.

      vi. Photographic documentation of environmental conditions at the project site before, during and after project completion.
         (1) Photographs would include general project location views and close-ups showing details of the project area and project, including pre- and post-construction.
         (2) Each photograph would be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
         (3) Relevant environmental conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

   b. On an annual basis, the COE shall ensure submittal of a monitoring report to NOAA Fisheries describing the long-term effects of the proposed action on bedload transport and habitat features downstream of the culvert cleaning and dredging areas but within the action area along the Dry and Viento Creek channels. This report would consist of the following information:

i. Project identification.
   (1) Project name.
   (2) starting and ending dates of work completed for this project.
   (3) the COE contact person.

ii. Monitoring information. For each location monitored.
   (1) The permanently identified location of not less than three channel crossections downstream of the culvert cleaning or dredging areas but within the action area for each creek.
   (2) The cross-sectional contour and elevations of the active channel including any thalweg or side channels.
   (3) An analysis of active channel bedload composition including a pebble count or other comparable methodology.
   (4) A narrative assessment of the habitat quantity and quality including a reference to changes in substrate composition.

iii. Photographic documentation of environmental conditions at the monitoring locations.
   (1) Photographs would include general monitoring location views and close-ups showing details of the areas monitored, including bedload composition and channel morphology.
   (2) Each photograph would be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
   (3) Relevant environmental conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the monitoring location.

c. Submit monitoring reports to:

NOAA Fisheries
Oregon Habitat Branch, Habitat Conservation Division
Attn: 2002/00480
525 NE Oregon Street, Suite 500
Portland, OR 97232-2778

d. If a dead, injured, or sick endangered or threatened species specimen is located, initial notification must be made to the NOAA Fisheries Law Enforcement Office, located at Vancouver Field Office, 600 Maritime, Suite 130, Vancouver, Washington 98661; phone: 360/418-4246. Care would be taken in handling sick or injured specimens to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered and threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by

Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

3. MAGNUSON-STEVENS ACT

3.1 Background

The objective of the essential fish habitat (EFH) consultation is to determine whether the proposed action may adversely affect designated EFH for relevant species, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the proposed action.

3.2 Magnuson-Stevens Fishery Conservation and Management Act

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH.

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of essential fish habitat: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50CFR600.110).

Section 305(b) of the MSA (16 U.S.C. 1855(b)) requires that:

- Federal agencies must consult with NOAA Fisheries on all action, or proposed action, authorized, funded, or undertaken by the agency, that may adversely affect EFH.
- NOAA Fisheries shall provide conservation recommendations for any Federal or state activity that may adversely affect EFH.
- Federal agencies shall within 30 days after receiving conservation recommendations from NOAA Fisheries provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall explain its reasons for not following the recommendations.

The MSA requires consultation for all action that may adversely affect EFH, and does not distinguish between action within EFH and action outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account action that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies undertaking, permitting or funding activity that may adversely affect EFH, regardless of its location.

3.3 Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Pacific salmon: Chinook (*Oncorhynchus tshawytscha*); coho (*O. kisutch*); and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the *Pacific Coast Salmon Plan* (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based on this information.

3.4 Proposed Action

The proposed action is detailed above in section 1.2 of this document. For the purposes of this consultation, the action area is defined as the streambed, streambank and riparian corridor of Dry, Tumalt and Viento Creeks extending to the upstream project disturbance limits and downstream to the Columbia River. Other areas of the Columbia River watershed would not be directly affected. This area has been designated as EFH for various life stages of chinook salmon and coho salmon.

3.5 Effects of Proposed Action

As described in detail in section 1.5 of this document, the proposed activities may result in short-term, temporary adverse effects to water quality and habitat (sediment, risk of chemical contamination, and loss of primary productivity). NOAA Fisheries believes that the proposed action may also cause long-term degradation of anadromous salmonid habitat due to reduced ecosystem connectivity associated with loss of downstream bedload transport within the creek channels.

3.6 Conclusion

The proposed action will adversely affect the EFH for chinook and coho salmon.

3.7 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the Magnuson-Stevens Act, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. The conservation measures proposed for the project by the COE, all of the reasonable and prudent measures and the terms and conditions contained in sections 2.2 and 2.3 are applicable to salmon EFH. Therefore, NOAA Fisheries incorporates each of those measures here as EFH recommendations.

3.8 Statutory Response Requirement

Please note that the Magnuson-Stevens Act (section 305(b)) and 50 CFR 600.920(j) requires the Federal agency to provide a written response to NOAA Fisheries after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset the adverse impacts of the activity on EFH. If the response is inconsistent with a conservation recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

3.9 Supplemental Consultation

The COE must reinitiate EFH consultation with NOAA Fisheries if either action is substantially revised or new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920).

4. LITERATURE CITED

Bell, M.C. 1991. Fisheries handbook of Engineering requirements and biological criteria. Fish Passage Development and Evaluation Program. U.S. Army Corps of Engineers. North Pacific Division.

Berg, L. and T.G. Northcote. 1985. Changes In Territorial, Gill-Flaring, and Feeding Behavior in Juvenile Coho Salmon (Oncorhynchus kisutch) Following Short-Term Pulses of Suspended Sediment. Canadian Journal of Fisheries and Aquatic Sciences 42: 1410-1417.

Birtwell, I. K., G. F. Hartman, B. Anderson, D. J. McLeay, and J. G. Malick. 1984. A Brief Investigation of Arctic Grayling (Thymallus arcticus) and Aquatic Invertebrates in the Minto Creek Drainage, Mayo, Yukon Territory: An Area Subjected to Placer Mining. Canadian Technical Report of Fisheries and Aquatic Sciences 1287.

Bisson, P.A., G.H. Reeves, R.E. Bilby, and R.J. Naimon. 1997. Watershed management and Pacific salmon: Desired future conditions. Pages 447-474 *in* D.J. Stouder, P.A. Bisson, and R.J. Naiman, eds. Pacific salmon and their ecosystems: Status and future options. Chapman & Hall, New York, New York, USA.

Bjornn, T.C., and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. Pages 83-138 *in* W.R. Meehan, ed. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19:83-138.

Bryson, D. 2002. Personal communication between Melinda Trask, ODOT Biologist and Dave Bryson, ODOT Hydraulic Engineer. Oregon Department of Transportation, Technical Services, Salem, Oregon. Various conversations in 2000, 2001, 2002.

Dawley, E. M., R. D. Ledgerwood, T. H. Blahm, C. W. Sims, J. T. Durkin, R. A. Kirn, A. E. Rankis, G. E. Moran, and F. J. Ossiander. 1986. Migrational characteristics, biological observations, and relative survival of juvenile salmonids entering the Columbia River estuary, 1966-1983. Final Report of National Marine Fisheries Service, Northwest Fisheries Science Center, Seattle, Washington, to Bonneville Power Administration, Portland, Oregon.

DeHart, M. 2001. Fish Passage Center of the Columbia Basin Fish & Wildlife Authority 2000 Annual Report (Draft). March. 108 pp. plus Appendices.

DeVore, P. W., L. T. Brooke, and W. A. Swenson. 1980. “The Effects of Red Clay Turbidity and Sedimentation on Aquatic Life In the Nemadji River System. Impact of Nonpoint Pollution Control on Western Lake Superior.” S. C. Andrews, R. G. Christensen, and C.

D. Wilson. Washington, D.C., U.S. Environmental Protection Agency. EPA Report 905/9-79-002-B.

Gregory, R. S., and C. D. Levings. 1998. "Turbidity Reduces Predation on Migrating Juvenile Pacific Salmon." Transactions of the American Fisheries Society 127: 275-285.

Gregory, R.S. 1993. Effect of turbidity on the predator avoidance behavior of juvenile chinook salmon (Oncorhynchus tshawytcha). Canadian J. Fish. Aquatic Sciences 50:241-246.

Gregory, R. S. 1988. Effects of Turbidity on benthic foraging and predation risk in juvenile chinook salmon. Pages 64-73 *In:* C. A. Simenstad (ed.) Effects of dredging on anadromous Pacific coast fishes. Washington Sea Grant Program. Washington State University. Seattle, Washington.

ISG (Independent Scientific Group). 2000. Restoration of Salmonid Fishes in the Columbia River Ecosystem. Document NWPPC 2000-12. Northwest Power Planning Council, Portland, Oregon.

Junk W., P.B. Bayley and R.E. Sparks, 1989. The flood pulse concept in river-floodplain systems. Proceeding of the International Large River Symposium (LARS). Canadian Special Publications in Fisheries and Aquatic Sciences 106:110-127.

Larson, R. 2001. Personal comunication between Melinda Trask, ODOT Biologisty and Richard Larson, USFS Biologist. United States Forest Service, Columbia Gorge National Scenic Area. February 2001.

Leopold, Luna B. 1970. Fluvial Processes in Geomorphology. New York: McGraw Hill.

Lloyd, D. S. 1987. Turbidity as a Water Quality Standard for Salmonid Habitats in Alaska. North American Journal of Fisheries Management 7:34-45.

Lloyd, D. S., J. P. Koenings, and J. D. LaPerriere. 1987. "Effects of Turbidity in Fresh Waters of Alaska." North American Journal of Fisheries Management 7: 18-33.

McLeay, D. J., G. L. Ennis, I. K. Birtwell, and G. F. Hartman. 1984. "Effects On Arctic Grayling (Thymallus arcticus) of Prolonged Exposure to Yukon Placer Mining Sediment: A Laboratory Study." Canadian Technical Report of Fisheries and Aquatic Sciences 1241.

McLeay, D. J., I. K. Birtwell, G. F. Hartman, and G. L. Ennis. 1987. "Responses of Arctic Grayling (Thymallus arcticus) To Acute and Prolonged Exposure to Yukon Placer Mining Sediment." Canadian Journal of Fisheries and Aquatic Sciences 44: 658-673.

Neff, J.M. 1985. Polycyclic aromatic hydrocarbons. *In*: Fundamentals of aquatic toxicology, G.M. Rand and S.R. Petrocelli, pp. 416-454. Hemisphere Publishing, Washington, D.C.

Newcombe, C. P., and D. D. MacDonald. 1991. "Effects of Suspended Sediments on Aquatic Ecosystems." North American Journal of Fisheries Management 11: 72-82.

NMFS (National Marine Fisheries Service). 1996. Making Endangered Species Act determinations of effect for individual and grouped actions at the watershed scale. Habitat Conservation Program, Portland, Oregon, 32 p.

NMFS (National Marine Fisheries Service). 2000. Biological Opinion: Reinitiation of Consultation on Operation of the Federal Columbia River Power System, Including the Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin. Web site: http://www.nwr.noaa.gov/1hydrop/hydroweb/docs/Final/2000Biop.html. December 21, 2000.

NMFS (National Marine Fisheries Service). 2001. Biological Opinion for the City of Boardman Well No. 2 Project, Columbia River, RM 268.0, Morrow County Oregon. Portland: OSB2001-0153-FEC, August 10, 2001. North American Journal of Fisheries Management 19: 198-202.

NRC (National Research Council). 1996. Upstream: Salmon and Society in the Paacific Northwest. Washington D.C., National Academy Press, 452 p.

PFMC (Pacific Fishery Management Council). 1999. Amendment 14 to the Pacific Coast Salmon Plan. Appendix A: Description and Identification of Essential Fish Habitat, Adverse Impacts and Recommended Conservation Measures for Salmon. Portland, Oregon.

Poff, N.L., and J.V. Ward. 1990. Physical habitat template of lotic systems: recovery in the context of historical pattern of spatio-temporal heterogeneity. Environmental Management 14: 629-645.

Poff, N. L., et al., 1997. The Natural Flow Regime. Bioscience Vol. 47 No. 11.

Powers, P.D. and J.F. Orsborn. 1985. An investigation of the physical and biological conditions affecting fish passage success at culverts and waterfalls. Part IV: Analysis of barriers to upstream fish migration – Final Report. Prepared by Albrook Hydraulics

Redding, J. M., C. B. Schreck, and F. H. Everest. 1987. "Physiological Effects on Coho Salmon and Steelhead of Exposure to Suspended Solids." Transactions of the American Fisheries Society 116: 737-744.

Reiser, D.W., T.A. Wesche, and C. Estes. 1989. Status of instream flow legislation and practices in North America. Fisheries 14(2): 22-29.

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, Colorado.

Scannell, P.O. 1988. Effects of Elevated Sediment Levels from Placer Mining on Survival and Behavior of Immature Arctic Grayling. Alaska Cooperative Fishery Unit, University of Alaska. Unit Contribution 27.

Servizi, J. A., and Martens, D. W. 1991. "Effects of Temperature, Season, and Fish Size on Acute Lethality of Suspended Sediments to Coho Salmon". Canadian Journal of Fisheries and Aquatic Sciences 49:1389-1395.

Sparks, R.E. 1992. Risks of altering the hydrologic regime of large rivers. Pages 119-152 in J.V. Ward and J.A. Stanford, eds. The ecology of regulated streams. Plenum Press, New York., N.Y.

Sigler, J. W., T. C. Bjornn, and F. H. Everest. 1984. "Effects of Chronic Turbidity on Density and Growth of Steelheads and Coho Salmon." Transactions of the American Fisheries Society 113: 142-150. 1984.

Spence, B. C., G. A. Lomnicky, R. M. Hughes, and R. P. Novitzki. 1996. An ecosystem approach to salmonid conservation. ManTech Environmental Research Services, Inc., Corvallis, Oregon, to National Marine Fisheries Service, Habitat Conservation Division, Portland, Oregon (Project TR-4501-96-6057).

USACE (United States Army Corps of Engineers). 1977. Nehalem Wetlands Review: A Comprehensive Assessment of the Nehalem Bay and River (Oregon). U.S. Army Engineer District, Portland, Oregon. [Page count unknown].

Whitman, R.P., T.P. Quinn and E.L. Brannon. 1982. Influence of suspended volcanic ash on homing behavior of adult chinook salmon. Trans. Am. Fish. Soc. 113:142-150.