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

December 28, 2001

Stanley Speaks
Northwest Regional Director
Attention: Dave Renwald
U.S. Department of the Interior
Bureau of Indian Affairs
911 NE 11th Avenue
Portland, Oregon 97232-4169

Thomas F. Mueller
Chief, Regulatory Branch
Attention: Kristina G. Tong
Seattle District, Corps of Engineers
P.O. Box 3755
Seattle, Washington 98124-3755

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Act Essential Fish Habitat Consultation on the 324-Acre Land Transfer and Proposed Land Uses Along the White River, Washington (WSB-99-156; Corps # 1997-4-01098-ATF)

Dear Mr. Speaks and Mr. Mueller,

Attached is the National Marine Fisheries Service's (NMFS) Biological Opinion (Opinion) on the White River Land Transfer and proposed land uses, including issuance of the 404 Clean Water Act authorization. This Opinion was prepared in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16U.S.C. 1531 *et seq.*) and the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996. NMFS concludes in this Opinion that implementation of the proposed action is not likely to jeopardize the continued existence of Puget Sound chinook salmon or result in the destruction or adverse modification of their critical habitat. Please note that the incidental take statement (*Section II-G* of the Opinion) includes nondiscretionary reasonable and prudent measures and terms and conditions designed to minimize take of Puget Sound chinook salmon.

The Bureau of Indian Affairs (BIA) initiated formal consultation with NMFS on June 14, 2000, after having determined that the proposed action is likely to adversely affect the Puget Sound chinook salmon *(Oncorhynchus tshawytscha)* Evolutionarily Significant Unit. Previously (June

20, 2000), the U.S. Army Corps of Engineers (Corps) had initiated informal consultation on the issuance of the 404 permit. Subsequent to the BIA decision to proceed with formal consultation,

the BIA and the Corps determined that the BIA would be the lead Federal agency for the consultation. This Opinion reflects the results of formal ESA consultation and contains an analysis of the effects of the proposed action on threatened Puget Sound chinook salmon in the White River, Washington. This Opinion is based on information provided in the biological assessment sent to NMFS by the BIA and the Corps, and additional information contained in the Environmental Impact Statement for the project, and a number of other supporting documents, emails and meetings.

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 its implementing regulations at 50 CFR Part 600.

A complete administrative record of this consultation is on file at the Washington State Habitat Branch Office. Questions regarding this consultation should be directed to Ann Garrett of my staff at (206) 526-6146 .

Sincerely,

D. Robert Lohn
Regional Administrator

Enclosure

ENDANGERED SPECIES ACT – SECTION 7

BIOLOGICAL OPINION

and

MAGNUSON- STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT CONSULTATION

Muckleshoot Indian Tribe
Land Transfer and Proposed Land Uses Along the White River
Muckleshoot Indian Reservation, Washington
WSB-99-156

Agency: U. S. Department of the Interior, Bureau of Indian Affairs

Consultation Conducted By: National Marine Fisheries Service
Northwest Region
Washington Habitat Branch

Issued By: [signature] Date 1/2/02
D. Robert Lohn
Regional Administrator

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I. INTRODUCTION

The U.S. Department of the Interior, Bureau of Indian Affairs (BIA), Portland, Oregon proposes to authorize the transfer of 324 acres of Tribal fee title lands into Federal trust status. The land proposed for transfer is on the Muckleshoot Indian Reservation in King and Pierce County, Washington, and is within the White River basin. The BIA, as the lead agency for the proposed action, would authorize the transfer for the benefit of the Muckleshoot Indian Tribe (Tribe). The U.S. Army Corps of Engineers (Corps) is a cooperating agency and proposes to issue a permit under section 404 of the Clean Water Act.

This document presents the National Marine Fisheries Service's (NMFS) biological opinion (Opinion) on the effects of both Federal actions, the issuance of the permit under the Clean Water Act, and the authorization of the proposed land transfer and the associated land uses, on threatened Puget Sound chinook salmon (*Oncorhynchus tshawytscha*) and is in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). This document also serves as consultation on Essential Fish Habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations at 50 CFR Part 600.

A. Background and Consultation History

The Tribe began construction on the White River Amphitheatre (Amphitheatre) in May of 1997. After the U.S. District Court ordered BIA to prepare an Environmental Impact Statement (EIS) for the project, the Tribe voluntarily halted construction in July of 1998. A little more than a year later NMFS listed Puget Sound chinook salmon as threatened on March 24, 1999.

Shortly thereafter (June 7, 1999), NMFS received a biological assessment (BA) and written request from BIA to initiate informal consultation on the White River Amphitheatre. The BIA determined that the project was "not likely to adversely affect" Puget Sound chinook salmon. On August 6, 1999, NMFS responded to BIA with a request for additional information on stormwater treatment and detention, wetland impacts, bluff stability, and other activities occurring within 300 feet of the river. On October 13, 1999, NMFS received a copy of the two-volume draft EIS (DEIS) for the Amphitheatre project and on October 27, 1999, an amended BA was received by NMFS.

With the consent of the BIA, representatives of the Tribe contacted NMFS and began a series of meetings and conversations regarding the potential effects of the Amphitheatre on listed chinook salmon and EFH, and set about ways to reduce those effects. Informal consultation continued with the development and exchange of project details and included site visits.

During this consultation, members of Citizens for Safety and Environment (CSE) occasionally provided NMFS with information that is reflected in this Opinion. For instance, NMFS received a video copy of CSE's response to the White River Amphitheatre DEIS, which contained footage of the 1997 landslide that occurred along Pussyfoot Creek (CSE 1999). Additional comments and documents were submitted by CSE for NMFS's consideration, including survey data from 1874.

On January 20, 2000, NMFS received a BA and written request from Corps to initiate informal consultation on the issuance of the Clean Water Act permits for the Amphitheatre. Subsequently, the BIA and Corps determined that the BIA would be the lead Federal agency for the consultation. The Corps action is considered within this Opinion as a subset of the larger proposed action by the BIA. The Corps will condition their 404 permit authorization to require compliance with all of the mandatory terms and conditions associated with NMFS' Opinion (T. Tong, Corps, pers.comm., 2001).

On February 28, 2000, BIA notified NMFS that the stormwater plan for the Amphitheatre project had been revised (D. Renwald, pers. comm., 2000). On March 7, 2000, NMFS requested the revised stormwater information and copies of two other supporting documents. A meeting was held between the Tribe's consultants and NMFS on April 26, 2000 to discuss the effects of the project on threatened chinook salmon further. On May 5 the Tribe gave NMFS additional details on the stormwater management system. An amended BA was subsequently submitted to NMFS on May 17, 2000, during an onsite visit of the project site by NMFS personnel. On June 12, NMFS informed the BIA that it could not concur on a "may affect, not likely to adversely affect" determination as the project, according to information in the BA, would have an adverse effect on two indicators of functional chinook habitat: Large woody debris (riparian reserves) and peak/base flows. On June 14, 2000, the BIA requested formal consultation on the White River Amphitheatre.

During the course of this consultation, it became evident that the Federal action was the authorization of the land transfer, rather than simply the construction and operation of the Amphitheatre. The consultation package was subsequently revised to reflect the Federal action and the indirect effects of this action (the proposed land uses). On August 31, 2000, the Tribe provided NMFS with a copy of the five-volume preliminary final EIS (PFEIS) to use in the deliberative process. By late fall 2000, NMFS determined that a complete consultation package had been submitted for the project.

Later, the Tribe provided additional information on the project to help NMFS determine the likelihood that the effects of the project would result in reductions in reproduction, numbers, or distribution of chinook salmon. This included performing more detailed analyses of the effects of the project on groundwater extraction and impervious surface (base flows), and modifying portions of the proposed land uses to reduce the risk that the project would degrade functional indicators of chinook habitat. The Tribe and NMFS agreed to postpone completion of the Opinion until these studies and design modifications were complete. The Tribe completed the additional studies on October 23, 2001 (Massman 2001a), and subsequently submitted additional information on November 1, 2001 (D. Every, pers. comm., 2001). This Opinion reflects those design changes and additional mitigation measures.

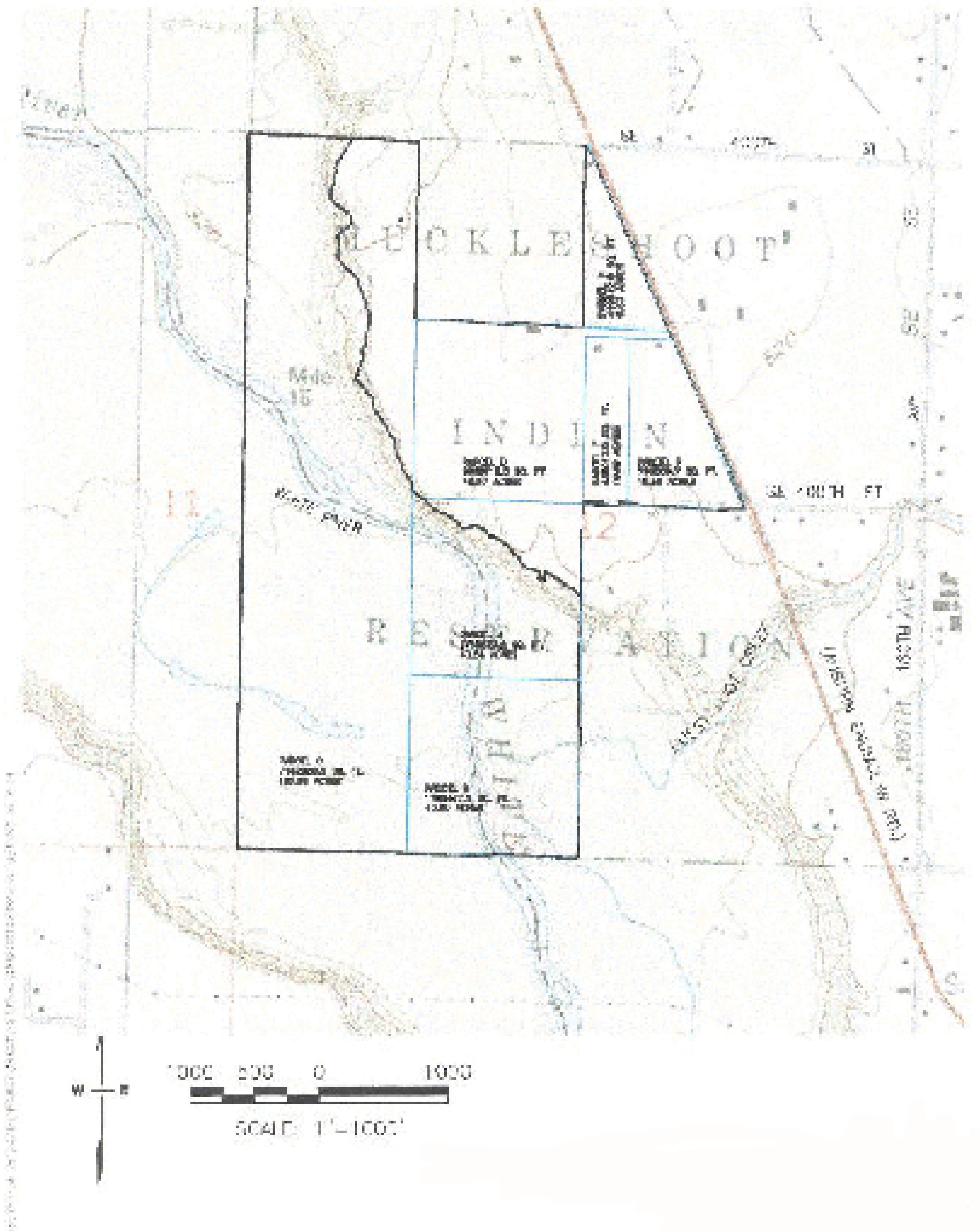

Figure 3. Land to be transferred (323.8 acres) into Trust status.

This Opinion is based on the following information: the BA (received June 7, 1999; amended October 27, 1999, and May 17, 2000); the PFEIS (received August 31, 2000); additional reports and project modifications (received September 7 and 27, 2001, and October 23, 2001); and site visits by NMFS personnel on May 17, August 22, and October 6, 2000; comments received regarding the DEIS; and supplemental information provided in meetings, and by telephone and email. A complete administrative record of this consultation is on file in the Washington State Branch of the Habitat Conservation Division of NMFS, located in Lacey, Washington.

B. Description of the Proposed Action

The proposed Federal action is the transfer of 324 acres of Tribal fee title lands into Federal trust status. A concurrent proposed Federal action is the issuance of a permit under section 404 of the Clean Water Act. The effects of the Corps' action is described in this Opinion as a subset of the larger action, the land transfer and its associated land uses. Land uses proposed for the transfer lands include the development and operation of a performing arts center (Amphitheatre) on 98 acres, a drug, alcohol, and mental health counseling center (counseling center) on 9 acres, and preserving a large portion (217 acres) of the land in fish and wildlife habitat (ts current use) for cultural and subsistence purposes. In this Opinion information on the Amphitheatre is taken from the PFEIS (BIA and WSDOT 2000), the BA, and numerous emails, unless otherwise noted. Information on the drug and alcohol counseling center and fish and wildlife lands was obtained through correspondence (emails and letters).

The land proposed for transfer into trust status is located west of State Route (SR) 164, approximately midway between Auburn and Enumclaw (Township 20 North, Range 5 East, Sections 12) in King and Pierce County, Washington (Figure 1). This acreage is within the Puyallup River Watershed Resource Inventory Area (WRIA) 10, and includes the 42,131-acre Lowland-White Watershed Administrative Unit (WAU). There are four principal topographic features of the 324 acres of transfer lands: 1) the Enumclaw Plateau, above the White River Valley; 2) the bluffs separating the plateau and flood plain portions; 3) the vegetated flood plain, braided channels, and adjacent valley of the White River, together with its creek tributaries; and 4) a terrace adjacent to the bluffs on the north end of the transfer lands, about 20 feet higher in elevation than the flood plain (see Figure 2-1 in the PFEIS).

The Amphitheatre project was partially constructed when section 7 consultation was initiated by BIA. This pre-consultation work, and the existing facilities, are described in detail in the *Environmental Baseline* section of this Opinion because NMFS expects that doing so will bring clarity to the reader as to what exists on the site, and because the short-term construction effects of these activities are past. Nevertheless, because these facilities are also part of the proposed project, are essential to its operation, and several (e.g. stormwater facilities, total impervious surface) have the potential to affect chinook salmon and their habitat through regular operation, they are also discussed in the *Effects of the Proposed Action* section of this Opinion.

Appendix O of the PFEIS describes the major ground disturbing activities that occurred before consultation was initiated. Approximately 90 acres of the site were disked and ripped when construction began in May 1997. Of this, about 45 acres sustained major disturbance, such that natural vegetation would not grow back without planting and soil amendments, and runoff/infiltration characteristics were significantly altered (D. Every, URS, pers. comm., 2001). Wetland vegetation and hydrological characteristics were altered, and vegetation was removed from the bluff (Dames and Moore[1] 2000). This pre-consultation work exposed soil that was later planted with a mixture of grass seed. Construction was voluntarily halted in July of 1998, after the U.S. District Court ordered BIA to prepare an EIS for the project. Subsequently, Puget Sound chinook salmon were listed as threatened on March 24, 1999, instigating the need for consultation under ESA. By that time, several key features of the Amphitheatre complex were partially completed, including detention basin 2, the perimeter ditches, the Amphitheatre bowl, the fixed seating area, roof and part of the berm, the plaza area, a 1.38 acres construction parking and work area, and about a mile of temporary roads, which varied from graded dirt to graveled, and the swales were enlarged.

Elements of the proposed action yet to be completed include: the Amphitheatre earthen lawn-seating berm; parking lots and roads; buildings; landscaping; wetland filling, restoration, enhancement, and creation; wastewater facilities; and the stormwater facilities. Final construction of the Amphitheatre berm and parking areas will require regrading and moving approximately 250,000 cubic yards of soil, including existing on-site stockpiles and surfaces. An underground storage tank and a house will be removed from the Amphitheatre site and the counseling center building and will be built on the adjacent parcel. Construction activities are expected to take about 7 months and be completed in the year 2002, subject to obtaining all necessary permits. Below is a summary of the land uses changes that would occur under the proposed action. Additional project details are found in Appendix A.

<u>1. Impervious Surfaces and Stormwater Management</u>

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[1]During the course of this consultation the consulting firm for the Amphitheatre project changed names from Dames and Moore to URS Corporation. References are attributed to each company according to the time of communication. Similarly, BGP was subsequently purchased by SFX, which was purchased by Clearchannel Worldwide in 2000. Correspondence and other communications in this document are attributed to Clearchannel Worldwide (Clearchannel).

Construction of the Amphitheatre, counseling center, access roads, and other roadway improvements will create about 71 acres of new impervious surface in the White River basin. The majority of impervious surface will be on the Amphitheatre site situated near the confluence of the White River and Pussyfoot Creek. New impervious surface includes four parking lots on the Amphitheatre site (totaling 37 acres with parking for about 7,000 cars) and one parking lot on the counseling center site (for about 20 cars), highway turn lanes, a stacking lane, and access roads.

Stormwater runoff will be detained and treated through the use of perimeter ditches, bioswales, oil/water separators and seven detention basins (see Figure 4.3-1 in the PFEIS). Stormwater from these facilities will discharge into wetlands, and into Pussyfoot Creek and the White River. The capacity of these systems is designed to meet the quantity and quality standards of the 1998 revisions to the King County Surface Water Design Manual (SWDM) (King County 1998). Flow control facilities will meet the performance standards for Level 2 flow control, which will match pre-development discharge durations for 50 percent of the 2-year peak flow, up to the full 50-year peak flow. The two basins associated with the highway improvements will also meet the performance standards for Level 2 flow control.

Basin 2, the largest stormwater basin, was constructed in 1997, in the southwest portion of the site less than 100 feet from the edge of an unstable bluff above the White River and Pussyfoot Creek. This basin will be modified to meet current stormwater standards for King County, which will increase the capacity of the structure. Basin 2 will also be reconfigured so that it has a double-liner and sump system to detect potential leaks, and so that it sits 170 feet from the bluff edge. Basins 2 and 4 will convey stormwater down slope through high-density polyethylene (HDPE) pipelines (one primary and one secondary) to energy-dissipation structures (gabions) situated upslope of Pussyfoot Creek and the White River, respectively (Dames and Moore 2000). Basin 2 will also have a tertiary pipe to insure that severe storms and full basin conditions will not overtop the structure or saturate the unstable bluff.

Additional details on the proposed stormwater management facilities including several monitoring and conservation measures proposed by the Tribe to detect and track the potential effects of stormwater management on bluff stability and fish habitat are described in detail in Appendix A. Monitoring will focus on the long-term integrity and function of the basin liners, pipes and berm, water quality, and physical habitat in Pussyfoot Creek. Responses would be adaptive, and in accordance with the information gathered during monitoring.

2. Changes in wetlands and vegetated areas

About 250 acres of the transfer lands will remain vegetated, the majority of which will stay in its existing condition. Construction of the counseling center and Amphitheatre will require the removal of upland vegetation, primarily grasses, to accommodate the proposed facilities. No riparian vegetation will be removed to complete the project, although some trees were removed from the Amphitheatre site during preconsultation activities. Wetland creation and restoration will occur on about 3 acres of the Amphitheatre site, and about one acre will be created on the terrace at the north end of the transfer lands. About 12 acres of the Amphitheatre site will be landscaped including about 1.9 acres of vegetation planted along the bluff.

Wetland restoration will be done to replace functions lost during initial construction activities in 1997 when six wetlands and six swales, totaling 3.7 acres, were disked, cleared, and excavated on the Amphitheatre site. The project proposes to permanently fill 0.31 acres of wetlands, which will be mitigated for in accordance with Section 404 of the Clean Water Act through the creation of 1.58 acres of new wetlands. A wetland of 1.1 acres will be created north of the Amphitheatre project and 0.57 acres will be created on site.

3. Waste Handling, Treatment and Transport

Initial operation of the Amphitheatre will rely on a temporary wastewater storage and disposal plan, while a permanent means of managing wastes at the facility is pursued. Similarly, the counseling center would eventually connect to the existing sewer system; however, a septic system is proposed in the interim. Both interim plans are considered in this Opinion as those most reasonably certain to occur.

Conventional facilities, including flush water closets and urinals, lavatories and commercial sinks, and institutional-type dishwashers and disposal units will be used in the Amphitheatre system. Event generated sewage and wastewater would be temporarily stored on site in six above-ground storage tanks located at the intersection of SE 404th Street and the Amphitheatre's north access road. The design capacity for the Amphitheatre's sewage collection systems and an onsite pump station was based on an estimated flow of 138,000 gallons per day and an average flow rate of 300 gallons per minute (0.67 cubic feet per second (cfs)). A capacity event will likely generate up to 140,000 gallons of sewage per day. On-site storage tanks will provide approximately 126,000 gallons of wastewater storage capacity, which is expected to provide adequate storage capacity for typical events. To maintain sufficient storage capacity, the tanks would be emptied during a capacity event, daily during multi-day events, and less frequently during single day events. Large-capacity sewage tank trucks (4,000 to 6,000 gallon tankers) would be used to haul wastes from the Amphitheatre site to an offsite disposal point in King County's regional sewer system.

The storage tanks will be installed on a paved pad surrounded by a containment curb that will drain to a sump, which can collect spills and be readily cleaned. This emergency containment system can hold more than 32,000 gallons, which represents more than 25 percent of the total capacity of the tanks and more than the capacity of one tank. A sump within the structure will facilitate pumping any spillage to a cleanup truck or back to a Baker tank. Several best management practices, including the use of secured and released cam-lock connections, vacuums, and spill response measures are included with the proposed project and should reduce the risk of spills reaching waterways. These are described in detail in Appendix A.

The counseling center septic system will be designed to meet King County standards (D. Every, pers. comm., 2001). The septic system will be located about 250 feet upslope of the meadow, about 900 feet from the White River, and about 600 feet from Jones Creek. The system will be designed using pressure distribution, and having a calculated flow of 1,050 gallons per day.

4. Water Supply

The Tribe is relying on groundwater to provide water to the Amphitheatre and counseling center. Water withdrawal to meet the needs of these facilities is considered as part of the proposed action. Water for the Amphitheatre would be supplied by a combination of two wells and the counseling center would be supplied with water from a new, dedicated well (D. Every, pers. comm. 2001). The two wells that serve the Amphitheatre are connected to the water distribution system that serves development in sections 1, 2, and 12. Although one well was constructed during the course of this consultation, NMFS believes that the wells have independent utility from the Amphitheatre project and are necessary to meet the Tribe's needs. While the current system could meet the water demand at the counseling center, the necessary connections are not in place. The Tribe is proposing to open the counseling center using a temporary well, as a permanent connection to the existing water distribution system is pursued. For the purposes of this consultation, the interim system is the only water supply considered reasonably certain to occur. Unlike the wells that supply the Amphitheatre, the construction of the counseling center well is considered part of the proposed action.

Water for the Amphitheatre will be pumped from the Tribal water system and stored in a 915,000 gallon reservoir located near the Tribal Administration Center. These two wells draw from the aquifer that is hydraulically connected with the White River. Water demand for the Amphitheatre is estimated at 138,000 gallons per day based upon a peak attendance event (RW

Beck 1998). Only five to six peak events are anticipated per year, with average events requiring proportionately less water. Water demand for the counseling center facilities is estimated at 1,300 to 1,630 gallons per day based upon a staff of 15 and up to about 50 more people using the facilities each day (D. Every, pers. comm., 2001). The proposed well for the counseling center facilities will be located in a shallow aquifer (D. Every, pers. comm. 2001).

5. Access/Trespass Issues

No camping will be allowed at the Amphitheatre site except for the annual powwow, during which camping will occur on the parking lots. Amphitheatre event attendees will be prevented from accessing the White River from the site by onsite fencing and security. The Tribal Fisheries Department already monitors for poaching and other illegal activities, and that monitoring will continue during Amphitheatre events. Signs prohibiting unauthorized camping and parking, and illegal harvest and other forms of take will be posted on the land being transferred into trust (D. Every, pers. comm., 2000).

II. ENDANGERED SPECIES ACT

The ESA (16 USC 1531-1544), amended in 1988, establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with NMFS and U.S. Fish and Wildlife Service (FWS) to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy their designated critical habitats. This document is a product of an interagency consultation pursuant to Section 7(a)(2) of the ESA and its implementing regulations found at 50 C.F.R. Part 402, and presents NMFS' Opinion on whether the land transfer and associated land uses are likely to jeopardize the continued existence of Puget Sound chinook salmon, or destroy or adversely modify designated critical habitat.

The geographic extent of all direct and indirect effects of a proposed agency action define the action area for the proposed action [50 C.F.R. 402.02 and 402.14(h)(2)]. In accordance with the implementing regulations, NMFS, BIA, and the Tribe have defined the action area for the proposed land transfer and associated land uses to include: the Muckleshoot Reservation; the White River and its floodplain from river mile (RM) 15.5 downstream to about RM 13 (where effects from groundwater withdrawal will attenuate to background levels); the lower ½ mile of Second Creek (RM 15.5); the Pussyfoot Creek from SR-164 downstream to its confluence with the White River (RM 15.4); Jones Creek from SR-164 downstream to its confluence with the

White River (RM 14.3); and portions of the Enumclaw Plateau along SR-164 (between SR-18 and SR-169), SR-167 (between SR-164 and Renton), SR 169 (between SR-164 and SR-18) and SR-18 (from I-5 to SR-169). Most of the action area is included in the Lower Puyallup WRIA (10). A small portion of this action area, associated primarily with increased traffic and the sewage hauling route, is included in the Green River WRIA (9).

A. Rangewide Status of the Species

NMFS completed a status review of chinook salmon from Washington, Idaho, Oregon, and California in 1998, which identified fifteen distinct species (termed Evolutionarily Significant Units [ESUs]) of chinook in the region (Myers *et al.* 1998). After assessing information concerning chinook salmon abundance, distribution, population trends, risks, and protection efforts NMFS determined that chinook salmon in the Puget Sound ESU are at risk of becoming endangered in the foreseeable future. Subsequently, NMFS listed Puget Sound chinook salmon as threatened on March 24, 1999 (64 Fed. Reg. 14308; March 1999). This listing extends to all naturally spawning chinook salmon populations residing below natural barriers (e.g., long-standing, natural waterfalls) in the Puget Sound region from the North Fork Nooksack River to the Elwha River on the Olympic Peninsula, inclusive.

The Puget Sound ESU is a complex of many individual populations of naturally spawning chinook salmon, and 36 hatchery populations (64 Fed. Reg. 14308, March 1999). Recently, NMFS' Puget Sound Technical Recovery Team (TRT 2001) tentatively identified 21 geographically distinct populations of chinook salmon in Puget Sound, including one in the White River. Through the recovery planning process NMFS will define how many and which naturally spawning populations of chinook salmon are necessary for the recovery of the ESU as a whole (McElhany *et al.* 2000). At this time, only five hatchery stocks are considered essential to the recovery of Puget Sound chinook salmon. The listed hatchery stocks are: Kendall Creek (spring run), North Fork Stillaguamish River (summer run), White River (spring run), Dungeness River (spring run), and Elwha River (fall run)(64 Fed. Reg. 14308, March 1999).

In most streams within Puget Sound, both short- and long-term trends in chinook salmon abundance are declining. Overall abundance of chinook salmon in this ESU has declined substantially from historical levels and many populations are small enough that genetic and demographic risks are likely to be relatively high. Migratory blockages and degradation of freshwater habitat, especially in upper river reaches, has contributed to these reduced abundances. Widespread agriculture and urbanization have significantly altered the complexity of freshwater and estuarine habitats used by chinook. Spring- and summer-run chinook salmon populations through the Puget Sound ESU have been particularly affected. These life histories have exhibited widespread declines throughout the ESU and some runs are believed extinct (Nehlsen *et al.* 1991; 64 Fed. Reg. 14308, March 1999). These losses represent a significant reduction in the life history diversity of this ESU (NMFS 1998; 64 Fed. Reg. 14308, March 1999).

B. Critical Habitat

Critical habitat for Puget Sound chinook salmon was designated on February 16, 2000 (65 Fed. Reg. 7764). Critical habitat is defined in the ESA as "(i) the specific areas within the geographical area occupied by the species on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection and (ii) specific areas outside the geographical area occupied by the species... upon a determination by the Secretary of Commerce that such areas are essential for the conservation of the species" (50 C.F.R. Part 226).

In designating critical habitat, NMFS considers the following biological requirements of the species: (1) space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, or rearing of offspring; and, generally, (5) habitats that are protected from disturbance or are representative of the historical geographical and ecological distributions of the species. In addition to these factors, NMFS focuses on the known physical and biological features within the designated area that are essential to the conservation of the species and that may require special management considerations. Essential features may include: substrate, water quality and quantity, food, and riparian vegetation (65 Fed. Reg. 7764; February 16, 2000).

Indian lands, however, were excluded from this description of critical habitat out of respect for tribal sovereignty over the management of their lands, and because NMFS determined that designating such areas is not essential to the conservation of Puget Sound chinook salmon (65 Fed. Reg. 7764, February 2000). Indian lands include fee lands either within or outside the reservation boundaries, owned by the tribal government; and fee lands within the reservation boundaries, owned by individual Indians. Although not designated as critical habitat, NMFS believes that habitat on Indian lands currently accessible to chinook salmon is important for the long-term survival and recovery of this species (65 Fed. Reg. 7764, February 2000).

The proposed project action area encompasses both Indian and non-Indian lands. The majority of the action area contains critical habitat for Puget Sound chinook salmon. The transfer lands do not contain critical habitat, however, because they are located within the Reservation boundary.

C. Evaluating Proposed Actions

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 C.F.R. Part 402 (the consultation regulations). NMFS must determine whether the action is likely to jeopardize the listed species and/or whether the action is likely to destroy or adversely modify critical habitat. This analysis involves the initial steps of (1) defining the biological requirements and current status of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' current status.

The purpose of interagency consultation is to protect threatened and endangered species from Federal activities that are expected to jeopardize their continued existence or destroy or adversely modify habitat that has been designated as critical to the conservation of listed species (16 U.S.C. 1536). NMFS must determine whether an action is or is not likely to (a) jeopardize listed species and (b) destroy or adversely modify critical habitat. In making this determination, NMFS 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. This evaluation must take into account measures for survival and recovery specific to the listed salmon's life stages that occur beyond the action area. If NMFS finds that the action is likely to jeopardize, NMFS must identify reasonable and prudent alternatives for the action.

NMFS evaluates whether the action, directly or indirectly, is likely to destroy or adversely modify the listed species' designated critical habitat. Then NMFS must determine whether habitat modifications appreciably diminish the value of critical habitat for both survival and recovery of the listed species. If NMFS concludes that the action will adversely modify critical habitat it must identify any reasonable and prudent alternatives. NMFS generally relies upon guidance in *The Habitat Approach, Implementation of Section 7 of the Endangered Species Act for Actions Affecting the Habitat of Pacific Anadromous Salmonids,* August 1999 (Attachment 1) for making determinations of jeopardy and adverse modification of habitat. Actions that are found likely to impair currently properly functioning habitat, appreciably reduce the functioning of already impaired habitat, or retard the long-term progress of impaired habitat towards properly functioning conditions (PFC) at the population or ESU scale will generally be determined likely to jeopardize the continued existence of listed salmon, adversely modify their critical habitat, or both (50 C.F.R. PART 402.02; NMFS 1999).

1. Biological Requirements

The first step in the ESA section 7(a)(2) analysis is to define the species' biological requirements that are most relevant to each consultation. NMFS 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, NMFS starts with the determinations made in its decision to list Puget Sound chinook for ESA protection and also considers new data available that is relevant to the determination.

This Opinion relates the biological requirements for chinook salmon in terms of the habitat attributes, or pathways, established in the Matrix of Pathways and Indicators (MPI). These pathways are: water quality, habitat access, physical habitat elements, channel condition and dynamics, flow/hydrology, and watershed conditions. The pathways indirectly measure the baseline biological, physical and chemical health of chinook salmon habitat. Specifically, each pathway is made up of a series of individual indicators (e.g., indicators for water quality are temperature, sediment/turbidity, chemical contamination/nutrients) that are measured or described directly (NMFS 1996). Based on the measurement or description, each indicator is described in terms of their existing condition level. Three condition levels are possible: "properly functioning," "at risk," and "not properly functioning." Properly functioning conditions are defined as "the sustained presence of natural habitat forming processes in a watershed that are necessary for the long-term survival of the species through the full range of environmental variation (NMFS 1996)."

Relevant biological requirements are those necessary for Puget Sound chinook salmon to survive and recover to naturally reproducing population levels that would make protection under the ESA unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment. The biological requirements of chinook salmon include: food, flowing water (quantity), high quality water (cool, free of pollutants, high dissolved oxygen concentrations, low sediment content), abundant clean spawning substrates, and unimpeded migratory access to and from spawning and rearing areas (adapted from Spence *et al.* 1996). The biological requirements of chinook salmon potentially affected by the proposed action include clean, clear water, food, and spawning substrates.

2. Environmental Baseline

The term "environmental baseline" means "the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process" (50 C.F.R. § 402.02). Myriad activities influence the current environmental conditions in the action area. Important insights on the magnitude and extent of habitat changes are gained when information is examined on human activities within the action area and upstream areas, because habitat processes and changes in upstream reaches strongly influence downstream conditions. Therefore, information is included on activities and conditions upstream of the action area as we have defined it, because they provide context for understanding the status of the species and the environmental baseline of the action area. Similarly, because the only reliable long-term information on population trends for White River chinook is collected above the action area at the Buckley trap (RM 24.3), it is also considered in this discussion.

Status of the Species within the Action Area

Recently, NMFS' Puget Sound TRT delineated one independent population of chinook salmon within the White River. These fish are genetically unique and comprise the last existing spring chinook stock in South Puget Sound (WDFW *et al.* 1996; B. Sanford, pers. comm., 2000). In the early 1970s an artificial propagation program was established for White River spring chinook because returns were critically low (WDFW *et al.* 1996). The artificial propagation program was initially started to restore the south Puget Sound fishery, and by the late 1970s, NMFS was working cooperatively with WDFW and the Tribe to recover the stock (WDFW *et al.* 1996).

Counts of adult chinook in the White River dropped precipitously from the earliest counts at the Buckley trap to a critical low in the 1970s (WDFW *et al.* 1996). The Buckley trapping effort provides the longest data set available on White River chinook. Trap and haul operations began in 1940 and counts of fish returning to the trap began in 1941. Chinook returning to the trap averaged 2800 annually, ranging from 1,200 to almost 5,500 in the first decade of operation (WDFW *et al.* 1996; Ladley *et al.* 1999). Counts declined steadily until about 50 chinook returned in 1977 and only 6 adults were passed above the dam in 1986 (WDFW *et al.* 1996; Ladley *et al.* 1999).

In 1991, Nehlsen *et al.* identified the White River spring run as having a moderate risk of extinction and in 1999, NMFS listed the White River spring-run as one of only five hatchery populations essential for the recovery of the Puget Sound ESU (64 Fed. Reg. 14308, March 1999). The decline of the stock is attributed to the additive, cumulative, and synergistic effects of intense human activities (Ladley *et al.* 1999). Harvest and habitat constraints, specifically flow regime, sedimentation, streambed instability, estuarine loss, reduced large woody debris volumes, and passage problems associated with dams affect White River chinook, threatening the long-term viability of the population (Bishop and Morgan 1996). These and other threats to White River chinook are described below, under *Factors Affecting the Species in the Action Area.*

In 1996, WDFW, and the Muckleshoot and Puyallup Tribes (WDFW *et al.* 1996) established an interim recovery goal of passing 1,000 natural spawners above Mud Mountain Dam. The number of spawners passed above Mud Mountain Dam has exceeded this goal twice in recent years (2000 and 2001), while the average number of chinook passed above the Dam from 1991 to 2000 was 537 chinook (C. Baranski, pers. comm., 2001). Abundance of chinook captured at the Buckley trap from 1986 to 2000 is depicted in Figure 2. Numbers of adults returning to the Buckley trap may overestimate the actual number of chinook spawning in the upper White River because some fish may fall back and spawn in the lower river or re-enter the trap resulting in duplicate counts, and others may die prior to successful spawning (Smith 2000). Nonetheless, data suggest that the stock is responding to recent management efforts to increase returns, particularly reduced harvest and the "increasingly conservative management of Washington fisheries (PSIT and WDFW 2001)." Total exploitation has been falling from greater than 70 percent in the early 1980s to below 50 percent since brood year 1992, and was projected at 16 percent for 2000 (PSIT and WDFW 2001).

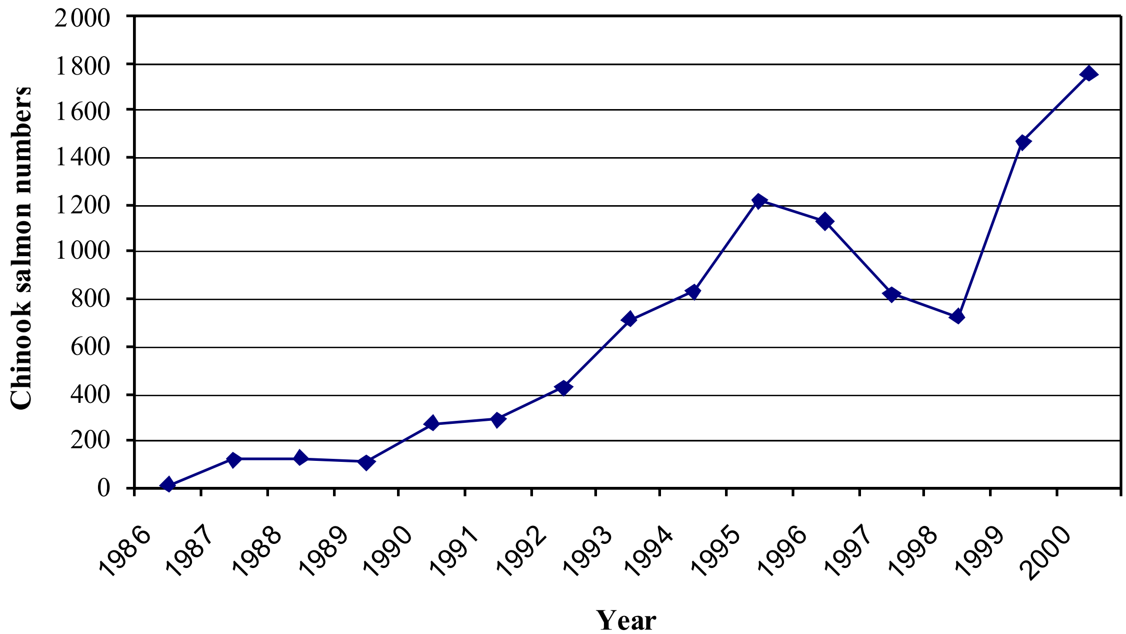
Adult chinook salmon typically spawn between ages 3 and 5, entering the White River as early as March (Williams *et al.* 1975). Between 1942 to 1950, chinook were typically encountered at the Buckley trap from May through August, with peak returns in June (WDFW *et al.* 1996; Ladley *et al.* 1999). Currently, returns peak in mid-July at the Buckley trap and fish continue to migrate into early October.

During a recent radio-telemetry study, the Puyallup Tribal Fisheries Division (PTFD) tagged a total of 147 chinook and 125 chinook in 1996 and 1997 in the lower Puyallup River, respectively. Thirty-eight percent reached the Buckley trap and were passed to the upper river. Approximately 16 to 18 percent of the total number of fish tagged were tracked to areas below RM 24 of the White River (Ladley *et al.* 1999).

Ladley *et al.* (1999) revealed that chinook salmon spend roughly 16 to 18 weeks in the White River before spawning. Once the fish enter the lower Puyallup River they took an average of about two weeks before entering the White River, and another 40 days to pass through the action area to the Buckley trap (Ladley *et al.* 1999). Peak spawning in tributaries above the dam occurs about mid-September, roughly 8 weeks after peak return time to the Buckley trap (Ladley *et al.* 1999). Generally early-run chinook frequent pools during their upstream migration and holding period. Deep pool habitat, which provides important resting areas to migrants and could provide some thermal relief from warm mainstem waters, is limited in the action area. Ladley *et al.* (1999), however, did not observe extended holding behavior in the action area during their study. Recent data collected by MITFD (unpub. data) indicates that only 8 percent of the mainstem White River between RM 9.0 and 15.5 contains pool habitat during summer low flow and most of these pools have residual depths measured at less than 1 meter, which may be insufficient to create desirable holding areas (Ladley *et al.* 1999). Thus, the pool located at the confluence of Pussyfoot Creek and the White River (RM 15.4), as well as sections of Pussyfoot Creek contained within the floodplain of the White River where adult chinook have been observed holding, provides critically important habitat for adults spawning in the action area and those migrating to upstream areas (Dames and Moore 2000; BIA and WSDOT 2000).

The majority of White River chinook spawning occurs in 4 major non-glacial tributaries in the upper watershed: Boise Creek (RM 23.9), Clearwater River (RM 35.3), Greenwater River (RM 45.8), and Huckleberry Creek (RM 53.1) (Ladley *et al.* 1999; Williams *et al.* 1975). Boise Creek, which enters the White River on the downstream side of SR 410, produces a large portion of the chinook salmon within the system (J. Iverson, PTFD, pers. comm., 2001). Malcom and Fritz (1999), however, suggest that the number of chinook that spawn in the mainstem between RM 8.9 and 15.5 may be equivalent to, and perhaps even greater than, the number that spawn above Mud Mountain Dam. Data supporting this assumption is limited, however, and no information is available to assess escapement trends within the action area.

Figure 2. Chinook salmon returns to Buckley, 1986-2000 (Corps, unpubl. Data)



Information on chinook spawning in the mainstem, including the action area, is limited by visibility. To gain a better understanding of chinook use of the lower river the PTFD (unpub. data) has surveyed for adult chinook below the Puget Sound Energy (PSE) Diversion since 1995. Surveys typically begin at the diversion (RM 24.3) and are terminated at the 8th Street Bridge (RM 7.5). On September 28, 1999, 50 redds were observed within this reach by PTFD staff. Additionally, Muckleshoot Indian Tribe Fisheries Department (MITFD) staff detected adult chinook within the side channels and mainstem during one day of their 1997 survey effort (September 30, 1997). That day they recorded chinook in two left bank side channels, two right bank side channels, and the mainstem White River between RM 14.3 and 15.5. A total of 86 live and 54 dead adult chinook, and 69 redds were recorded in the action area and 80 were recorded for the study area (Malcom and Fritz 1999). The majority of chinook (live, dead and redds) surveyed by MITFD were found in the side channels of the White River. Side channels accounted for 86 and 93 percent of the total fish found in the White River, respectively, and 90 percent of the observed redds (Malcom and Fritz 1999).

Fry emerge from the gravel from late winter to early spring. After emergence, juvenile chinook may migrate downstream to rear in low-gradient channels (WDFW *et al.* 1996). The majority (80 percent) of chinook in the White River rear for short periods (1 to 3 months) in fresh water, outmigrating as subyearlings and the remainder (about 20 percent) outmigrate as yearlings after rearing in fresh water for about one year (Dunston 1955). Scales collected from adult chinook at the Buckley trap confirm age at outmigration (WDFW *et al.* 1996). Characteristically high suspended sediment loads may limit rearing densities compared to what would be expected in a rain dominated (clear) river of comparable size (Ptolemy *in* Newcombe and Jensen 1996). Short periods of freshwater rearing may represent an adaptive response by juvenile chinook to the characteristically turbid waters of the White River.

In other basins, side channels fed by clear groundwater, and valley-wall runoff provide critical non-turbid (or low turbid) habitat and are extensively used by chinook fry (Murray and Rosenau 1989; Chamberlain *et al.* 1991; Scrivener *et al.* 1994). Studies suggest that even nonnatal clear-water tributaries are used by juvenile chinook salmon and that these habitat types provide juveniles an opportunity to maximize their growth and survival through increased feeding success (Murray and Rosenau 1989).

Data on chinook salmon use of Pussyfoot Creek is sparse although suitable habitat does exist. Anecdotal information from Tribal members suggests chinook spawned in Pussyfoot Creek as late as the early 1960s (D. Every, pers. comm., 2000; R. Malcom, EFH, pers. comm., 2000). Further, anecdotal information provided to NMFS suggests that between 30 to 60 juvenile chinook have been observed in Pussyfoot Creek in close proximity to recent bank stabilization projects; however, these documents appear to be in error (MIT 1997, 1998; R. Malcom, pers. comm. 2000). Although a recent survey by Malcom and Fritz (1999) found neither spawners or rearing juveniles in Pussyfoot Creek, the surveys were limited and are inconclusive for determining chinook use. Regardless, clear water refuge areas, like Pussyfoot Creek, may be important to juvenile chinook survival (Scrivener *et al.* 1994). Therefore, for this analysis NMFS assumes that chinook salmon have access to and may use Pussyfoot Creek for rearing and spawning.

Factors Affecting The Species In The Action Area

The life history characteristics (e.g., migration timing) of White River chinook are an expression of genetics and also adaptation to the local glacial environment of the basin. White River chinook salmon have evolved in a basin with frequently shifting braided channels, highly turbid waters, a history of large wildfires and major channel shifts between the Puyallup and Duwamish basins. The headwaters of the White River, which originate at the terminus of Winthrop, Emmons, and

Fyingpan glaciers, are considered pristine where they have been protected since 1899 with the creation of Mt. Rainier National Park. The river drains a watershed of approximately 494 square miles to the confluence with the Puyallup River at about RM 10.4, entering south-central Puget Sound at Commencement Bay. The majority of this basin has undergone pronounced changes since European settlement began in the region, as early as 1850 (Williams *et al.* 1975; Kerwin 1999).

Human land use practices that induce alterations to chinook salmon habitat have the potential to alter responses to local conditions and could indirectly lead to genetic changes in the population (NRC 1996). For instance, changes in the hydrograph, specifically reduced low flows, have resulted in a shift in the timing of the upstream migration of adult White River chinook (Ladley *et al.* 1999). Since White River chinook salmon return to the river early and remain in fresh water for much of the summer before spawning, reductions in summer flows have been particularly detrimental to this stock, nearly driving it to extinction in the 1980s (WDFW *et al.* 1996). Other factors contributing to the decline of White River chinook include intense logging and road building, loss of estuarine habitat, agriculture, urban development, channelization, streambed instability, gravel extraction, and over-harvest (Bishop and Morgan 1996; WDFW *et al.* 1996; Ladley *et al.* 1999).

This section of the Opinion describes the environmental baseline of the action area. Specifically, chinook habitat in the White River, Pussyfoot, Second and Jones Creeks, and the Green River are described in the context of indicators of the MPI, where appropriate. A detailed description follows of the Amphitheatre facilities that were constructed before consultation was initiated. These facilities are described in this section largely because NMFS believes doing so provides clarity to the reader as to the present conditions of the Amphitheatre site. These elements, however, are also addressed in the *Effects of the Proposed Action* section of this Opinion because they are part of the proposed action, and they have the potential to affect chinook salmon in the future.

White River. *Riparian Vegetation, Large Woody Debris, and Pool Frequency.* The White River basin has been intensely managed for timber harvest, particularly in the last 50 years. Timber harvest practices have reduced large woody debris (LWD) recruitment, channel sinuosity, pool habitat, and increased the sediment load as streambanks have eroded and landslides resulted (WDFW *et al.* 1996; Kerwin 1999). Vegetation composition and LWD recruitment have also been affected by an intense history of wildfires within the basin. Shortly after the fires, wood recruitment to the channel probably increased, while the long term potential for wood recruitment likely reduced. Notably, some creeks including Ranger, Dry, Lightening, Deep and Goat Creeks have low potential for recruiting LWD to the channel and downstream reaches as a result of wildfires (USFS 1995).

Although recruitment potential was reduced by wildfires, active debris cleaning and the presence of the dams, which act as a barrier to the downstream transport of wood, have further reduced debris loading in the action area. Intent on preventing massive debris jams from forming in the lower river, the Inter-County River Improvement Commission (ICRI) constructed two debris barriers, one at RM 11.5 and another at about RM 24.0, where they periodically hauled away and burned wood as it collected on the barriers (Kerwin 1999; R. Ladley, pers. comm., 2000). These barriers were about 2,000 feet long, and consisted of several large concrete blocks strung together by cables. Records indicate that in 1915 about 35,000 cords of wood had been removed in a five-mile reach near Auburn, and by 1920 an estimated 100,000 cords of wood had been removed from the White River (WDFW *et al.* 1996). As a result, LWD loading is presumed degraded in the action area.

In general, LWD tends to collect less frequently in large channel like the White River, than in smaller streams, however, log jams would tend to be quite massive. LWD jams are a critical component of chinook salmon habitat through their influence on bed and bank scour, hydraulic complexity, side channel development, pool formation and stability, and bar and island formation (Montgomery *et al.* 1995; Spence *et al.* 1996). LWD jams may also help maintain appropriate thermal gradients by inhibiting the mixing of cool water tributaries with mainstem reaches (Spence *et al.* 1996).

A recent survey by the Tribe indicates that LWD loading and pool frequency are degraded in the mainstem White River between RM 8.9 and 15.5 (MIT, unpub. data). The Tribe estimates, based on survey data, that the frequency of LWD (24 inches in diameter and 50 feet long or larger) in the action area is 18 pieces/mile in the mainstem and 1.7 piece/mile in side channels between RM 10.9 and 15.5 (MIT, unpub. data). No pieces of LWD meeting this size criteria were found between RM 8.9 and 10.9. As a result, NMFS believes that the LWD loading is “not properly functioning” for the action area (NMFS 1996).

The bulk of the wood surveyed by the Tribe was comprised of small pieces of deciduous trees. Although the majority of these were collected in debris jams, persistence of these jams would likely be short-lived compared to those composed of large conifer pieces. In general, small pieces tend to be more mobile than larger ones, and deciduous pieces decay more rapidly than conifers (Spence *et al.* 1996; Cederholm *et al.* 1997). Small deciduous pieces also tend to not function as well in retaining sediment and creating pool habitat (Spence *et al.* 1996). Between RM 8.9 and 15.5, wood forms an estimated 28 percent of the pools surveyed (MIT, unpubl. report). The ensuing pool frequency is low with an estimated 5.1 pools per mile in the mainstem and 9.1 pools/mile when side channel habitat is included. Thus, only 8 percent of the mainstem White River (between RM 9.0 and 15.5) during low flow is comprised of pools, 76 percent is riffle, and 16 percent cascade (BIA and WSDOT 2000). Of the pools located in this reach, 14 had residual depths greater than 1 meter and only 1 pool had residual depths greater than 2 meters. The remaining pools had residual depths less than 1 meter (BIA and WSDOT 2000).

Even so, the lands proposed for transfer contain some of the highest quality second growth riparian habitat in the action area, which may lead to improved LWD loading and pool frequencies over time if timber harvest is limited. On the west (left) bank of the mainstem White River relict stumps are in an advanced state of decay, suggesting that the trees were harvested decades ago. Here, vegetation is a mixture of conifers and hardwoods, composing about 45 percent and 55 percent of the area, respectively (Tinoco 2001).

Initial (pre-consultation) construction activities at the Amphitheatre site, however, degraded riparian vegetation and reduced potential LWD recruitment along the right bank bluffs through the removal of about 20 large trees along the bluff. Mass wasting presumably plays a large role in wood reaching the White River and Pussyfoot Creek from atop the Plateau. The likelihood that these trees would have entered Pussyfoot Creek or the White River depends upon the frequency of mass wasting, and the driving factors such as slope, soil type, and hydrology (Spence *et al.* 1996). If the wood was not delivered to the channel immediately, but settled in the floodplain, it could have eventually provided an indirect source of LWD as the channel meandered over time (Rhodes *et al.* 1994). Furthermore, downed wood can also provide significant sediment storage on the hillslope, potentially delaying its delivery to the channel. Nonetheless, the preconsultation tree removal represents a small reduction in potential LWD recruitment to the action area.

Sediment Yield and Bluff Recession. The White River basin, in general, is inherently unstable as the river cuts through a series of glacial and mudflow deposits. Data for the action area are limited, but an assessment of mass wasting potential within the upper watershed (primarily the National Forest and Park Lands) indicates that about 38 percent of the total area considered (28,158 acres) is moderately to highly unstable in its natural state (USFS 1995). Several thousand to well over a million tons of sediment are delivered annually from the upper basin to lower gradient reaches, most of which is transported during winter storm events (WDFW *et al.* 1996; Kerwin 1999). Suspended sediment varies from 1 to 6,200 milligrams per liter with annual loads estimated, during a three year study, as ranging from 440,000 to 1,400,000 tons (Nelson 1979; WDFW *et al.* 1996).). Annual average transport above Mud Mountain Dam is estimated at 500,000 tons per year (Dunne 1986) and turbidity during summer months, July through

September, ranges from 100 to 1000 NTU for the basin (Ladley *et al.* 1999). Glacial meltwater is the primary source of turbidity during summer months. Data collected by the Washington Department of Ecology (WDOE) in 1996 indicates turbidity at the Sumner station (RM 4.9) ranged from 2 to 260 NTUs, and generally exceeded 25 NTU during summer months (WDOE 2001).

Sediment transport to the action area has been interrupted by Mud Mountain Dam since its construction in 1948. Originally, the configuration of the dam's tunnels was such that frequent deep pooling of impounded waters resulted, reversing the natural sediment regime as high sediment loads were mobilized with the falling water level rather than during high flow events (WDFW *et al.* 1996). The tunnels were modified in September 1995 allowing for more natural fluctuations in discharge rates and shortened water impoundment periods reducing the likelihood of suspended materials settling in the reservoir (WDFW *et al.* 1996). However, during high flow events material still settles behind the dam and erodes over a much longer period than would occur in the absence of the dam. For instance, following a flood in February 1996 material that collected behind the dam continued to erode for three months afterwards (WDFW *et al.* 1996).

Within the transfer lands, sediment yield is also affected by bluff recession. The 180-feet high bluff overlooking the White River is the most prominent topographic feature in the action area. Portions of the bluff are vertical or nearly vertical, particularly near the central third of the Amphitheatre site. The 180-feet high bluff is dynamic, shows variable erosion potential and a history of shallow slumps and slides, and is identified as a landslide hazard area (see Figure 3.1-1 of the PFEIS).

Geology, groundwater, river flow and weather are elements that influence the rate of bluff recession and the presence and quality of functional chinook salmon habitat. The effects of bluff recession on fish and any changes that may occur under the proposed action are discussed in the analysis of effects. Surface soils at the Amphitheatre site are underlain by deposits from the Osceola Mudflow, which appears to be a relatively uniform layer up to 24 feet thick (Earth Consultants, Inc., 1997). The mudflow deposits tend to be poorly to moderately drained and perched groundwater has been observed at depths ranging from 2 to 25 feet below the ground surface (Earth Consultants Inc. 1997). In many areas, the mudflow layer sits above lenses of glacial outwash, commonly above compacted basal till. The borings showed the outwash (sand and gravel) to be roughly 10 feet thick and typically contained perched water. Both the outwash and the till are very dense in character. The glacial outwash deposits are well drained to very well drained, depending on particle size, whereas the glacial till is a compacted layer that tends to be poorly drained.

Ground water under artesian conditions (i.e., a confined aquifer) was encountered in the outwash deposits. The underlying till layer minimizes the continued downward movement of groundwater, causing water to perch in the outwash deposits. These confining layers result in groundwater seeps emerging along the face of the bluff. Ground water in the glacial outwash is inferred to move toward the bluffs bounding the rivers based on the topography and visual observations. The largest quantities of groundwater seepage have been observed in the winter and spring, coinciding with infiltration and surface runoff periods. The source of the groundwater in the glacial outwash deposits beneath the site is expected to be a combination of infiltration through the Osceola Mudflow and lateral groundwater flow from up gradient areas. Ground water that does not emerge through seeps may contribute to the alluvium aquifer associated with the White River or may discharge directly into the river as baseflow.

The most influential factor in bluff recession at the Amphitheatre site is erosion occurring at the toe of the slope by the White River. Aerial photographs taken in 1936, 1960, and 1997 indicate that the river has migrated closer to the bluff and now flows towards the bluff causing active erosion and sloughing of the toe of the slope. Additionally, before the Amphitheatre site was partially constructed, surface runoff was conveyed over the bluff via topographic swales to the White River and caused local areas of erosion and instability along the bluff (Dames and Moore 2000). Surface water flow over the west slope was primarily concentrated in two locations: a swale at the southwest portion of the Amphitheatre site and a swale located in the middle of the site. These swales created vertical and overhanging erosion channels in the west slope (Earth Consultants Inc. 1998a). These channels were a source of sediment to Pussyfoot Creek and the White River in the past, and likely contributed to reduced feeding and spawning success of salmonids.

In general, sediment affects the abundance and quality of spawning gravels, pool riffle ratios, water quality, survival to emergence, the delivery of organic materials, and can potentially affect fish access. Determining the condition of the sediment indicator is difficult because the MPI was not written for glacial rivers like the White River, which naturally carry a high suspended sediment load. Nonetheless, information exists to suggest that land use activities, gravel extraction, and the presence of instream barriers have altered the natural sediment regime within this basin. Thus, NMFS believes this indicator is functioning “at risk” under the MPI.

Changes induced by Flood Control and Water Withdrawal Projects. The most extensive changes in the White River have been the modifications to natural hydrological regime. These changes have significantly reduced chinook salmon rearing and spawning habitat and have altered channel morphology. Geological evidence suggests that the lower White River historically migrated, albeit sporadically, between the Puyallup and Green River basins. The last such event occurred in November of 1906 when heavy winds and rains flooded the basin and a log jam formed near Auburn causing an avulsion of the White River from the Green/Duwamish River basin into the Puyallup River through the Stuck River. The White River was permanently diverted into the Puyallup basin in 1914 with the construction of a concrete diversion at RM 8.5. As a result Puyallup River flows were permanently increased by about 50 percent and the drainage area was approximately doubled (Kerwin 1999).

Shortly after the 1906 event, several projects were undertaken within the basin to alleviate flooding problems including construction of debris barriers (discussed previously), gravel removal, and several revetment projects. Revetment projects performed by the ICRI in the early 1900s included the installation of concrete pylons and wing walls, timber pile walls and deflectors, concrete levees and rock riprap armoring of dikes and banks (WDFW *et al.* 1996). The revetment and levee system in the lower river extended from Commencement Bay to about RM 11 of the White River (Kerwin 1999). As a result of such activities, the lower Puyallup River, from its confluence with the White River to its mouth, has lost about 15 percent of its channel length since 1894-95, and the mainstem White River, from its confluence with the Puyallup River to the PSE's Diversion at Buckley (RM 24.3), has lost about 7.2 percent of its channel length (Kerwin 1999).

Additional efforts to control flood waters in the basin included the construction of Mud Mountain Dam, which was authorized by the Flood Control Act of 1936. The project was designed to attenuate flood flows through storage and metered release of upper White River flows. For nearly 50 years the project attenuated floods greater than 2,000 cfs until pool levels reached the second tunnel. Today, due to modifications of the tunnels, attenuation will not occur "until a flow of 45,000 cfs (Federal Emergency Management Agency 100-year flood criterion) is measured at the Puyallup gage (WDFW *et al.* 1996)."

Active geomorphic surface area, side channel length, and channel sinuosity have declined 69 percent, 88 percent, and 44 percent, respectively between RM 7.6 and 11.3. These losses are attributed primarily to the levees in this reach (MITFD unpub. data). Revetments in this reach are contained within the boundaries of the Tribe's Reservation, however, and have not been maintained since the 1970s (WDFW *et al.* 1996). Upstream of RM 11.3 to RM 23.3 the White River is largely unconfined and is free to meander and migrate in response to flow, although active geomorphic surface area and length of side channels have been reduced by 56 percent and 35 percent, respectively since Mud Mountain Dam was constructed (MITFD unpub. data; Ecocline 2000). Nonetheless, according to Ecocline (2000), channel sinuosity has not declined over the period considered.

A little more than five miles downstream of Mud Mountain Dam is PSE's hydroelectric project at Buckley (RM 24.3), which diverts a significant portion of the river's flow from about 21 miles of the mainstem White River. The Buckley water diversion was constructed in 1911 and has drastically reduced flows in the bypass reach, which includes the action area. Water is diverted at RM 24.3 and conveyed through a series of canals and settling basins to the Lake Tapps reservoir, then to the Dieringer Powerhouse for power generation, and returned to the White River at RM 3.5. In 1910, PSE was required by a Pierce County Superior Court to maintain a minimum flow of 30 cfs since its completion, although low-flows in the bypass reach have ranged between 0 cfs and 130 cfs (WDFW *et al.* 1996; Kerwin 1999). In 1986 an agreement was adopted between PSE and the Tribe that the project would maintain a minimum of 130 cfs within the bypass reach (WDFW *et al.* 1996). More recently, an agreement between the resource agencies and PSE (effective July 2001) resulted in minimum flows increasing to 350 cfs in April and May, and 250 cfs from June through October. Flows during November through January remain at 130 cfs, and increase to 200 and 275 cfs in February and March, respectively. These recent flow increases should improve conditions for chinook salmon in the action area.

Operations of the diversion are restricted by license (the first of which was issued by the Federal Energy Regulatory Commission in 1997) for minimum flows, ramping rates and the timing of scheduled outages (WDFW 2000). These requirements are intended to minimize the impacts of PSE's operations on fish within the basin. For instance, periodically (usually annually) PSE shuts off the diversion for maintenance reasons, at which time the river flows naturally through the bypassed reach. Abrupt changes in river flows have stranded fish in the bypassed reach as power generation turbines are brought on and off-line (WDFW *et al.* 1996). Recently, PSE shut down the diversion for maintenance, which resulted in natural flows in the 21 miles of the bypass reach. Prior to the outage, flows in the bypass reach were about 275 cfs and during the outage ranged from 700 to 1,400 cfs (WDFW 2000). When the maintenance activities were complete and flows returned to the diversion, flows in the bypass reach fell sharply, stranding fish. The most notable incident occurred at RM 23.3, where over 750 fish were stranded. The majority that were stranded were dace, but the incident stranded 7 chinook adults, two of which were killed (WDFW 2000). Hundreds more may have been stranded throughout the 21-mile bypass reach when this activity has occurred in the past. In 2001, before maintenance activities occurred, PSE dug an egress channel from the pool to the mainstem White River to ensure fish could move out of the pool with the declining flows.

Surface and groundwater withdrawals and an increase in impervious surfaces have also significantly affected flows in the White River and its tributaries. The basin is considered "over-appropriated" meaning there is not enough water to support users, maintain instream flows, and support healthy salmon runs (State of Washington 1999). Strong downward trends in low flows have been evident since the 1970s, and in the 1980s instream flows were established for the basin while at the same time it was closed to further surface water appropriations (WDOE *et al.* 1995; Kerwin 1999). In the 1980s, instream flows were not being met an average of 35 days per year in the lower Puyallup River (WDOE *et al.* 1995). It was in 1987 that instream flows were not met for over 100 days and in 1992 there were 70 days when low flows were not met (WDOE *et al.* 1995).

Closing the basin to surface water appropriations resulted in a dramatic increase in applications for groundwater rights (WDOE *et al.* 1995). In 1995, water rights and registered claims within WRIA 10 were 453 cfs and 61 cfs for surface and groundwater use respectively (WDOE *et al.* 1995). Known water demands (rights and claims) equaled about 18 percent of the median annual streamflow as measured at the lower Puyallup gage, and about 44 percent of the minimum low flows. In 1995, WDOE had applications for 34 groundwater rights and 10 surface water rights pending within WRIA 10. The applications requested a total of 126 cfs for municipal and domestic supplies, commercial use and fish rearing (WDOE *et al.* 1995).

The actual consumptive water use within the White River basin is unknown. Recorded water rights and claims provide the only data to estimate actual use, but are a poor measure for several reasons: there may be illegal water users, water rights have not been consistently recorded over the years, and some recorded or claimed rights may no longer be in use (WDOE *et al.* 1995; M. Snoeberger, WDOE, pers. comm, 2001). Furthermore, State law exempts groundwater users from obtaining a water right permit if they use 5,000 gallons or less each day.

The above discussion suggests that the peak/base flow indicator of the MPI is “not properly functioning” as a result of historical and persistent activities, and water withdrawals within the basin. Increases in flows since 1986 and more recently, in 2001, have improved flows and chinook salmon habitat within the action area; however, these modifications are not expected to change the peak/base flow indicator to “at risk” as the hydrology of the White River is still markedly different than an undisturbed condition (NMFS 1996; S. Fransen, pers. comm., 2001).

Water quality. Instream flows are only one of several water quality standards exceeded within the basin. The White River, listed as impaired under Section 303(d) of the Federal Clean Water Act, exceeds of the following standards: temperature, pH, fecal coliform, mercury, copper, and instream flows (WDOE 2000). Sewage effluent discharges from treatment plants in Enumclaw and Buckley are attributed with causing the bypass reach to exceed standards for pH (Kerwin 1999). Several water quality parameters are also exceeded within the estuary, where the most extensive development and industrialization have occurred within the basin. The basin, including the action area, is considered "not properly functioning" for the chemical contamination indicator of the MPI and the temperature indicator ranges from "at risk" to "not properly functioning."

A water temperature assessment by the WDOE indicated that between July 15 and August 15, water temperature criteria in the mainstem at RM 43.4 were exceeded nearly half the time (Kerwin 1999). Water temperatures in several tributaries also exceeded water quality criteria, as much as 71 percent of time during the same recording period. Summer temperatures in the mainstem White River can get quite high, and may play a significant role in determining juvenile chinook outmigration timing and adult spawning success. White River water temperatures during summer have reached as high as 70 degrees Fahrenheit (G. Stagner, FWS, pers. comm., 2001). The high temperatures in the White River are likely exacerbated by reduced summer flows, channel widening, and shallow depths. Such high temperatures may increase the susceptibility of salmonids to infection, interfere with metabolism, and alter migration timing (Spence *et al.* 1996).

Pussyfoot Creek. Pussyfoot Creek borders the south side of the Amphitheatre site just before joining the mainstem White River on its right bank at RM 15.4. Pussyfoot Creek is the largest White River tributary that runs through the Reservation and the 3rd largest tributary below the dams. The drainage basin for Pussyfoot Creek is approximately 3,200 acres (Massmann 2001b).

With its headwaters on the Enumclaw Plateau, Pussyfoot Creek courses through agricultural lands for almost 3 miles before passing underneath SR 164. Grazing and agriculture have severely damaged the upland riparian vegetation, such that it is virtually non-existent. Downstream of the 408th Street bridge observations of the channel indicate that landowners allow livestock to trample through the creek bed. Grazing, agriculture, and trampling within the riparian corridor, not only reduce riparian vegetation, but adversely affect soil characteristics, infiltration capacity, sedimentation, water temperatures, nutrient dynamics, physical habitat, and primary productivity and invertebrate composition (Platts 1991; Spence *et al.* 1996). Several indicators of habitat function in Pussyfoot Creek are degraded by these practices, including temperature, sediment/turbidity, chemical contamination/nutrients, substrate, LWD, pool frequency, pool quality, width/depth ratio, streambank condition, change in peak/base flows, disturbance history, and riparian vegetation.

Currently, year-round juvenile salmon rearing in Pussyfoot Creek is restricted to below (west of) 180th Avenue SE, a few hundred feet upstream of SR 164. Pussyfoot Creek is primarily spring fed and has perennial flows downstream of 180th Avenue SE (Dames and Moore 2000). The extent to which salmon used upper Pussyfoot Creek historically, is unknown. Today, the reach above 180th Avenue SE is typically dry from July through September and can become moderately turbid during high flows in the winter and spring. These conditions are likely a result of upstream land uses.

Coho salmon, steelhead, and chum salmon spawn in lower Pussyfoot Creek, and coho have been observed ascending above SR 164. On October 17, 1997, and December 18, 1997, respectively, over a survey distance of about 1,000 feet measured from the mouth of Pussyfoot Creek, 14 chum and 6 coho redds were observed. Steelhead were observed on January 3, 1995, holding in the pool at the downstream outlet of the culvert under SR 164 and probably ascended through the culvert to spawn above. All of these fish were adult spawners (BIA and WSDOT 2000). Additionally, electroshocking and fyke net trapping of juveniles between April 20 and May 20 of 1997, yielded a total of 62 coho salmon, 12 cutthroat trout, and one steelhead.

Baseflows in Pussyfoot Creek are sustained by groundwater recharge (BIA and WSDOT 2000). Summer low-flow velocities are reported between 0.4 to 0.6 fps (MITFD unpub. data). A small intermittent tributary of Pussyfoot Creek drains wetlands on and near the southeastern corner of the Amphitheatre site on both sides of SR 164 in the vicinity of SE 408th Street. This tributary discharges down a draw on the bluff and joins Pussyfoot Creek about one-quarter mile south of the site.

Water temperatures in the lower reach of Pussyfoot Creek have been measured by the Tribe for at least the last 7 years. During winter 1994/1995 water temperatures reached a low of about 37˚F and in summer 1995 temperatures were as high as 59˚F (MIT unpub. data). Monthly temperatures reach their highest in July, and the lowest recorded temperatures have occurred in January and February (MIT unpub. data). The perennial portion is primarily spring fed and this section contains a dense riparian canopy cover. Springs can dominate small systems, particularly during summer-low flows, and can provide a particularly important influx of cool water. Cool water from Pussyfoot Creek likely moderates temperatures within the holding pool at its confluence with the White River and may also help moderate the temperatures of the White River, although the effect would be localized.

Stormwater from basin 2 of the Amphitheatre site is directed into Pussyfoot Creek. The outlet pipes extend over the bluff and discharge into a large rock gabion. The gabion is located about 30 feet upslope from Pussyfoot Creek (Dames and Moore 2000). The flow then goes over gravel substrate into Pussyfoot Creek about 100 feet upstream from where it joins a high-flow channel of the White River. During very high flow events in the White River, the river flow encroaches into the mouth of the creek, but the gabions are above the flood level.

A recent debris flow occurred along the right-bank bluff above Pussyfoot Creek. Heavy rains, unstable slopes and a leaking detention pond contributed to this 1997 mass wasting event. Video footage of the site taken by members of CSE (1999) shortly after the 1997 event indicates that a slurry of material composed of debris and water reached the channel. The debris fan forced the channel from its former location, away from the toe of the bluff, causing Pussyfoot Creek to flow around the debris (Malcom 1998), where it was captured by a roadbed. Although the event could have initiated as a "slump" (i.e. having a bulk rotational movement over a slip plane), by the time it reached Pussyfoot Creek, it appears to have been a "flowing" mixture of water and other materials. Some of the material settled out at the toe of the slope, and some of the material appears to have also flowed downstream. Visual estimates of the substrate in Pussyfoot Creek immediately downstream of the 1997 slide consists of generally large (D50 = 32-45 mm, D84 = 128-180 mm) gravels underlain by finer gravels supported by a silt and sand matrix, which appears to be a typical debris-flow "lag" deposit (P. Bakke, pers. comm., 2000). Pussyfoot Creek has apparently washed away most of the fine material from the surface layer of the November 1997 slide deposit, but lacks the hydraulic energy to mobilize the surface layer, which now functions as an immobile armor (a "lag" deposit). In places, the bed surface appears to have a bimodal distribution, with one component centered on the 90-120 mm size range and the other on the 8-16 mm size range, suggesting that sources of the finer material may still be actively eroding upstream. Gravel sizes fall within the range used by spawning chinook salmon, although the presence of finer materials will reduce egg survival to emergence (Spence *et al.* 1996).

Downstream from the slide, segments of the Pussyfoot Creek channel bed are covered with silt or with gravel. Silt-laden areas are thickly vegetated with reed canary-grass to the point of blocking the channel at low flow. Gravel-covered portions have a silt-dominated subsurface composition, and some areas the surface gravels are firmly embedded in silt and fine sand. As the stream nears its confluence with the White River, the bed is entirely composed of silt and fine sands, and in some areas covers a pre-existing gravel layer. At the confluence, much of this fine material seems to have been transported in from the White River, as indicated by bedforms and buried grass. Further upstream, however, the fine material seems to originate from in-channel, as silt is prevalent above the uppermost point of recent flow influence from the White River.

A pond developed upstream of the slide material and it appears that beavers may be contributing to the maintenance of the dam that developed. As mentioned previously, at the slide location the channel was forced to move outward, away from the toe of the bluff, and is now confined by an old road bed. The portion of the channel occupying the road bed is wide and has a coarse, compacted substrate. Channel conditions in this reach before the slide are not known, but might be inferred from the current channel conditions upstream from the slide/beaver pond. Upstream of the slide the gravel substrate does not appear as compacted as the gravels below the slide, and gravels upstream exhibit a more evenly-distributed range of sizes. Streambed armoring is also seen in several places upstream of the slide. Surface and subsurface gravel sampling would need to be done to confirm these observations. It appears, based on these observations, that substrate in Pussyfoot Creek can be categorized as "at risk" according to the MPI.

Previous mass wasting events have occurred within Pussyfoot Creek, and likely had similar effects on salmonid habitat. Streams affected by mass wasting are subject to cycles of disturbance and recovery. Observations of Pussyfoot Creek as discussed in this section were made after a disturbance event, absent measurements of pre-slide and post-slide channel geometry (i.e. cross sections, longitudinal profiles, and planform maps), streambed composition and structure. Therefore, the absolute response of Pussyfoot Creek to this event cannot be quantified. The fact that such disturbances occur is less of an issue than the magnitude and frequency at which they occur, and whether anthropogenic activities accelerate the rate of such disturbances such that recovery is arrested.

Visual observations suggest that the LWD indicator for Pussyfoot Creek falls within the "not properly functioning" category of the MPI. It appears that wood in Pussyfoot Creek may meet the count criteria of the MPI (80 pieces/mile), but none of the wood meets the size criteria of greater than 24 inches in diameter and greater than 50 in length (R. Malcom, pers. comm., 2001). MTFD staff counted 134 pieces of wood greater than 4 inches by 7 feet long (but none greater than 50 feet long), thus resulting in a "poor" rating under the TFW methodology.

In an effort to add hydraulic complexity to Pussyfoot Creek below the Amphitheatre stormwater discharge, the Tribal Fisheries Department added 20 pieces of wood to the channel (Dames and Moore 2000; R. Malcom, pers. comm., 2001). The intent of the wood placement project was to mitigate the lost wood recruitment potential from preconsultation activities that removed trees on the Amphitheatre site (Dames and Moore 2000). Although the project has been constructed, it is part of the action and is addressed further in the analysis of effects.

Second Creek. Second Creek is a right bank tributary, and enters the White River just upstream of Pussyfoot Creek (RM 15.5). Second Creek is roughly 2.2 miles long and drains a portion of the Enumclaw Plateau (Williams *et al.* 1975). Like Pussyfoot Creek, Second Creek flows beneath SR 164. Coho and chum salmon, and cutthroat trout predominate within the tributary; however, one chinook salmon fry was captured in Second Creek (Williams *et al.* 1975; MITFD, unpub. data). Only a small portion of Second Creek, less than ½ mile of the lower reach, flows through the Reservation. Here, the Tribe uses a gravel road that traverses the stream to access the White River.

Jones Creek. Jones Creek is a right bank tributary of the White River, entering at about RM 14.3 (Williams *et al.* 1975). According to Williams *et al.* (1975), Jones Creek is less than a mile in length, originating on the Enumclaw Plateau just downstream of Pussyfoot Creek. Fish species known to use Jones Creek include coho and chum salmon, steelhead, and cutthroat trout (D. Every, pers. comm., 2001).

Green River. A portion of the Green River, from Renton to about RM 25, is included within the action area for the proposed project because it encompasses the route of sewage tank trucks leaving the Amphitheatre site. The Green River originates in the Cascades about 30 miles northeast of Mt. Rainier and flows generally northwest about 94 miles before it drains to Puget Sound at Seattle (Williams *et al.* 1975). The lower 11 mile stretch is called the Duwamish River. The Green-Duwamish basin contains 367 identified streams with over 643 lineal miles of drainage (Williams et al 1975).

The basin has been significantly modified since early settlement of the area. Urbanization within the lower river has altered physical and chemical parameters of salmonid habitat. The basin is listed for several water quality exceedences including: temperature, fecal coliform, chromium, dissolved oxygen, and several organics and metals (WDOE 2000). Specific tributaries that the Amphitheatre sewage trucks will cross include Hill and Springbrook creek, and the mainstem Green River (RM 24 [see *Project Description* for more details]). Hill Creek is listed on the final 303(d) list (WDOE 2000) for exceeding standards for temperature, dissolved oxygen and fecal coliform. Water quality parameters listed within the Springbrook Creek basin, include: dissolved oxygen, fecal coliform, temperature, and several metals (WDOE 2000).

Like the White River, the Green-Duwamish River is also identified as a high priority for restoration (State of Washington 1999). The Green River is also considered an ‘over allocated” basin with all tributaries closed to surface water withdrawals, including Springbrook Creek and Garrison Creek (tributaries of the Black River) WAC 173-509-040)).

Amphitheatre Facilities. Before construction of the Amphitheatre began on the site in May 1997 the 98-acre site was occupied by two houses and pastureland. The houses had septic tanks that were not working properly and were discharging untreated waste water into drainage swales that discharged over the bluff to the White River. These drainage swales also conveyed surface water runoff from the site and caused local areas of erosion and instability along the bluff (Dames and Moore 2000). Initial construction activities on the site included removal of one of the houses and rerouting of the drainage swales. Additionally approximately 90 acres of the site were disked and ripped, with about half of this area sustaining major disturbance (D. Every, pers. comm., 2000). Before work was halted, several key features of the Amphitheatre complex were constructed on approximately 45 acres of the site between May of 1997 and June 1998. These features included:

- The Amphitheatre bowl and roof structure;
- A berm surrounding the Amphitheatre;
- Grading of the plaza area;

1. Temporary access roads, and a gravel parking area;
2. An initial infiltration pond, which was later abandoned;
3. Detention ponds 2;
4. And the perimeter ditches.

Most of this work created exposed soil, which was stabilized by planting a mixture of grass. This pre-consultation work resulted in impacts to 3.7 acres of wetland and the removal of about 20 large trees along the bluff over looking the White River. Appendix O-1 of the PFEIS contains a time line when the of major ground disturbing activities occurred. Existing features are described in detail in the following sections.

Stormwater Ponds and Ditches. In the summer of 1997, drainage from the Amphitheatre site was altered by construction of a surface water runoff detention basin and swale (Earth Consultants 1998a; BIA and WSDOT 2000). This first basin was located within about 50 feet of the bluff in the southwest portion of the site (D. Every, pers. comm., 2001). The basin was unlined and water seeped from the face of the adjacent bluff (D. Every, pers. comm., 2001). The pond was abandoned because the project was reconfigured to reduce wetland impacts and concerns about potential bluff stability at that location (R. Otsea, pers. comm., 2001).

Another pond, basin 2, was then excavated to the southeast in the fall of 1997. The southwest corner of basin 2 lies about 80 feet from the bluff's edge as measured from the outside of the berm (P. Bakke, pers.comm., 2000). The pond was excavated below the Osceola Mudflow. During excavation, gravel lenses were encountered before the pond's ultimate depth was reached, and the pond was subsequently backfilled with compacted material (Dames and Moore 2000; BIA and WSDOT 2000). With the onslaught of fall rains, water collected in the basin and soon drained through the lenses to the bluff over Pussyfoot Creek rather than the discharge system as intended (BIA and WSDOT 2000). By November 1997, a mass wasting event was observed on the adjacent bluff, apparently resulting from groundwater seepage at the site (Malcom 1998). The incident, characterized as a debris flow by Earth Consultants Inc, (1998b), contributed coarse and fine debris to Pussyfoot Creek (Malcom 1998).

After discovering the leak, the applicant installed filter fabric over the gravel lenses and along the pond wall in an effort to collect fine sediment and stop the seep (Dames and Moore 1998). The filter fabric was installed in January 1998. In February or March 1998, a bentonite liner was installed on the south and east walls of the basin to further seal the leak. The partial pond liner was later removed, and the basin was regraded. At that time the basin was divided into two cells with the inflow directed into the cell away from the gravel lenses and the basin was fully lined with 40 mil. polyvinyl chloride (PVC) (D. Every, pers. comm., 2001). The PVC is also overlaid by two layers of filter fabric, and soil between the filter fabric and above the top filter fabric layer, to protect it from puncture during cleaning and from burrowing fauna. Additionally, this covering will protect the PVC from premature aging which might otherwise be caused by ultra-violet radiation.

Surface runoff is conveyed to the detention basin by a series of drainage ditches, except for water that accumulates around the Amphitheatre stage. The elevation of the Amphitheatre stage is lower than the surrounding grade, resulting in impounded water in this area. Water collected around the stage is subsequently pumped to the detention basin. Currently unlined, the drainage ditches lie within 50 feet of the edge of the bluff at their closest point (BIA and WSDOT 2000). The total length of the ditches is approximately 3,000 feet.

Basin 2 is currently sized to provide 6.5 million gallons (19.9 acre-feet) of storage capacity, representing 2.5 million gallons of inactive ("dead") storage for water quality purposes and 4.0 million gallons of active ("live") storage for design storm events. The current pond design is based on outdated standards for stormwater treatment and will be updated according to current King County guidelines (see *Project Description*). The maximum surface water elevation within the pond is 214 feet above mean sea level, which is approximately 1 to 5 feet below the ground surface (BIA and WSDOT 2000). The basin has extra freeboard all around and an earthen berm, approximately 2 feet high on the southwest corner (D. Every, pers. comm., 2001). The berm is also lined with PVC.

Stormwater discharged from basin 2 is conveyed over the bluff via enclosed (tightlined) HDPE pipes to an energy dissipater upslope of Pussyfoot Creek. Discharge rates are controlled at the outlet pipes. The secondary outlet pipe provides a backup to the primary outlet in the event of an emergency. The outlet pipes emerge from the pond on the southern end of the basin, are buried below ground level, and are joined at the eastern manhole. (BIA and WSDOT 2000, Figure 4.1-1). The pipes then run diagonally across the top of the bluff and emerge roughly 10 feet below the top of the bluff. Visual observations of the area indicate the presence of a shallow depression where surface water could collect and cause localized erosion. The depression extends from the approximate location of the eastern manhole to the top of the bluff. Additionally, where the outlet pipes emerge from the face of the bluff, several vertical cracks roughly 6 to 8 feet long are evident.

The northwestern corner of the site discharges to the west, directly over the bluff. This drainage is part of the runoff from a forested area north of the Amphitheatre site. Runoff from the eastern section of the site discharges through wetland 2 at the southeastern corner of the site. The wetland also receives runoff from a roadside ditch along SR 164 and the water from a small watershed east of SR 164 through a culvert. The latter sources appear to be collectively larger than the flow from the site into the wetland. All of this flow discharges south across SE 408th Street, via a ditch through another wetland area, and ultimately down a draw in an intermittent tributary to Pussyfoot Creek below the bluff.

Wetlands. Preconsultation construction of the Amphitheatre significantly altered six wetlands and six swales, totaling 3.7 acres. These wetlands were disked, cleared, or excavated during initial construction activities in 1997. The wetlands that were disked only (surface ripped with a disk plow) have recovered their former vegetation and functions.

Wetland delineation was done after the original pre-consultation impacts had occurred. Dames and Moore identified many of the wetlands based upon topography, soils, and hydrology. Most of the wetlands were dominated by pasture grasses. The most diverse wetland was wetland 2. Wetland 2 was forested and had been cleared for construction, but had a few remaining patches of shrubs and emergents along the roadway. Formerly, the outflow for wetland 2 was constricted by 408th Street and blockages sometimes resulted in its flooding, making it deeper and more persistent than it would be if no blockages occurred. Hundreds of new shoots and seedlings have sprouted at wetland 2, some of which were relocated at the site for optimal distribution (BIA and WSDOT 2000; D. Every, pers. comm., 2001). Growth of the planted trees to full size is expected to take 30 to 40 years.

A berm will be constructed along the south edge to help maintain the pre-project flooding regime of wetland 2. The berm is required by the Corps due to concerns that the duration of inundation would be too short due to flow modifications (D. Every, pers. comm., 2001). To restore the hydrology of wetland 2 the previous inflow magnitude, frequency, and duration was estimated based on topography and cover. Inflow comes from off site via the roadside ditch and the unnamed tributary of Pussyfoot Creek.

Roads. Three roads provide access to the White River Valley from this portion of the Enumclaw Plateau. Two of the roads are gated and the third road connects to a network of dirt roads on the valley floor. Anecdotal information suggests that it may be possible to drive from Auburn to the vicinity of the Amphitheatre on these roads, although it would require driving adjacent to, or perhaps even within, the White River channel at times, thus limiting accessibility during high water (D. Every, pers. comm., 2000). These roads are used by Muckleshoot Fisheries Enforcement to patrol Tribal lands.

D. Effects of the Proposed Action

This section discusses the direct and indirect effects of the proposed action and its interrelated and interdependent activities. NMFS may use two approaches for assessing the effect of the proposed action (NMFS 1999). First, NMFS may consider the impact in terms of the number of Puget Sound chinook that will be killed or injured during a particular life stage and gauge the effects on the population size and viability. Alternatively, NMFS may consider the effect of the proposed action on the freshwater biological requirements of the species, which is generally done in terms of the habitat indicators of the MPI.

First in this analysis, the probable direct and indirect effects of the action on the chinook salmon and their critical habitat are identified. The ESA implementing regulations direct NMFS to do so "together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 C.F.R. §402.02)." Direct effects include those occurring at the project site and can extend upstream or downstream based on the potential for impairing fish passage, hydraulics, sediment and pollutant discharge, and the extent of riparian habitat modifications. Indirect effects are those effects that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Indirect effects can occur throughout the action area, and are used to help define the extent of the action area.

Then, the effects of the land transfer and the proposed land uses are expressed in terms of whether the proposed action is likely to restore, maintain, or degrade an indicator of chinook habitat functional condition. By examining the effects of the proposed action on the habitat portion of a species biological requirements, NMFS can gauge how that action will affect the population variables that constitute the rest of a species' biological requirements and, finally the effect of the action on the species's current and future health (NMFS 1999).

In this analysis, the majority of the effects of the proposed action are attributed to the construction and operation of the Amphitheatre, although the probable effects of all proposed land uses were considered. The proposed action may induce changes to the following components of chinook salmon habitat: peak and base flows (through groundwater extraction, changes in wetland hydrology, impervious surface), physical habitat (through changes to riparian vegetation, large woody debris, and pool frequency), and water quality (temperature changes, total suspended sediments, and chemical/nutrient loads). The potential that enforcement activities may increase in off-road areas in the Pussyfoot and Second Creeks within the White River floodplain during event days is also addressed. Although these changes and impacts are addressed separately, their effects are likely to be additive in nature. For example, changes in hydrology could result from the additive effect of otherwise minor impacts on an already-degraded baseline. These impacts could then be exacerbated by other adverse effects of the project on water quality, for example. Also, potential leaks in basin 2 could either exacerbate or be caused by normal mass-wasting events along the bluff.

1. Hydrology

The proposed project may adversely affect chinook salmon by altering the hydrology of Pussyfoot Creek, Jones Creek, and the White River through groundwater extraction and land uses changes. Changing the land use at the Amphitheatre site, from pasture lands to a commercial facility, will modify runoff processes (and potentially the base flow/peak flow indicator of the MPI) through ditching, draining, soil compaction, and through newly added impervious surfaces. For chinook salmon and other aquatic organisms, flow regimes in streams and rivers determine the amount and availability of habitat, and the seasonal patterns of disturbance. Streamflow is also important in determining the rate at which smolts move downstream (Spence *et al.* 1996). High flows shape channel width and depth, and redistribute sediments. These events are essential in the development and maintenance of healthy floodplains as fine sediments are deposited, gravel and organic matter are recruited, aquifers are recharged, and seeds are dispersed (Spence *et al.* 1996). High flows can also cause fish mortality through displacement and redd scour. Similarly, low flows can also create conditions that affect fish survival through reductions in useable habitat area, altered temperatures, reduced availability of aquatic insects, and increased competitive interactions (Gregory and Bisson 1997).

The project seeks to minimize the effects to peak and base flows in the White River, and Pussyfoot and Jones Creeks through stormwater management facilities, wetland enhancement and creation, increasing riparian buffer, water conservation measures, extensive monitoring and follow-up actions if necessary, and by increasing hydraulic complexity in Pussyfoot Creek. NMFS expects, as described in the following sections, that these measures will reduce the degree and likelihood of adverse effects such that, the additive or cumulative effect of the project would be to “maintain” this indicator (hydrology [peak/base flows]) of functional salmon habitat. In the White River, this indicator is presently is considered “not properly functioning” and the hydrology of Pussyfoot Creek is considered “at risk.”

Groundwater Extraction

Early reports produced for the Tribe suggested that the combined effect of the two wells that supply the Amphitheatre may adversely affect the base flow of Pussyfoot Creek. Concern regarding this potential effect prompted the Tribe and Clearchannel to investigate this issue in further detail. Recently, a study was contracted to examine the effects of groundwater extraction on Pussyfoot Creek flows. To simulate the potential effects of the Tribe's wells, Massmann (2001b) developed a conceptual model using the U.S. Geological Survey's MODFLOW program. Massmann (2001b) concluded that 1) the wells will extract water from the aquifer that is indirectly hydraulically connected to the White River; and 2) that significant vertical leakage will not be induced from shallower aquifers (i.e., the Pussyfoot Creek/Springs aquifer) because hydraulic conductivity of the confining unit is very low, the shallow aquifer deposits are discontinuous, and groundwater appears to flow in a northwesterly direction.

According to the model, water levels respond relatively quickly when drawdown occurs at peak capacity (Massmann 2001b). Within 24 hours after initiating pumping, the model suggests that about 95 percent of the groundwater would be derived from the White River Valley (Massmann 2001b). Changes in pumping rates would change discharges to the White River Valley, in a relatively short time. The conceptual model estimates that it will take a matter of days or weeks for increases (or decreases) in pumping rates at either well to result in an equivalent reduction (or increase) in discharge to the White River (Massmann 2001b).

Only a portion of the water drawn from the distribution system would be used for the Amphitheatre. Currently, daily average water use is presently about 42,000 gallons per day (roughly 30 gpm) (R.W. Beck 1998; Massmann 2001b). Water demand at the Amphitheatre could be met by operating the one well during each event, or by obtaining water from the storage tank and replenishing the tank between events. By operating in the latter fashion, the Tribe would need to increase pumping during the Amphitheatre event season to 40 gpm (an additional 10 gpm) based on the assumption that average attendance throughout the event season would be 10,000 people (Massmann 2001b). For water demand purposes, Massmann (2001b) also estimated the increased pumping rate for 180-day event season with all sold-out events. Under this exaggerated scenario, water demand would increase 20 gpm (to 50 gpm).

Based on Massmann's work, it appears that the additional demand during the Amphitheatre event season (May through October), would cause a small decrease in the amount of water that would otherwise discharge to the White River Valley (Massmann 2001b). The small amount of groundwater extracted would have an additive effect on an already degraded baseline, and would coincide with the upstream migration of adult chinook salmon. According to the particle tracking simulations, the groundwater extracted would otherwise enter the White River Valley downstream of RM 14 (Massmann 2001b). Conversely, the counseling center well is expected to draw from a shallower aquifer, which likely contributes water to the terrace and meadow nearby, although it may also contribute to Jones Creek, north of the counseling facilities. Water demand at the counseling center is very small compared to the Amphitheatre and most (roughly 70 percent) of the water will be returned to the ground through the septic system (D. Every, pers. comm., 2001).

The total quantity of water the Tribe proposes to withdraw to meet the needs of the proposed land uses is not, by itself a significant volume. In fact, changes to surface flows would be difficult to detect through standard flow meters for several reasons. First, only a small volume of water would be extracted for the Amphitheatre relative to baseflows (less than 0.5 percent). Second, spatial and temporal variability in surface water velocities, intragravel flow, and irregular streambed texture would preclude physical readings of velocity or discharge at such a fine scale. Third, the Valley gains considerable groundwater through recharge from Lake Tapps in the same general vicinity that the wells would capture water (Massmann 2001b). The White River is also dominated by glacial melt-water, and flows during concert season would be some of the highest of the year, which would tend to mask the reduction. The loss will also be offset by each measure that the Tribe and Clearchannel has proposed that reintroduces water to the soils (i.e., use of a septic system at the counseling center, use of rain-water collected from rooftops, and directing stormwater to wetlands (after treatment)), further reducing the degree and likelihood of adverse effects on chinook salmon and their habitat.

Impervious Surfaces

Scientific studies indicate that there is a strong relationship between modification of the land surfaces during urbanization, changes in hydrological properties of a site, and degraded fish habitat (Klein 1979; Booth 2000). Although an "imperfect measure of human influence," basin imperviousness is commonly used as an indicator of basin degradation (Booth 2000). Conversion to impervious surfaces can change the hydrological regime of a basin by altering the duration and frequency of runoff, and by decreasing evapotranspiration and groundwater infiltration (May *et al.* 1997). Such changes can typically be detected when the total percentage of impervious surface in the watershed is between 5 and 10 percent (Booth and Reinelt 1993). Watershed degradation likely occurs with incremental increases in impervious surfaces below these levels and is exacerbated by other factors such as a reduced riparian cover and pollution (Booth 2000; Karr and Chu 2000).

Dames and Moore (2000) estimated that impervious surfaces covers about 2.4 percent and about 2.2 percent of Pussyfoot Creek and the White River basins, respectively. The proposed action will create about 71 acres of new impervious surfaces at the confluence of Pussyfoot Creek and the White River. The majority of new impervious surface is attributed to the Amphitheatre project and its associated highway improvements (70 acres), and slightly less than one acre is attributed to the counseling center. About 50 acres of the new impervious surfaces will drain into the lower portion of Pussyfoot Creek, and about 6 acres of impervious surface will drain into the unnamed tributary of Pussyfoot Creek, while the remainder of the impervious surface drains to the northwest and enters a side channel of the White River (Dames and Moore 2000; BIA and WSDOT 2000). The result is a measurable increase in impervious surface in the Pussyfoot Creek basin (from 2.4 percent to roughly 3.4 percent) and a negligible increase in the White River basin because of its size. Although, most of this new impervious surface would occur at the confluence of the White River and Pussyfoot Creek, roughly 85 percent would drain into the lower 200 to 300 yards of Pussyfoot Creek.

The relationship between on-site patterns of groundwater movement, geology, and aquifer recharge has been difficult to establish at the site, particularly given the variable nature of the Osceola mudflow. Earlier in this consultation NMFS had concerns that the lost opportunity for infiltration could potentially reduce baseflows within Pussyfoot Creek and in turn, reduce salmon access to the mouth of Pussyfoot Creek or the utility of the confluence pool for migrating and holding chinook. When construction is complete, added impervious surface will prevent the infiltration of precipitation reducing the groundwater contribution of the site. Recent particle tracking simulations by Massmann (2001b) suggest, however, that what water currently infiltrates soils at the Amphitheatre site probably does not contribute to baseflows in Pussyfoot Creek. The extent to which the water that moves through the soil actually contributes to deep groundwater sources appears quite limited (Massmann 2001a,b). The soils at the site exhibit very low permeability, and a large portion of the water that infiltrates surface soils likely discharges along the bluff. Seeps tend to occur along the bluff when surface soils are saturated and the rate of precipitation exceeds the rate at which water can infiltrate the underlying stratigraphic layers. During these wet periods water also moves laterally underneath the site from upland areas.

These conditions are the result of the slow draining Osceola mudflow and the glacial till layer underlaying the site. Although these dense strata restrict the rate at which groundwater moves downward, they do not strictly prohibit the vertical movement of water. Water flow between the grains, termed primary porosity, still occurs although it would be limited relative to more porous soils. Rather, the greatest contribution to aquifer recharge and downslope stream flows can occur through mechanisms of secondary porosity, such as cracks or other discontinuities in these dense layers (Haefner 2000). Fractures in rock have long been recognized as providing important hydrological connections between surface waters and aquifer recharge, but only recently has the importance of cracks within unlithified (not hardened) material been recognized

(Weatherington-Rice *et al.* 2000). Presumably such features exist under the Amphitheater site; however, no data are available to suggest their extent or location, nor their influence on groundwater flow to deeper aquifers. Rather, the best available indicator of how the proposed land uses will affect groundwater recharge comes from traditional estimates of infiltration (which are based upon the hydraulic conductivity of the underlying layers). These estimates do not account for infiltration through mechanisms of secondary porosity, and only roughly account for spatial differences in infiltration throughout the site. Rough estimates of the hydraulic conductivity were obtained from tests conducted at monitoring wells at and near the Amphitheater site (Earth Consultants 1997). Most of these tests indicate that infiltration occurs very slowly on the Amphitheater site suggesting that a large portion of the water that does infiltrate surface soils likely discharges at the bluffs (Massmann 2001a).

Draining, ditching, and covering the site with impervious surfaces will likely reduce seeps along the bluff and may reduce overall site susceptibility to mass wasting. In places where the bluff (wall) is steep and adjacent to the river (e.g. at the river bend), the runoff may have provided an influx of clear water to the otherwise turbid water in the White River. In other glacial rivers, rearing chinook fry have been observed in these areas along river margins, probably because sediment concentrations are lower (Chamberlin *et al.* 1991; Scrivener *et al.* 1994). The extent to which this loss would affect juvenile chinook in the White River appears limited. NMFS expects that clear water from Pussyfoot Creek would have an even greater mitigating effect on suspended sediment concentrations in the White River. Further, NMFS expects that most of the seepage probably infiltrates the colluvium at the base of the slopes before reaching Pussyfoot Creek or the White River.

Conversion to impervious surface will, however, alter the total volume of water runoff leaving the site. Water that otherwise would slowly move through the soil or be lost to evapotranspiration will be conveyed to stormwater detention ponds. The detention ponds, designed to King County standards for level 2 flow control, will match durations for 50 percent of the 2-year peak flow up to the full 50-year peak flow. The intent of this design standard is to protect the channel from increased energy that can aggravate erosion rates (King County 1998). Flows below one-half of the 2-year storm will not be controlled, and NMFS expects that these flows would increase in duration and frequency.

Structural stormwater controls may reduce effects, but do not necessarily protect the biological integrity of lowland anadromous streams in Puget Sound (Horner and May 2000). Increases in stream flows can decrease the spatial and temporal extent of water velocities within the swimming tolerance of juvenile salmon. To minimize this effect on juvenile salmonids the Tribe added wood below the stormwater discharge to create low velocity pockets where fish can take refuge (R. Malcom, pers. comm., 2000; Dames and Moore 2000).

The success of the wood project will depend largely upon the function and stability of the anchoring system, which research suggests may have high failure rates (Frissell and Nawa 1992). NMFS expects that the wood will provide only a small area of refugia, limited by its small size of the wood, and may fail to function as intended. It is NMFS' opinion, that the project could have been used to increase LWD loading within Pussyfoot Creek and improve the functional condition of chinook salmon habitat while also providing for greater wood stability. In general, larger pieces of wood serve to retain small pieces that may otherwise be transported during high flows, thus making them "key" pieces in debris accumulations. The pieces placed below the stormwater outfall, however, were small, cut pieces that were anchored in place, none of which met the NMFS definition of LWD according to the MPI. NMFS defines LWD in the MPI as the size and composition of material that would occur naturally at the site (whole trees with intact branches). Such pieces would have a higher likelihood of serving as key functional pieces without anchors, and would interact dynamically with water flow creating the pockets of low velocity refuge over a greater range of flows. To address NMFS' concern regarding the functional life of the wood project, the Tribe has committed to monitoring the wood over time.

Finally, the project has the potential to adversely affect functional chinook habit if prolonged heavy rains lead to water overtopping the detention basins or bypassing the storage area such that it may experience little or no detention or treatment. The project design minimizes the risk of overtopping at three stormwater basins by adding containment berms and secondary outlets. Basins 2 and 4 for the Amphitheatre, and the stormwater pond for the counseling center have primary and secondary outlets for large storm events and other emergencies. These redundant outlet systems reduce the likelihood of basin overtopping, which is particularly important given the proximity of basin 2 to the unstable bluff. Basin 2 will also have a tertiary outlet system installed to reduce the risk of overtopping in the event a 100-year storm occurs when the basin is full.

Wetlands

The proposed project will alter wetlands on the Amphitheatre site. Permanent fills are limited to 0.31 acres, which will be mitigated for through the creation of 1.58 acres. Only about 0.035 acres of wetland 2 would be filled, while the rest of the fill would be distributed among several of the small grassy swales (wetlands 1, 3, 4, 5, and 7) (Dames and Moore 1997). Mitigation for the fill was determined with the Corps in accordance with Section 404 of the Clean Water Act, and is part of this consultation. The mitigation will consist of creating a wetland of 1.1 acres near the counseling center and 0.57 acres near the Amphitheatre facilities. The compensatory sites will receive water from the Amphitheatre facilities and clean stormwater from detention basin 4 to maintain suitable hydrological conditions to support wetland plants.

The majority of the 3.7 acres of wetlands on the transfer lands that were affected by initial construction activities will be restored. Most of these wetlands were dominated by aggressive/nonnative pasture grasses, with the exception of wetland 2, which was forested (Dames and Moore 1997). Wetland restoration will be done to replace functions lost during initial construction activities. This will largely consist of restoring the depth and contour of the swales, as many were made deeper during initial activities (D. Every, pers. comm, 2001). Seed mixes to be used in the grass swales were recommend by the Corps (D. Every, pers. comm., 2001).

In general, wetlands are important to the maintenance of functional chinook habitat through their role in flood attenuation, groundwater recharge and discharge, downstream water quality, and the moderation of microclimate. Wetland 2 likely performed several of these functions given its size and complexity (Dames and Moore 1997). Most of the other wetlands affected by early activities were small in size with limited topographic relief, and were rated by Dames and Moore (1997) as performing limited functions. Although there remains a temporal loss in the functions that wetland 2 provided, NMFS expects that one indicator of wetland function, vegetation, will continue to improve over time.

The performance standards for the restoration and mitigation goals of the wetlands outlined in Appendix J-1 of the PFEIS may be insufficient to evaluate success, particularly for wetland 2. In general the plan requires at least 80 percent plant cover of the sites, with 70 percent of the species surviving from 2 to 5 years after planting. Non-native, invasive species should not be greater than 10 percent. If monitoring indicates that the survival rates or percent cover of native species are not being met, then replanting, soil amendments, or other contingency measures will be implemented.

According to a recent report National Research Council (NRC) Committee on Mitigating Wetland Losses Under the Clean Water Act, management may be necessary for a longer time frame, as it may take some sites like forested wetland, up to 20 years to achieve functional goals (NRC 2001). For the Amphitheatre, control of nonnative aggressive plant species may also prove problematic in achieving plant performance goals. Therefore, NMFS believes that the mitigation plan should contain provisions to extend monitoring and maintenance, if after 5 years, plants are not performing as expected.

Prior to construction, wetland 2 was affected by poor water quality and a disturbed hydroperiod. Formerly, wetland 2 was situated within a septic drainfield. Water quality presumably improved when the residence and drainfield were removed. The hydroperiod of wetland 2 was also affected by the nearby roadway and culverts. During large rain events wetland 2 reportedly backed-up and overflowed across driveways and a dirt road to the White River (Dames and Moore 1997). The Corps has required that the Tribe ensure the hydrological condition (i.e., timing, duration, depth of water) in wetland 2 be similar to that which existed prior to construction activities. To do so, without continued flooding of the roads, the Tribe proposes to create a berm along the south edge adjacent to the roadway. The wetland will have the same water sources, and will also receive additional surface water from the Amphitheatre roof and berm (Dames and Moore 1997). A control structure will be designed into the berm to pass storm flows, while allowing water to drain slowly during lesser flows. The proposed modification intends to recreate previous water depth and retention times without causing flooding over the roadways.

Plant survivability and distribution will be used to monitor the success of the modified hydroperiod (Dames and Moore 1997). The basic tenet behind this approach seems reasonable since hydrology is the primary influence on wetland development, structure, and persistence (NRC 2001). Presently, the mitigation plan states that if vegetation would thrive better with lower water levels, then the outlets would be modified to achieve desired conditions (Dames and Moore 1997). Hydrology, however, may be one of the most difficult functions to establish in a wetland (Holman and Childres 1995 *in* NRC 2001). Based on the on the recent publication by the NRC, NMFS believes the performance criteria for monitoring and modifying the hydrological conditions at the wetlands is vague and lacks measurable standards. Clear, comprehensive performance standards should be outlined, replete with milestones, for the wetlands having hydrological controls. Further, since preconstruction monitoring of the hydrology of wetland 2 was not conducted before it was altered, NMFS recommends that the hydrological regime of wetland 2 be based, in part, upon comparisons to nearby reference sites as recommended by the NRC (2001).

Overall, NMFS expects that the wetland restoration should be successful in terms of regaining many of the functional wetland processes that existed before initial construction activities. The success of the mitigation sites, however, will need to be evaluated over time. NMFS expects that measures that return waters to the soil should offset, to some extent, the incremental groundwater losses attributed to the proposed action.

<u>2. Riparian Vegetation</u>

The project will not change the existing riparian vegetation on the majority of the transfer lands. Construction of the counseling center will not affect riparian vegetation and when construction of the Amphitheatre is complete, a marginal increase in riparian vegetation along Pussyfoot Creek and the White River will occur through the planting of vegetation along the bluff and at the site of the 1997 slide. Over time this vegetation will improve site conditions by providing a future source of LWD, and other important functions of vegetation, including reduced surface erosion, soil stabilization and retention through root strength, and reduced groundwater levels through evapotranspiration (Rhodes *et al.* 1994; Dunne and Leopold 1978).

Only native trees will be planted along the bluff and at the site of the 1997 slide. The revised planting plant directs that at least half of the Douglas fir planted will be bare- root or “ball and burlap” conifers at least 6-10' in height. Plantings will be monitored for survival for five years and at the end of five years, live tree density will be at least 150 trees per acre. If density is below 150 trees per acre, then trees will be replanted to 200 per acre. All newly planted areas will be fenced off with brightly colored ropes and signs to protect vegetation from trampling by event attendees. The effect of planting along the bluff will not be realized for some 40 years, or more, because the vegetation proposed for planting is small and will not provide the function that large mature vegetation provides for many years in the future. The revision of the planting plan to include some larger trees will provide some immediate structural diversity to the corridor, specifically the larger trees are expected to have larger roots and provide more immediate increases in root strength.

Currently, the Tribe has no immediate plans for timber harvest in the transfer lands. Since transfer lands contain some of the highest quality riparian vegetation in the lower White River and because NMFS believes that the existing environmental baseline for the riparian vegetation in the action area likely ranges from “at risk” to “not properly functioning” future reductions in riparian vegetation are of concern. If, however, timber harvest activities remain limited on the transfer lands, then ecological function of the existing riparian vegetation will continue to improve towards a “properly functioning” condition. While the Tribe is not currently planning to harvest timber, such plans would be subject to approval by BIA and thus consultation in accordance with Section 7 of the ESA.

3. Pool Frequency and Quality

Large pools are particularly important to juveniles and adult chinook salmon. Pools provide deep areas to hide from predators, low velocity resting areas, and areas of thermal refugia (Reeves *et al.* 1991). In fact, pools are generally the most productive rearing habitat available to juvenile salmonids (Sedell and Everest 1991). Pools also provide thermal and metabolic refugia for adult chinook prior to spawning (Bermann and Quinn 1991). Ladley *et al.* (1999), however, did not find White River chinook holding for extended periods within the bypass reach and speculated that available pools may not be deep enough to provide adequate thermal refugia.

Pool frequency and quality are considered degraded for the White River and Pussyfoot Creek. Land uses proposed with the land transfer could potentially indirectly alter pool frequency and volume in Pussyfoot Creek by altering peak flow, flow timing, and sediment input. The action includes several measures to minimize or eliminate changes to these indicators (e.g., stormwater facilities), and therefore should not have a measurable effect on pool frequency or quality in Pussyfoot and Jones Creeks, or the White River. Rather, the project will improve riparian vegetation along the bluff, which would, over time, improve both pool quality and frequency in lower Pussyfoot Creek and the White River by increasing recruitable woody debris. Nevertheless, it is NMFS' opinion that the wood debris project (installed to mitigate the effects of stormwater discharges) could have also been used to improve pool frequency and quality in Pussyfoot Creek. Due to its small size, however, the wood project may have only a negligible beneficial effect on this indicator of functional habitat.

4. Water Quality

The BIA determined that the project has the potential to adversely effect the following indicators of water quality: temperatures, sediment/turbidity, and chemical contamination. NMFS believes that the proposed action minimizes these effects to the extent possible with current technologies, and monitoring and adaptive management provide a mechanism for responding as technology changes.

Temperature

Runoff from the new impervious surfaces could contribute warm water to Pussyfoot Creek, resulting in the incremental degradation of instream temperatures. In other regions, runoff from hot paved surfaces has indirectly altered water temperatures and adversely affected fish habitat, particularly where the ponds are very large and treat large areas of impervious surface (DDNREC and EMC 1997). Few studies address the effectiveness of stormwater ponds in mitigating thermal changes to receiving water bodies, or the extent to which warm water discharging from stormwater basins is a problem in the Pacific Northwest region. The temperature of the water at release may be moderated (or exacerbated) to some extent by the conditions of the discharge pipes. That is, the distance the water travels and the temperature of the pipes could also affect water temperatures. Nonetheless, the Tribe and Clearchannel determined a sustained rainfall event during hot weather in the summer could lead to warm water discharging into the lower 600 feet of Pussyfoot Creek (Dames and Moore 2000). In response, the Tribe and Clearchannel have committed to pumping basin 2 down to a level that will allow containment of the probable maximum summer storm before and during summer. Water pumped from the stormwater detention basin will be used for landscape irrigation on the Amphitheatre site or will be pumped to basin 4. A precise pumping schedule has not been established, but it is likely to occur between June and September (D. Every, pers. comm., 2000).

This may not, however, prevent the release of warm water to Pussyfoot Creek. If water temperatures in the stormwater basin rise above background temperatures in Pussyfoot Creek, before pumping begins, stormwater discharges could elevate temperatures in Pussyfoot Creek and the confluence pool. To ensure that the pumping schedule is adequate to minimize potential warmwater discharges, the Tribe will also monitor water temperatures in Pussyfoot Creek, in the stormwater basin, and at the outlet. Monitoring data would provide a means for determining if additional measures are necessary to further minimize warm water discharge, such as shading the pond, or modifying the pumping schedule. The Tribe proposes to consider discharges to have increased stream temperatures in Pussyfoot Creek if the water temperature at the thermograph downstream of the diffuser is statistically greater than the water temperature at the thermograph upstream of the diffuser. Otherwise, increases in temperature will not be considered an impact of the project. This approach does not account for future changes in background temperatures from land uses elsewhere in the basin. Temperatures in Pussyfoot Creek upstream of the stormwater outfall may reflect a progressively degraded condition over time, which would allow for progressively warmer discharges from the stormwater basin that could exceed the thermal preference of chinook salmon.

Temperatures in Pussyfoot Creek appear to range from "at risk" to "properly functioning." Conversely, temperatures in the mainstem White River can get quite high during summer months when adult chinook salmon are migrating upstream. Adult spring chinook salmon reportedly migrate upstream at temperatures ranging from 3.3 to 13.3 degrees Celsius (Bjornn and Reiser 1991). The recommended upper limit for spawning and incubating spring chinook is 13.9 and 14.4 degrees Celsius, respectively. Changes in stream temperatures can cause delays in migration, reduce maximum available dissolved oxygen levels, lead to disease outbreaks, and accelerate or retard maturation (Bjornn and Reiser 1991; Spence *et al.* 1996).

Eight processes, however, interact to regulate stream temperatures: evaporation, short-wave radiation, long-wave radiation, convective exchange with the air, evaporation, conduction with the stream bed, groundwater inputs, and hyporheic exchange (Spence *et al.* 1996). Vegetative cover helps moderate short-wave radiation, which is generally the dominant source of energy reaching a stream (Spence *et al.* 1996). Pussyfoot Creek (above the mainstem White River depositional area) is bordered by a mature riparian forest composed primarily of black cottonwood, red alder, and bigleaf maple, which would moderate some of the effects of stormwater temperatures.

Total Suspended Sediments and Chemical Contamination

Portions of the mainstem White River and tributaries are listed under the 303(d) list for pollutant loading. According to the MPI, this indicator is "not properly functioning." The project is expected to incrementally degrade this indicator through the addition of stormwater runoff from parking lots, even with stormwater treatment controls. Wastewater treatment and handling elements of the proposed action were also evaluated for potential adverse effects on chinook and their habitat.

Stormwater Management. Stormwater collected from parking lots and the highway improvements that is discharged to Pussyfoot Creek and the White River has the potential to carry a number of toxicants. Contaminants deposited on parking lots from automobiles include lubrication system losses, oil, grease, hydraulic fluids, antifreeze, particles from tires and brakes (particles of rubber and metals) (Ruediger and Ruediger 1999). Such runoff can convey pollutants (e.g., polynuclear aromatic hydrocarbons (PAHs) and metals) at concentrations that are toxic to fish (Spence *et al.* 1996).

Concentrations of pollutants leaving the Amphitheatre site will be highest with the onset of fall rains, at the beginning of the hydrograph. Most of these pollutants will accumulate on the parking lots over the summer concert season and will be flushed from the parking lots with the first storm. The parking lots are not expected to receive much use during winter because of the seasonal nature of the facility. The project has been designed to minimize the transport of pollutants (e.g. sediment) during construction and operation. Surface sediments washed from the parking lots will be conveyed to detention basins and will also settle out and collect within the perimeter ditches, which NMFS expects will significantly reduce inputs to Pussyfoot Creek. According to the PFEIS, the Construction Stormwater Pollution Prevention Plan and the revised Draft Operational Stormwater Pollution Prevention Plan, submitted to NMFS in February 2001, (D. Every, pers. comm.) also meet the Environmental Protection Agency's (EPA) requirements for stormwater management and erosion and sediment control, and are in accordance with EPA's multi-sector general permit. The EPA has issued Section 401 water quality certification for the project.

The stormwater ponds, swales, and oil/water separators will minimize pollutants delivered to off-site surface waters, through a treatment goal of 80 percent removal of total suspended solids (TSS) (King County 1998). NMFS expects that this would minimize the delivery of pollutants off-site, as many of the constituents in the water would likely be adsorbed by the sediments and settle out in the basins and ditches (Spence *et al.* 1996). For instance, PAHs are relatively insoluble in water and exhibit strong adsorption to particulates (Kennish 1992; Spence *et al.* 1996). Although, such ponds reduce pollutant loading to surface waters from impervious surface, it is not eliminated. In a recent study by Comings *et al.* (2000) the removal efficiency of two stormwater ponds was compared. Comings *et al.* (2000) found that metals (e.g. cadmium, copper, lead and zinc) removal efficiency ranged between 37 percent and 76 percent, and removal efficiencies for TSS was 61 percent and 81 percent. The long-term viability of these structures to function as designed is also questionable. Studies reveal that these structures are often not maintained over time, and that their effectiveness decreases as a result (Law and Band 1998; J.W. Morrissette & Associates Inc. 1998; Maryland Department of the Environment 1987, 1991).

As a general matter, when pollutants (e.g., metals and PAHs) enter streams, water quality degrades and biological oxygen demand increases. As a result, lethal or sublethal effects may occur to chinook. For instance, Arkoosh *et al.* (1991) found that juvenile chinook salmon that migrated through waters contaminated with PCBs and PAHs, bioaccumulated the pollutants, and showed signs of suppressed immune responses compared to uncontaminated fish. Similarly, Casillas *et al.* (1993) found that juvenile chinook in urban waters showed suppressed immune function, reduced survival, and impaired growth as they migrated to salt water. While NMFS does not expect episodes of acute exposure, NMFS believes it is possible some juvenile chinook may be exposed to small amounts of pollutants (e.g., ionic copper or PAHs), which could affect their ability to smolt.

Commitments by the Tribe and Clearchannel to monitor water quality of the stormwater discharges, and remove materials accumulated by the oil/water separator weekly and following storms of 0.5 inch or greater, will provide additional assurance regarding the efficacy of the stormwater facilities at reducing water quality impacts to chinook salmon and their habitat. Although the Tribe has indicated that stormwater discharges to Pussyfoot Creek and the White River will be within existing State water quality standards, NMFS has not yet determined the adequacy of those standards for avoiding jeopardy and adverse modification of chinook salmon habitat. Even so, NMFS believes that stormwater management is necessary to safeguard changes in water quality from chemical contamination. The Tribe commits to monitoring benthic organisms near the stormwater outfall, and monitoring for water quality, which should help to detect if habitat conditions become degraded over time. Response commitments have not yet been fully identified, and some of those that have been mentioned will not minimize adverse effects on chinook salmon. Specifically, the Tribe has suggested that they will review best management practices when sediment leaving the stormwater system exceeds 100 mg/l. Based upon Newcombe and Jensen (1996), it appears that this threshold is high and could allow sublethal, or even lethal, effects on fish depending upon the duration of exposure. Therefore, the final monitoring and contingency plan should clearly state a lower threshold for review of TSS levels and establish responses to correcting water quality exceedences. NMFS expects that stormwater discharges would have an small additive adverse effect on functional chinook salmon habitat.

Wastewater Handling and Transport. The wastewater treatment and handling elements of the proposed action were evaluated for potential adverse effects on chinook and their habitat. NMFS analysis of sewage management plan is restricted to the temporary containment and transport of event generated sewage to the King County Metro Treatment Plant in Renton.

A capacity event is forecasted to generate up to 140,000 gallons of sewage per day, and onsite storage capacity will be 126,000 gallons of sewage. Consequently, some sewage transport would be necessary during a capacity event, although most transport would occur the day following an event. About 24 to 35 trips would be necessary to dispose of the sewage and wastewater generated by a one-day capacity event. Based on the time needed to fill a truck and the time required to travel to and from the disposal facility, the process of emptying the onsite storage facility would generate between two and four truck trips per hour.

A tanker truck carrying the Amphitheatre sewage to Renton could be involved in a traffic accident resulting in spilled raw sewage. An estimated one spill every 72 years could occur along the sewage truck route. This estimate is based upon USDOT data on the frequency of tractor trailer accidents, and the ratio of spills per accident. National data probably underestimate the actual risk of a spill on the roadway in question but, site-specific data are not available. The actual risk of a spill is probably higher because trucks leaving the Amphitheatre traverse urban roadways, which generally have higher accident rates than rural roadways (WSDOT 1996). In fact, data from WSDOT (1996) suggests that portions of the route that the tanker trucks are most likely to travel when leaving the Amphitheatre have some of the highest accident rates among all State highways. Nonetheless, this data suggests that spill could occur during the life of the Amphitheater, and as a result, the transport route has been included in the action area.

The likelihood that a spill would affect chinook salmon and their critical habitat appears negligible. The project will generate an estimated 1,400 tanker truck trips between the Amphitheatre and the Metro treatment plant each year (Nielsen 2000). The maximum amount that a full truck can carry and potentially spill is 4,000 to 6,000 gallons of sewage. Although the sewage truck route encompasses 22.9 miles and crosses 11 streams, including 2 bridges, NMFS believes that the likelihood that a spill would reach one of these waterways is remote. For a spill to reach a waterway, it would likely need to occur within 200 to 300 yards (1/9th to 1/6th of the distance traveled) of a storm drain or discharge point. The Tribe has estimated that a spill, based on this scenario, would reach a surface waterbody once every 434 to 661 years (Nielsen 2000).

This risk of a spill reaching surface waters inhabited by chinook salmon is further reduced for a variety of reasons. First, most spills would likely be less than the maximum volume that a truck could carry. Second, if a spill were to occur, only a portion (if any) of the wastewater would likely enter surface waters because tanker drivers will have equipment and experience to provide immediate response and additional response contractors will be dispatched to the scene immediately. Third, flushing, dilution, dispersion, and attenuation will also vary depending upon the distance and gradient a spill would need to travel to reach a waterway and precipitation during such an event. Fourth, most of the sewage would also be transferred during low precipitation and low flow periods. Additionally, on site safeguards (e.g., berm and sump) built into the containment structure appear sufficient to reduce the likelihood of such a spill occurring at the Amphitheatre and during transfer to the tanker trucks. Consequently, although a spill could occur during the life of the Amphitheatre (one in 72 years) supporting the inclusion of the route in the action area, it does not appear likely that such a spill would adversely affect chinook salmon and their critical habitat.

The septic system for the counseling center could introduce some bacteria, viruses, and nutrients into the nearby waters, particularly if the system is not maintained properly. Since a septic system functions best when a healthy population of bacteria is present, the Tribe should limit the use of such things as drain cleaners, bleaches, antibacterial soaps, and disinfectants, which could kill the bacteria in the system. Further, drains should not be used to dispose of latex paint, drywall compound, cooking grease or oil, or other items that could clog the system (NESC 2001). Since the tank will be inspected regularly to ensure it is functioning properly, the drainfield will be some distance from Jones Creek and the White River, and nearby vegetation will likely uptake some of the nutrients, NMFS does not expect the septic system will adversely affect chinook salmon or their habitat. Rather, the septic system will mitigate most of the effects of groundwater extraction at the counseling center by reintroducing water into the soils on site. Therefore, NMFS does not expect this wastewater transport and handling actions associated with the proposed land uses will affect the chemical contamination/nutrient indicator of the MPI.

5. Sediment Input

As mentioned previously, the proposed action would alter runoff processes, reducing infiltration and subsurface flows, and localizing water in certain high risk areas (e.g., stormwater detention basins and ditches near the bluff). These changes could, in turn, alter the natural sediment yield of the site. In general, changes in land use activities that alter runoff processes can increase mass wasting and sediment delivery to downslope areas (Spence *et al.* 1996). Sediment delivery, whether through surface erosion or large-scale mass wasting events, is also a natural process that is vital to the maintenance of properly functioning conditions for salmon habitat. Spence *et al.* (1996) describe sediment transport processes as defining the nature and quality of salmonid habitat. The effect on salmonids from sediment transport, however, can be both positive and negative. That is, stream ecosystems are naturally subject to periodic catastrophic disturbances, and these events can add complexity and clean gravels to the stream channel, which are necessary to the formation and maintenance of spawning and rearing habitat (Bjornn and Reiser 1991). Fine sediments, however, can also reduce the survival of salmon eggs to emergence, and large-scale events can lead to displacement or direct mortality (Tagart 1984; Serdar 1999). Even in a glacial system like the White River, increases in sediment yield can have adverse effects. Evidence suggests that fish density is naturally lower in glacial systems than would be expected in clear water systems, indirectly resulting from sediment concentrations and duration (Newcombe and Jensen 1996).

The Amphitheatre site sits atop a 180-feet high bluff that is dynamic in nature, shows variable erosion potential and a history of shallow slumps and slides, and is identified as a landslide hazard area (McCabe 2000). During the course of this consultation there has been significant discussion regarding the potential effect proposed land uses could have on bluff stability and the functional processes that maintain salmonid habitat. Specifically, whether the bluff at the Amphitheatre is a landslide hazard area was not at issue, but rather discussion focused on what the historic rates and mechanisms of retreat in the transfer lands have been; what, if any, meaning do historic retreat rates have for predicting future events; what is the likelihood that the proposed land uses would increase bluff retreat rates; what is the risk that bluff retreat would lead to failure of the proposed facilities, particularly the stormwater management system; and ultimately, what are the potential effects on chinook salmon and their habitat?

Understanding geomorphic processes and disturbance regimes requires consideration of time spans much longer than is customarily available from limited records. Physical records spanning several cycles of disturbance would be ideal, particularly where landscape evolution is punctuated by sudden disturbances such as landslides. Absent such long term records, available information on historic bluff retreat within the project area primarily came from two sources, aerial photograph records and by calculating the long-term retreat rate for the White River basin (URS 2001). Aerial photographs taken in 1936, 1960, and 1997 were visually inspected and suggested that a few feet of recession likely occurred at the top of the bluff, within a limited zone near the central portion of the Amphitheatre site over the 61 year time frame examined (McCabe 2000). The amount, however, was too little to measure with accuracy or precision. Second, URS

(2001) was able to calculate a long-term cliff retreat rate based upon the development of the White River Valley, which was rather recent in geologic time. Although, considered conservative because the initial retreat of the valley walls would have been greatest during the initial development, the rate of retreat calculated is consistent with the aerial photo record and published literature for the region. Thus, according to URS, the historic rate of retreat at the Amphitheatre likely ranged from 0 to 1 foot per year, with the upper most value derived from the literature (URS 2001). Using the high end of the range of bluff retreat to predict future retreat, it appears that it would take roughly 150 years for the bluff to reach the outside edge of the berm protecting basin 2 in its revised configuration. Using the historic retreat rate calculated by URS for the White River Valley (0.33 feet per year), it would take more than 400 years for the edge of the bluff to reach the outside edge of berm. Under either scenario, it does not appear likely that the edge of the bluff will retreat to the extent that it would undermine detention basin 2 during the expected lifetime of the Amphitheatre project.

Survey notes taken in 1874 at the Amphitheatre site were also examined to determine rates of bluff retreat. NMFS had hoped that these notes would provide a longer record than available through aerial photos, and might provide supplemental information to determine the historic bluff retreat of the site. In fact, the notes seemed to suggest that bluff retreat has been considerably greater than detected in the aerial photo record (P. Bakke, pers. comm., 2000). To address this disparity, the 1874 survey data was field tested by examining the age of tree stumps along the bluff. According to the age of the trees examined, the actual rate of retreat could not have been as high as the survey records seemed to indicate (URS 2001). Rather, it appears, from this limited sampling effort, that the top edge of the bluff has probably not moved much in the past 100 to 150 years (URS 2001).

Retreat rates can be misleading, however, because mass wasting occurs episodically, and decades may pass with slopes exhibiting little erosion (Gerstel *et al.* 1997). Historic information is also an imperfect indicator of future behavior, particularly when construction alters site characteristics (e.g., surface and groundwater conditions). At the Amphitheatre site, patterns of sediment input and subsurface drainage patterns were altered when the swales at the site were directed away from the bluff and the stormwater management system was installed. These activities reduced surface erosion at the site and removed a source of chronic sediment input into Pussyfoot Creek and the White River.

While the swales contributed to bluff instability on the site, the main mechanisms for bluff recession have been groundwater-induced slumping, coupled with chronic rejuvenation of the slopes by the river. Ground water in strata below the Osceola mudflow triggered sporadic mass failures at the bluff face and is believed to have acted as a catalyst in the 1997 slide that entered

Pussyfoot Creek. Overall, when the Amphitheatre project is complete and the site overlain by impervious surfaces on-site percolation will be reduced, which should increase site stability. The extent to which mass wasting will decrease, however, is unclear because the relative contribution of moisture from interflow from upland areas versus on-site percolation of rains is unknown. Areas on the Amphitheatre site where water will still infiltrate surface soils are wetland and landscaped areas (including the perimeter buffer), and the collection areas (ditches and basins). Reduced interflow may reduce the risk of failure at the site overall, but in those areas where water is concentrated (e.g., ditches and stormwater ponds) the risk of mass wasting is heightened. To reduce infiltration near the bluff, a low permeable material (part clay) will be compacted into the ditches and two of the basins will have liners (one of which has a double-liner). NMFS expects that these measures significantly reduce the risk associated with these land use changes.

The most dynamic and erosive force at the Amphitheatre is the White River, and it will continue to affect bluff stability at the site regardless of land use changes. The river keeps the toe of the bluff clean and steep except when it migrates away from the bluff. The mainstem White River is highly dynamic, however, and has not yet attained equilibrium with altered conditions resulting from recent and historic human disturbances such as large wood removal, reduced wood recruitment, upstream dam/diversions, increased bank erosion, bank armoring and active channel manipulations. Based on channel migration patterns and as evidenced by young vegetation in the channel, it is possible that the river could alter course and begin eroding the bluff beneath the Amphitheatre facilities. The likelihood that channel adjustments will erode the bluff to the extent it will threaten the stormwater ponds during the life of the facilities appears to be very low. It is possible, however, that the ditch/parking lot, where it sits closest to the bluff's edge, may need to be relocated during the life of the Amphitheatre (McCabe 2000).

NMFS was also concerned that the outlet pipes from basins 2 and 4 are vulnerable to failure from falling trees, boulders and erosional processes. The outfall pipes of basin 2 run parallel across the top of the bluff and down a concave gully. Slope shape and surface depressions evident at the Amphitheatre site can contribute to slope instability by influencing surface and groundwater patterns. The concave shape of the gully, which supports the primary and secondary outlet pipes of basin 2, induces groundwater flow to converge and will also locally enhance slump activity. Surface depressions are also evident on the top of the slope where the outlet pipes were excavated. These depressions are expected to concentrate surface waters in these areas. Since the primary and emergency outlet pipes for basins 2 and 4 are parallel, if failure occurred, NMFS expects they would fail simultaneously. Earth movement could also separate the pipes from their connections at the pond or the seals around the outlet structures where dissimilar materials join. Furthermore, the gabion for basin 2 is located on unconsolidated material where risk of movement is high. Failure in any one of these areas could release water on unstable soils, which could increase surface erosion and the sediment yield into Pussyfoot Creek and mainstem White River.

To address these concerns, the Tribe has agreed to install a third outlet pipe at basin 2; monitor the bluff activity, pipe movement, and gabion performance, replacing or repairing problems as detected by monitoring; and provide redundant anchors on the pipes. These measures are expected to significantly reduce the risk that these structures will adversely affect the functional processes that maintain chinook salmon habitat.

NMFS expects that the precautions taken by the Tribe and Clearchannel will significantly reduce the risk that the project will aggravate sediment delivery to Pussyfoot Creek and the White River. While an event precipitated by nature could occur at the site and result in significant changes in Pussyfoot Creek and the White River, NMFS believes that a failure caused by the detention basins or outlet pipes is unlikely because of the distance between basin 2 and the bluff edge, the increase in riparian vegetation, the double-liner in basin 2, the redundant structural supports on the outlet pipes, and the extensive monitoring the Tribe has agreed to perform to detect potential problems (e.g., changes in water depth, changes in saturated conditions surrounding the basins, changes in structural facilities) that could lead to an increased risk of bluff failure. NMFS expects that monitoring would increase the chance of early detection and reduce the risk of failure, provided it leads to an immediate and meaningful response. Successful response will depend upon the mechanism of failure, and in the case of a gradual failure, the criteria used to make decision on when and how to deal with the problem. It is reasonable to assume that mass wasting events will still occur, but NMFS expects that the precautions and conservation measures incorporated into the project will prevent the project from exacerbating the natural rate of retreat at the site. Furthermore, monitoring bluff recession, as proposed by the Tribe, will provide a quantitative record that could be used to establish additional preventive protocols if needed.

6. Enforcement Activity

Evidence suggests that trespassing can be a problem during concerts at other venues (Seattle Times 1999; The Columbus Dispatch 2000) and could be a problem at the Amphitheatre. Currently, the Muckleshoot Fisheries Enforcement staff routinely check the White River Valley below the Amphitheater site for poaching and other illegal activities, and such monitoring is expected to continue. The Tribe does not expect that the number of enforcement trips to the river would increase as a result of the Amphitheatre because the perimeter fence should discourage most people from coming up from the river valley to a concert or going down to the valley from the site on concert event days. On event days, the perimeter will also be patrolled and the gate on the road from 408th Street to the mouth of Pussyfoot Creek will be locked (Every, pers. comm. 2000). No camping will be allowed at the Amphitheater site except for the annual powwow, during which camping will occur on the parking lots. Signs prohibiting unauthorized camping and parking, and illegal harvest and other forms of take, will also be posted on the land being transferred into trust (D. Every, pers. comm. 2000). If the Tribe assesses a fine for activities that cause take, those monies will be dedicated to rectifying the take, if feasible. Otherwise fees will be dedicated to habitat restoration and water conservation projects funded through the Community Mitigation Fund, as stated previously (D. Every, pers. comm. 2000).

Nonetheless, it may be necessary to increase enforcement patrols in the floodplain if trespassing becomes a problem. To determine if vehicle trips increase as a result of the Amphitheatre, the Tribe has committed to monitoring regular and event-day enforcement vehicle trips to the floodplain and across Pussyfoot and Second Creek (D. Every, pers. comm. 2001). Monitoring, including establishment of baseline information, will be detailed in the final Monitoring and Contingency Plan submitted to the NMFS within 90 days of completion of this Opinion. If a statistically significant increase is noted, then the Tribe proposes to discuss the need for crossing structures or other solutions with NMFS.

NMFS expects, however, that any increase in crossings could result in incidental take of chinook salmon. Chinook salmon migration and spawning will overlap with the concert season. If enforcement and trespassing does increase, chinook salmon could be directly and indirectly affected through the physical disturbance of habitat, behavioral disturbance, and direct mortality. Direct mortality could also include illegal harvest, and redd destruction. Increased vehicle crossings of Pussyfoot and Second Creeks would likely elevate turbidity levels, alter substrates, and reduce water quality. The following indicators of the MPI could temporarily worsen if vehicular traffic increases: nutrient and chemical contamination, sediment/turbidity, width/depth ratio, and streambank condition. NMFS expects that the responses built into the project to address increases in enforcement traffic will prevent temporary adverse effects from permanently impairing functional habitat.

E. Cumulative Effects

Cumulative effects are defined as those effects of future State, tribal, local or private actions that are reasonably certain to occur within the action area considered in this Opinion (FWS and NMFS 1998; 50 C.F.R. 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. Any future Tribal activity that requires BIA or other Federal agency involvement will constitute a “future federal action” and will be addressed in future section 7 consultations.

Once the transfer lands are in trust status, timber harvest, wetland fills, leases, easements, rights-of-way and road use agreements, for example, will all require regulatory compliance (D. Renwald, BIA, pers. comm., 2000) and are therefore not considered cumulative effects for the purpose of this Opinion.

Land ownership in the action area is almost all non-federal. Within the 42,131-acre Lowland-White WAU, for example, over 92 percent of ownership is private. Properties outside the Reservation to the north, east, and south are under the jurisdiction of King County, while properties to the west are under the jurisdiction of Pierce County. The Tribe maintains exclusive jurisdiction over development on Tribal lands.

Three broad categories of future non-federal actions may occur in the action area, or affect the action area: (1) growth and development, including conversion of forests or agricultural areas to residential areas, (2) forest management and agriculture, and (3) water withdrawals, hydropower, and irrigation diversions. All of these actions can result in the permanent loss or degradation of suitable aquatic habitat for chinook salmon. Growth and development actions include conversion of forest and agricultural lands to urban, residential, commercial, or other uses, and the usual infrastructure support systems such as roads and power-lines. Forest and agricultural management actions include harvest and farming activities in riparian zones, road construction, and the application of herbicides and pesticides.

Large population increases in the action area have occurred in recent years and are expected to continue. Out of 62 WRIAs in the State, WRIA 10 is ranked number 7 for anticipated increases in human population growth. The estimated 1990 population of 279,281 was expected to increase 33 percent within 20 years, to roughly 372,800 by 2010 (State of Washington 1999). WRIA 9 is ranked number 6 for growth, with the 1990 population estimated to grow from 474,150 to about 574,000 in 20 years. Future development in the action area would be consistent with adopted plans and zoning regulations for the Tribe, King County, and the Cities of Auburn, Enumclaw, and Black Diamond. The following information on future development is taken from the PFEIS, unless otherwise noted.

Land use in the northwest part of the Reservation has been more urbanized, while the southeast has been more rural and agricultural. The southeast end of the Reservation contains Tribal government buildings such as the Tribal Administration Complex and the Tribal school. Nearby land uses outside the Reservation are primarily rural residential, open space, and agriculture. Rural residences in King County are typically low-density, at approximately one dwelling unit (DU) per 2.5-10 acres. Uses west of the Reservation, across the White River in Pierce County, are a mix of open space and residential. New residential subdivisions are under construction near Lake Tapps, approximately 1 mile west of the project site.

Reservation zoning adjacent to the Amphitheatre is rural residential. Future development on the Reservation would be directed by the Tribe's Zoning Ordinance. A Comprehensive Development Plan is currently under preparation by the Tribe. Once completed, the Tribe's Zoning Ordinance will be revised. The content of the plan and the potential ramifications of zoning changes are uncertain. Even when the revisions are complete the Tribal Council will retain jurisdiction over zoning amendments. Anticipated Tribal projects on the Reservation include expanded government, clinic, and school facilities at the Administrative complex . A 50-unit housing complex is planned for the Davis property, behind the health food store at SE 388th Street. Other than the proposed Amphitheatre, the Tribe currently has no plans for commercial development in this part of the Reservation.

Future growth outside of the Reservation is likely to follow the trends of rural residential development in unincorporated King County, and urban residences in the Urban Growth Areas. For nearby farmlands in unincorporated King County, the agricultural designations in the County's Comprehensive Plan and Zoning Ordinance would slow development that was deemed incompatible with these designations. Background growth in King County would continue with planned growth in Enumclaw, Black Diamond, and Auburn. This is reflected in the expected two to four percent increase in traffic rates on SR-164, even without the project.

Farmland on the Enumclaw Plateau is facing intense development pressure. The dramatic rise in land values during the past two decades has resulted in commercial farmlands having more value as potential residential or commercial real estate. Consequently, farmlands continue to be lost to new development, and remaining farms operate with difficulty in the environment of a rapidly urbanizing county (KCDNR 1996). As such, the total acreage in farms in King County has declined 30 percent between 1982 and 1992 (KCOBSP 1999).

Several farms in the area are part of the King County Farmland Preservation Program (FPP), a bond measure that purchased development rights for prime but diminishing farmland. The purpose of the FPP is to preserve in perpetuity the farmland resource and prevent conversion of participating properties to more intense development. By purchasing developing rights and placing deed restrictions, participating properties are limited in their ability to subdivide into residential housing. However, the FPP does not require actual farming of preserved properties, and properties in the FPP may still be developed or used for open space purposes. For example, home construction, including exclusive multi-million dollar estates, has tripled last year on lands within the FPP, and pressure is growing to use preserved farmlands for nonagricultural uses such as soccer fields.

King County has designated FPP farmlands outside the Reservation to the east and south of the Amphitheatre Site. The nearest FPP property is located immediately east of 180th Avenue SE, approximately 1,500 feet from the site. King County also owns the development rights to approximately 4,800 acres of farmland on the Enumclaw Plateau. Seven of these properties are within approximately two miles of the site. In addition, other Farmland Presentation properties are located along the SE Green Valley Road.

The Enumclaw Plateau Agricultural Production District (APD) is located approximately 1,500 feet east of the Amphitheatre site. These APDs are King County designations of agricultural lands of long-term commercial significance. King County has approximately 41,000 acres in APDs county-wide (KCORPP 1999). Agricultural uses within the Enumclaw Plateau APD include dairy farming, livestock raising, grazing, hay growing, and some vegetable farming.

Other activities associated with increased development include transportation projects and water withdrawals. For example, the PFEIS listed nine transportation projects, most of which have funding through construction, in the vicinity of the Amphitheatre alone. King County, WSDOT, Auburn, Enumclaw, the Tribe, and others, are coordinating on a study of SR-164 corridor to address existing and future traffic congestion problems.

Development, road building, and associated activities can lead to numerous adverse impacts to salmonids and their habitats, including reduced stream shading and channel stability, elevated fine sediments in spawning gravels, filling of substrate interstices, reduced pool habitats and LWD, altered nutrient balances and physical character of the stream, reduced cover, increased stream temperature, and reduced stream habitat complexity and function overall. These impacts create water quantity and quality problems, and restrict natural movements of juvenile and adult salmonids (May *et al.* 1997, Spence *et al.* 1996).

Road construction and maintenance typically increases the amount of sediment delivered to streams through surface erosion and imperious surfaces. The disturbed areas of the road prism include road subgrade, cut and fill slopes, ditches, berms, turnouts, stream crossings, and any other construction features that may be present (Fitzgerald and Geier 1998). Roads are the major source of management-related sedimentation in streams, and continue to have negative impacts to stream habitat, even while not actively utilized, until they are stabilized and abandoned (Cederholm and Reid 1987). Rarely can roads be built or modified such that they have no negative impacts to streams (Furniss *et al.* 1991). Roads built within riparian areas and parallel to streams typically have more pronounced negative impacts to aquatic systems than roads built in other locations. Road densities in the action area are believed to be high.

Studies in the Puget Sound Basin have shown that watersheds with total impervious surface areas above five percent experience a precipitous decline in the biologic integrity as well as the physical habitat conditions necessary to support natural biological diversity and complexity (May *et al.* 1997). Existing private lands in the action area will continue to be cleared and converted over to residential and commercial development that is likely to further degrade chinook salmon habitat in the action area. This trend will likely result in increased disturbance to riparian areas, instream habitat degradation, and the introduction of pets and exotic pests (Knutson and Naef 1997, May *et al.* 1997).

Development in the action area would have to comply with existing stormwater management guidelines, such as the King County SWDM (King County 1998). There is little evidence, however, that structural stormwater controls effectively protect the biological integrity of lowland anadromous streams in Puget Sound (Horner and May 2000). Existing water quality criteria may not be adequate for protecting listed aquatic species. Hydrological modeling can also over-estimate runoff under pre-developed conditions, and lead to underestimating the amount of detention that is needed for proper control (Booth 1991). For instance, the King County SWDM, requires a level 2 flow control standard, which does not prevent increases in flows with reoccurrence levels above the 50-year event (1998). Furthermore, the manual states that it does not "necessarily prevent aggravation of all 'severe erosion problems" (King County 1998). Storms that exceed the design limit of detention or retention ponds could also overtop or bypass these storage areas, and outflows may experience little or no detention (Booth 1991).

Water withdrawals have significantly affected flows in the White River and its tributaries, and the basin is considered "over-appropriated" by WDOE (State of Washington 1999). Despite the establishment of instream flows for the basin in 1980, and above-average periods of precipitation, the seven-day low flow has continued to decline (WDOE *et al.* 1995). WDOE attributes this decline to increased demands for water withdrawals and an increase in impervious surfaces. Water withdrawals can impact habitat quantity, quality and accessibility. The trend toward increased groundwater claims is expected to continue. NMFS believes that the hydrological regime of Pussyfoot Creek and the White River is already degraded as a result of historical and persistent activities and water withdrawals.

In 1995, WDOE had applications for 34 groundwater rights and 10 surface water rights pending within WRA 10. The applications requested a total of 126 cfs for municipal and domestic supplies, commercial use and fish rearing (WDOE *et al.* 1995). Water rights applications do not represent a complete measure of potential cumulative impacts, because State law currently allows groundwater users to go unmonitored if they use 5,000 gallons or less each day (WDOE *et al.* 1995).

Now that chinook salmon are listed under the ESA, some non-Federal land owners may take steps to curtail or avoid land management practices that would result in the take of chinook salmon, or seek incidental take permission through section 10(a)(1)(B) of the Act. King, Pierce and Snohomish Counties and other local governments have been developing special rules for the conservation of chinook under section 4(d), but that process is incomplete. Despite the section 9 take prohibition, NMFS assumes that future State and private actions are likely to continue at similar intensities as in recent years. These remaining development pressures will result in adverse effects to chinook salmon foraging and migratory behaviors through degraded water quality, reduced flows, habitat changes, and migratory blockages.

In summary, the lack of Federal ownership in the action area will undoubtedly lead to an increase in the conversion of open space, agricultural and forested areas. NMFS believes these trends are reasonably certain to continue, and will likely to lead to further degraded riparian areas and instream habitat (Knutson and Naef 1997; May *et al.* 1997). Increased urbanization, the continued conversion of forest and agricultural lands to other uses, forest and agricultural practices, and future water withdrawals can all be expected to result in adverse affects to the aquatic environment and therefore to chinook salmon foraging and migratory behaviors.

F. Conclusion

Puget Sound chinook salmon exist as 21 distinct subpopulations; one of which includes chinook in the White River basin. White River chinook salmon are biologically and genetically unique, as they are they only spring run within south Puget Sound. Actions that would result in the extinction of this subpopulation would risk permanent loss of unique genetic and life history information that is critical to the survival and recovery of the Puget Sound ESU. For these reasons, this subpopulation has been the focus of intense recovery efforts and artificial reproduction since the 1970s as a result of the downward trend in escapement. Recently, NMFS listed the hatchery stock as one of only five hatchery stocks essential to the recovery of Puget Sound chinook salmon (64 Fed. Reg. 14308, March 1999). Population declines in the 1980s were precipitous, such that in 1986 only 6 fish were passed above the White River dams. In the last 10 years, however, the population has been experiencing an upward trend in the number of chinook being passed above the dams. The trend is considered largely a result of artificial propagation and outplanting efforts, and reductions in harvest. NMFS is not aware of information to suggest that habitat conditions have improved such that the trends could be attributed solely to increases in natural spawning.

After reviewing the current status of Puget Sound chinook salmon, the environmental baseline for the action area, the effects of the land transfer and proposed land uses (including the 404 permit), and the cumulative effects, it is NMFS' biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of Puget Sound chinook salmon and will not result in the destruction or adverse modification of designated critical habitat. The effects of the proposed land uses are minimized or eliminated through recent design modifications and additional mitigation measures, stormwater management facilities, wetland enhancement and creation, increased riparian buffer, and by the hydraulic complexity added to Pussyfoot Creek. Further, monitoring and reporting requirements will provide critical information over the life of the proposed land uses to assess the extent to which these measures are successful and allow for meaningful responses. In arriving at a non-jeopardy conclusion for this action, these minimization measures were important to consider against the incremental change attributable to the proposed actions.

Studies recently conducted for the Tribe, also indicate that the likelihood of adverse effects is significantly reduced. For instance, the total quantity of water the Tribe proposes to withdraw to meet the needs of the proposed land uses is not, by itself a significant volume, nor will it lead to detectable changes in instream flows. The proposed land uses, however, will result in an incremental loss of groundwater, while taken with other actions has an additive effect on an already degraded baseline. This effect, however, will be offset by each measure that reintroduces water to the soils (i.e., use of a septic system at the counseling center, use of rain-water collected from rooftops, and directing stormwater to wetlands (after treatment)). NMFS expects, as described in the preceding sections, that these measures will reduce the degree and likelihood of adverse effects on chinook salmon and their habitat. Further, the project will improve other habitat indicators (i.e., riparian vegetation) that are degraded in the basin, which, over time, would indirectly improve other indicators of functional chinook habitat (e.g., increased LWD loads and higher pool frequencies). It is NMFS' opinion, that the negative effects associated with the project are minimized or eliminated through adherence to the project design and conservation measures.

G. Incidental Take Statement

Sections 4 (d) and 9 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 essential behavioral patterns, including breeding, feeding, and sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injuring listed species 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.

The measures described below are non-discretionary, and must be undertaken by the BIA and the Corps so that they become binding conditions of the land transfer and 404 permit, as appropriate, for the exemption in section 7(o)(2) to apply. The BIA and the Corps have a continuing duty to regulate the activity covered by this incidental take statement. If the BIA or the Corps fails to (1) assume and implement the terms and conditions, (2) require the Tribe to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the authorization for the land transfer, or (3) if the Tribe fails to adhere to the terms and conditions, the protective coverage of section 7(o)(2) may lapse. The take statement 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. The BIA, Corps, or the Tribe must report the progress of the action and its impact on the species to the NMFS as specified in the incidental take statement [50 C.F.R. §402.14(i)(3)].

<u>1. Amount or Extent of the Take</u>

NMFS considers the proposed action “likely to adversely affect” because it has more than a negligible potential to result in take chinook salmon and it has the potential to hinder the attainment of relevant properly functioning indicators (NMFS 1996, 1999). Incidental take could occur as a result of adverse effects on chinook salmon habitat parameters (e.g., water quality, habitat elements, flow/hydrology, and watershed conditions) that directly affect the life history of aquatic species. Adverse effects due to the construction and operation of the proposed project, over time, and could impair essential behavioral patterns including foraging, migration, and spawning. These effects have been discussed qualitatively in the preceding sections. The actual number of individual fish taken as a result of the project is not possible to determine. While direct injury or death may unintentionally result during construction or operational activities, harm is more likely to accrue by exposure of fish to further degradation of habitat during all life stages. The timing, duration, and extent of such exposure will vary during the course of implementing the proposed project.

Using post project habitat conditions as a surrogate indicator of take, NMFS anticipates that incidental take may occur through short-term and long-term exposure of Puget Sound chinook to multiple stresses from the small incremental change in water quality, and the accumulative reduction in groundwater. While NMFS expects that some of these stressors have more than a negligible likelihood of resulting in the incidental take of Puget Sound chinook salmon, NMFS does not expect these impacts to be measurable on the population level. Further, the following reasonable and prudent measures reduce the level of incidental take likely to be associated with the proposed action.

2. Reasonable and Prudent Measures

The NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of chinook salmon. The Corps shall ensure that the Tribe and Clearchannel:

1. Reduce the effects of the proposed action on water quality and quantity, by minimizing impacts on wetlands.

The BIA shall ensure that the Tribe and Clearchannel:

2. Avoid or limit the adverse changes to water quality and quantity, and other indicators of functional chinook habitat in the White River and its subbasins.

3. Monitor implementation and effectiveness of all conservation measures described in the *Project Description* section of this Opinion, as well as the aforementioned Reasonable and Prudent Measures and their accompanying Terms and Conditions.

3. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the parties must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure 1 the Corps will ensure that:

a. If at the end of the 5 year monitoring period, the planted areas (the restoration sites and compensatory sites addressed in the planting plan) are not meeting performance criteria for vegetation growth, the monitoring and replacement regime will be continued for another 5 years, or until performance criteria are met.

b. Clear, comprehensive performance standards will be outlined to ensure functional hydrologic variability (duration and timing) within the enhanced wetlands and will be submitted to NMFS, replete with performance milestones, as part of the monitoring report for the project. Hydrologic variability will be based upon comparisons to reference sites as recommended by the NRC (2001).

2. To implement reasonable and prudent measure 2 the BIA will ensure that:

a. The Tribe and Clearchannel enhance top soil porosity and water retention capacity by amending top soils, where grass and other vegetation will be planted (in landscaped areas (other than wetland and perimeter areas covered in the planting plan--approximately 2 acres), with compost to a depth of at least 8 inches.

b. No surface water shall be diverted from either Pussyfoot Springs or the White River for future water needs on the lands proposed for transfer.

c. The stormwater discharge monitoring plan for TSS and total petroleum hydrocarbons (TPH) is revised as follows: Sampling will occur within the first 30 minutes of discharge during the first fall rain event that results in a discharge to Pussyfoot Creek, and within the first 60 minutes of a peak storm event. TSS values shall not exceed background levels by more than 10 percent. For TPH, if values exceed 10 mg/l, then the applicant will monitor for PAHs at the next representative storm event. If sampling detects these values are exceeded then the Tribe must notify NMFS with a response plan within 60 days of detection. Responses to correct exceedences could include retrofits to the stormwater basins to improve the quality of stormwater runoff, street sweeping before the onset of fall rains, or other approaches. Samples must be analyzed at a state-accredited laboratory.

d. The Tribe and Clearchannel prohibit stormwater releases from basin 2 above the preferred temperature range for various life history stages of spring chinook salmon. Temperatures in waters discharged to Pussyfoot Creek will not exceed 13.3° C, the maximum tolerable temperature for migrating adult spring chinook (Spence *et al.* 1996).

e. The temperature monitoring schedule will be revised so that thermographs are deployed no later than May 1 of each year.

f. If, over the course of a concert event season, enforcement vehicle crossings over lower Pussyfoot and Second Creeks increase over pre-project baseline conditions, then the Tribe and Clearchannel must submit a response plan to NMFS by December 1 of that year. Potential solutions may include installing stronger locks, limiting vehicle trips, or installing suitable structures[2] to allow vehicles to cross Pussyfoot and Second Creeks without entering the channel (e.g., culverts or bridges).

g. If the results of the B-IBI surveys conducted in Pussyfoot Creek suggest conditions are degrading over time due to the project, then the Tribe and Clearchannel must attempt to rectify these problems through an adaptive management approach commensurate with the scale of the effect. Monitoring and response criteria will be established in the final monitoring and contingency plan.

h. The following must be incorporated into the final monitoring and contingency plan for performing the biennial fish habitat surveys of Pussyfoot Creek for 10 years, the purpose of which is to ensure that instream wood placed below the stormwater outfall is providing the function originally intended: If the surveys indicate that the woody debris project fails to provide the function as intended then new woody debris will be installed within Pussyfoot Creek that would meet the NMFS default criteria for LWD. This and other restoration, habitat enhancement, or other salmonid enhancement projects conducted in the action area, including those funded through the Amphitheatre Mitigation Fund, will be developed by, or in close coordination with, Tribal Fisheries staff.

i. If at the end of the 5 year monitoring period, the planted areas (the wildlife habitat and stabilization sites addressed in the planting plan) are not meeting performance

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[2] These projects would be submitted to NMFS for review prior to Section 404 permit applications being submitted to the Corps. Permit applications for the implementation of this Term and Condition represent a separate Federal action pursuant to compliance with section 7 of the ESA.

criteria for vegetation growth, the monitoring and replacement regime will be continued for another 5 years, or until performance criteria are met.

j. If the edge of the bluff along the parking lots recedes to within 20 feet of the perimeter ditch, remove the fencing and the parking lot to a distance of at least 50 feet from the bluff edge and replant the bluff with native conifers in accordance with the planting plan. All removed asphalt must be disposed of off-site at a State-regulated landfill.

3. To implement reasonable and prudent measure 3 the BIA will ensure that:

a. A report is prepared describing the implementation and effectiveness of the terms and conditions (50 C.F.R. §402.14(i)(3)). The report shall be submitted to the Habitat Conservation Division (Lacey, Washington) of NMFS annually, no later than April 1 for the preceding 12- month period ending December 31. The report shall a) confirm the implementation of each term and condition; and b) describe the effectiveness of the terms and conditions.

b. Provide implementation and monitoring reports for all conservation measures described in this Opinion. An annual synopsis of the hourly thermograph data, including a computer database file with the raw data shall be included.

c. In addition, NMFS is to be notified within three (3) working days upon locating any dead, injured, or sick chinook salmon in Pussyfoot Creek, or the portion of the White River within the transfer lands. Care should be taken in handling dead specimens to preserve biological materials in the best possible state for later analysis. In conjunction with the care of sick or injured chinook salmon, or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed. Initial notification must be made to NMFS's Law Enforcement Office at (800) 853-1963. Notification must include the date, time, precise location of the injured animal or carcass, and any other pertinent information.

H. Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

These are as follows:

1. NMFS encourages the Tribe to submit their conservation and management plan for Tribal lands for review under section 4(d) of the ESA when it is complete (50 C.F.R. 223). NMFS' review will determine if implementation of the plan and proposed actions will "appreciably reduce the likelihood of survival and recovery" of listed species. Upon the approval of the plan by the Secretary of Commerce, the Tribe could conduct tribal trust resource management actions that may take threatened chinook salmon, without the risk of violating section 9 take prohibitions. Furthermore, NMFS will work with the Tribe at their request "to the maximum extent practicable to craft plans that will meet the needs of listed species and accomplish the goals of the tribes (50 C.F.R. 223)."

2. NMFS requests the results of all fish surveys conducted by the Tribe within the Reservation Reach of the White River.

3. NMFS recommends that thermographs should be deployed year-round for the first couple years of monitoring stream and stormwater temperatures to establish baseline temperature data for all seasons.

4. Sufficient tow trucks should be available to remove any vehicles in unofficial parking areas. If the number of parking spaces at the Amphitheatre lots and supplemental parking area are insufficient or parking in unauthorized areas is otherwise found to be chronic problem, then a revised parking plan should be prepared replete with measures to correct these problems.

NMFS requests notification should any of these conservation recommendations be implemented, so that additional actions minimizing or avoiding adverse effects of the project or benefitting listed species or their habitats can be recorded.

I. Reinitiation Notice

This concludes formal consultation on the 324-acre Muckleshoot Indian Tribe land transfer action outlined in the June 1, 2000 request for formal consultation. As provided in 50 C.F.R. §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

III. ESSENTIAL FISH HABITAT CONSULTATION

A. Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2));

- NMFS must provide conservation recommendations for any Federal or State activity that may adversely affect EFH (§305(b)(4)(A));

- Federal agencies must within 30 days after receiving conservation recommendations from NMFS provide a detailed response in writing to NMFS regarding the conservation recommendations. The response must 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 NMFS, the Federal agency must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: 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 (50 CFR 600.110). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NMFS is required by Federal agencies regarding any activity that may adversely affect EFH, regardless of its location.

The objective of this EFH consultation is to determine whether the proposed action may adversely affect designated EFH, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse impacts to EFH resulting from the proposed action.

B. Identification of EFH

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Federally-managed 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 the impacts to these species' EFH from the proposed action is based on these descriptions and information provided by the BIA.

C. Proposed Actions

The proposed action and action area are detailed above in *Section I*, *Introduction* section of this document. The action area includes habitats that have been designated as EFH for various life-stages of chinook, coho, and Puget Sound pink salmon.

D. Effects of Proposed Action

As described in *Section II-D,* these activities may result in detrimental short- and long-term impacts to the designated EFH for Pacific salmon. The proposed project incrementally adversely affects spawning and rearing habitat, and essential features of migration and holding habitat available to Pacific salmon. The action would:

- Incrementally increase chemical contamination from stormwater runoff and potentially through increased enforcement activity.
- Incrementally increase the temperature of surface water in Pussyfoot Creek.
- Incrementally alter the hydrology of Pussyfoot Creek and the White River.

E. Conclusion

NMFS believes that the proposed action may adversely impact designated EFH for Pacific salmon.

F. EFH Conservation Recommendations

Pursuant to Section 305(b)(4)(A) of the MSA, NMFS is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. While NMFS acknowledges that the conservation measures described in the BO will be implemented by the BIA, it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. Consequently, NMFS has the following EFH conservation recommendations that, if implemented, will minimize the potential adverse impacts of the proposed project and conserve EFH:

- Adopt Reasonable and Prudent Measures 1 and 2, and the associated Terms and Conditions, described in *Section II-G* of this document. Where these Terms and Conditions are written to apply only to chinook (e.g., 1d and 2c), NMFS recommends that they be extended to both coho and Puget Sound pink salmon.

G. Statutory Response Requirement

Pursuant to the MSA (§305(b)(4)(B)) and 50 CFR 600.920(j), Federal agencies are required to provide a detailed written response to NMFS' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. In the case of a response that is inconsistent with the EFH Conservation Recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

H. Supplemental Consultation

The BIA must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR 600.920(k)).

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APPENDIX A. DETAILS OF THE PROPOSED PROJECT

The Tribe is proposing the following uses for the 324 acres: to develop and operate a performing arts center (Amphitheatre) on 98 acres and a drug, alcohol, and mental health counseling center on 9 acres, and retain a large portion (217 acres) of the land in fish and wildlife habitat for cultural and subsistence purposes (current use). There are four principal topographic features of the 324 acres of transfer lands: 1) the Muckleshoot Prairie, above the White River Valley; 2) the bluffs separating the plateau and flood plain portions; 3) the vegetated flood plain and braided channels of the White River, together with its creek tributaries; and 4) a terrace adjacent to the bluffs on the north end of the transfer lands, about 20 feet higher in elevation than the flood plain (see Figure 2-1 in the PFEIS). Information on the Amphitheatre is taken from the *Preliminary Final Environmental Impact Statement* (PFEIS [BIA and WSDOT 2000]) and numerous emails, unless otherwise noted. Information on the drug and alcohol counseling center and fish and wildlife lands was obtained through correspondence (emails and letters). The following paragraphs describe the Tribe's proposed uses for the transfer lands in detail.

1. White River Amphitheatre Complex

In October 1994, the Tribal Council passed a resolution approving the concept of an amphitheater facility on the Reservation. The Tribe's objectives in pursuing this action are to advance their economic, social, and cultural interests through development of an economically desirable amphitheater to serve the greater Puget Sound area outdoor concert market. The Amphitheatre project would meet these objectives by producing tax revenues and other revenues for the Tribe, providing a center for cultural, educational, and community gatherings and events for the Tribe, providing employment for tribal members, and diversifying the economic base of the Muckleshoot Reservation. The Tribe later entered into a management agreement with Bill Graham Presents (BGP[3]) that specified that the Tribe would own the facilities and BGP would manage them on behalf of the Tribe.

Location and Use

The 98-acre Amphitheatre project site is situated along SR164 on the Enumclaw Plateau between SE 404th and SE 408th Street. The Amphitheatre will be used for about 30 to 40 concert events each year. In addition, community and cultural events such as Native American powwows, dance performances, and children's events will also occur at the facility. Attendance estimates and a description of events are described in Table 1.

Table 1. White River Amphitheatre Events

Events	Number
Concerts	
Number of concerts per year	30 to 40
Average attendance per concert	9,000 to 11,000
Maximum attendance	20,000
Anticipated number of sell-out events	5 to 6 per year
Concert season	May to October
Cultural Events	
Skopabsh Days (annual powwow)	One 2 to 3 day event
Expected attendance for the multi-day event	6,000

[3]BGP was subsequently purchased by SFX, and later purchased by Clearchannel Worldwide. Communications in this document are attributed to Clearchannel.

Table 1. White River Amphitheatre Events

Events	Number
Season	August
Mini powwows (per year)	2 to 3
Other festivals	3 to 4
Tribal General Council Meetings (per year)	6 to 12 (600 person capacity)
Other meetings and community events (per year)	Approximately 10 (attendance variable)
Total number of days facilities would be used	43 to 72 days per year

Concert events will take place from May to October. Event attendance, based on typical attendance patterns at other amphitheaters, is expected as follows:

- 40 to 50 percent of the events are expected to draw crowds of 10,000 people or less;
- 30 to 40 percent of the events are expected to draw crowds of 10,000 to 15,000 people; and
- 15 to 20 percent are expected to draw crowds of 15,000 to 20,000 people.

Average event attendance is expected to range between 9,000 and 11,000 people. Up to 32 non-concert events per year are expected. These include the annual two- to three-day Skopabsh Days festival (the annual powwow), which is expected to draw about 6,000 people. The Tribe also expects to hold two or three mini powwows per year, and other tribal festivals. Typically, powwow attendance has been up to 1,000 people, but attendance is expected to grow larger with the new facilities. The Tribe will hold between six and 12 general council meetings throughout the year, and several local groups have expressed interest in using the facility.

Facilities and Operations

The Amphitheatre complex will include fixed and lawn seating for 20,000 with parking for up to 7,300 cars, a main stage, a number of support facilities, and surrounding landscaped areas (see Figure 2-5 of the PFEIS). The various facilities associated with the Amphitheatre are listed in Table 2. For a detailed description of these facilities, see the PFEIS (BIA and WSDOT 2000). The completed project will consist of about 70 acres of impervious surfaces (e.g, structures, parking, and lined detention basins), and 28 acres of pervious surfaces (e.g, landscaping and unlined basins).

Table 2. Facility Elements for the White River Amphitheatre.

Facility Element	Acres
Amphitheatre bowl and berm, stage, seats, lawn berm, etc.	5
Amphitheatre service access and loading area	3
Amphitheatre grounds, plazas, concessions, restrooms, and pedestrian circulation	5
Onsite roads, bus loading area, and walkways	10
Parking	36.5
Stormwater management system	11
Landscaping, open space, and other areas	27.5
Total	98

Wetlands and Landscaping

About 12 acres of the Amphitheatre site will be landscaped, and about 6 acres will be maintained as buffers and restored wetlands. Six wetlands and six swales, totaling 3.7 acres, were disked, cleared, or excavated during initial construction activities in 1997. As a part of the proposed action, these wetlands and swales will be restored. Restoration activities have begun in wetland 2, a wooded wetland located in the southeast corner of the Amphitheatre site adjacent to SR 164, where the most significant preconsultation impacts occurred. Swales 8-10 will also be largely restored, for a total of 3.39 acres. About 1.58 acres of new wetlands would be created as compensatory mitigation for the 0.31 acres of permanent wetland lost. Additional details are in the wetland report (Appendix I) and the wetland mitigation plan (Appendix J-1) in the PFEIS.

A planting plan for the bluff perimeter, wetland mitigation sites, and the previous slide site, is provided in the FEIS. A 1.9-acre buffer ranging from 50 to 100 feet wide will be established between the White River bluffs and the perimeter ditch. The perimeter planting plan has been modified slightly from that presented in the PFEIS to include native trees, including big-leaf maple *(Acer macrophyllum)*, black cottonwood *(Populus trichocarpa)*, Douglas fir *(Pseudotsuga menziesii)*, and western red cedar *(Thuja plicata)* to partially mitigate for the potential long-term loss of large woody debris (LWD) recruitment due to the removal of large trees by the project. At least half of the Douglas fir planted along the bluff will be bare- root or "ball and burlap" conifers at least 6-10' in height. Plantings along the bluff will be monitored for survival for five years. At the end of five years, live tree density will be at least 150 trees per acre. If density is below 150 trees per acre, then trees will be replanted to 200 per acre. Plantings in the mitigation wetland will be monitored to ensure compliance with the performance standards in the plan.

About 10 acres of grassy meadow on a floodplain terrace at the northwest end of the transfer area will remain largely in its current condition. It will be used for cultural and wildlife purposes, except for one acre that is proposed for the creation of a compensatory mitigation wetland. An annual Tribal event called "Something in May" will continue to be held there. This is a one-day event, without camping (D. Every, pers. comm., 2000).

Parking Lots and Access Roads

Four parking lots, totaling 37 acres, will be constructed at the Amphitheatre site. On-site parking would be provided for 6,170 vehicles in a conventional manner, or up to 7,300 vehicles in a "stacked," head-to-tail manner. Parking fees would be included in the ticket price, and parking would not be allowed on adjacent roads or Reservation properties.

There will be four traffic access points from SR 164. General access will be available at SE 400th Street, SE 404th Street, and SE 408th Street. A new access road from SE 400th Street is proposed along the west boundary of a triangular 9.6-acre parcel, otherwise known as the "Porter property," at the northeast corner of the land transfer site. The access road would occupy about one acre of this parcel and there are no development plans for the remaining 8.6 acres, the south half of which is largely wetland (D. Every, pers. comm., 2001). Both the SE 400th and SE 404th Street access points will be designed for right turns from SR 164. The emergency vehicle access and entrance for performers (Center Drive) would be located between SE 404th and SE 408th Streets, and would not require improvements to SR 164. The entrance at SE 408th Street would require an extra lane to accommodate left turns from SR 164. During events, all access drives would be controlled with special temporary signing and uniformed traffic control personnel. The entrance at SE 404th Street would provide 24-hour access to the site.

A remote parking and shuttle option will provide additional parking spaces for large events, and will be located at the Auburn Supermall or other similar location. The Auburn Supermall is located at the interchange of SR 18 and SR 167. About 780 parking spaces would be provided, with a shuttle service to the Amphitheatre. Additionally, the Tribe has committed to establishing an ordinance prohibiting unauthorized parking on the Reservation, near the Amphitheatre. The details of the ordinance are not yet established; however, NMFS recommends that it include measures to remove cars parked illegally.

Stormwater Management

The completed project will consist of about 70 acres of impervious surfaces (e.g, structures, parking, and three lined detention basins), and about 28 acres of pervious surfaces (e.g, landscaping, wetlands, and unlined basins). Stormwater runoff will be detained and treated through the use of perimeter ditches, bioswales, oil/water separators and four detention basins (see Figure 4.3-1 in the PFEIS). Stormwater from these facilities will discharge into Pussyfoot Creek and the White River. The capacity of this system is designed to meet the quantity and quality standards of the 1998 revisions to the King County SWDM (King County 1998). Flow control facilities will meet the performance standards for Level 2 flow control, which will match pre-development discharge durations for 50 percent of the 2-year peak flow, up to the full 50-year peak flow. Basin size, stormwater capacity, and treated acreage for each of the four Amphitheatre detention basins is depicted in Table 3.

Table 3. Stormwater Detention Basins for the White River Amphitheatre Complex.

Detention Basin	Surface Area (acres)	Active Storage Capacity (mill. gals)	Total Acres Treated	Impervious Surface (acres)
Basin 1	1.91	5.14	34.59	30.64
Basin 2	2.66	5.87	29.52	25.41
Basin 3	0.10	0.10	10.75	5.62
Basin 4	1.60	2.51	16.08	13.58

The Amphitheatre's stormwater system uses about 3,000 feet of perimeter ditches to convey stormwater runoff into detention basins 2 and 4. The perimeter ditches are in place, but will be modified. A low permeability soil will be compacted in the ditches to reduce the potential for infiltration, and overlaid with topsoil during final construction. Sediment from the parking lots will settle within the detention basins and oily materials that wash off the parking lots will be collected by oil-water separators. Oily material will be removed from the oil/water separators on a regular basis and taken off site for proper disposal and recycling.

Basin 2 is currently lined with 40-mil PVC material. The existing detention pond will be modified as the Amphitheatre construction is completed. The basin will be reconfigured so that it is 170 feet from the bluff edge, the outlet structure will be raised one-foot to increase capacity, about 500-600 yards of dirt will be added to the berm near the outlet pipes, a third outlet pipe will be added, and the basin will be double-lined. The double liner will include a composite liner on the bottom (made up of a geomembrane and clay), a geogrid, and another geomembrane liner will be on top. Geofabric will be placed above and below the liners to minimize the likelihood that sharp objects could puncture the geomembranes. The pond bottom will be sloped to a middle trench on a 1 to 5 percent slope. The geogrid material will then transmit any water that might leak through the uppermost geomembrane liner to the middle trench where a slotted pipe will then convey water to a sump. The sump will consist of lined manhole designed with calibrations to allow regular monitoring of leakage from the stormwater basin.

The purpose of these lined systems is to provide secure impoundment of the stormwater and minimize infiltration of stored water to the subsurface soil. The impervious liner in basin 1 will be placed on a preconsolidated, stable subgrade that is free of sharp protrusions. The installer will heat-seal the seams, and the distributor will test and approve all seams. A 24-inch layer of dirt that includes a substantial amount of clay will be added above the liner to protect the liner material against weathering and mechanical damage. The liner material itself will be protected by an 8-ounce, coarse felt-like fabric above it and by a similar, 12-ounce fabric below it. In addition, 6 inches of topsoil will be placed between this fabric/PVC “sandwich” and the smooth subgrade (D. Every, pers. comm., 2000).

The 24-inch layer of dirt is intended to protect the liner from damage that might be caused by machinery during maintenance. A soft-tired Clark Bobcat front-end loader, or similar light piece of equipment, will be used for removing the layer of solids that settle out of the stormwater while in detention during the previous maintenance cycle. The manufacturer warrants that, if properly fabricated, installed, sealed, and covered with suitable material, the liners will have a useful service life for 20 years (D. Every, pers. comm., 2000). The Tribe and Clearchannel commit to replacing these liners in 20 years or earlier if monitoring shows a failure of the material or seams (D. Every, pers. comm., 2000).

Basin 1 will be constructed adjacent to basin 2 and will, at capacity, contain 5.14 million gallons (15.79 acre-feet) of water. Stormwater will discharge through an 18-inch diameter pipe and flow control structure into basin 2. These two linked basins will treat and detain stormwater from approximately half the site including the Amphitheatre, parking lots B and C, and part of parking lot D (see Figure 4.3-1 of the PFEIS). There will be a single discharge point at basin 2, with a coalescing plate oil-water separator.

Basin 3 will treat stormwater runoff from parking lot A, and will not be lined. Stormwater will drain through bioswales into basin 3, pass through a coalescing plate oil-water separator, and then supplement the hydrology of wetland 2. This basin will also receive runoff from a wetland swale, a grassy roadside ditch along SR 164, and a small watershed east of SR 164. As existed prior to the project, the runoff would enter Pussyfoot Creek via a small and intermittent tributary.

Basin 4 will treat and detain runoff from parking lot E and part of D in the northwestern corner of the site. Basin 4 will be lined with a thick layer of compacted, fine-grained soil to make it impervious. Stormwater would be directed via drainage ditches to an oil-water separator at this basin. The basin would supply the water for a compensatory wetland to be built on the terrace below the bluff, with the majority of the flow discharged into an intermittent channel of the White River. Other water input to this compensatory wetland would come from local runoff and seepage from the slope above the wetland.

The outlet systems for basins 2 and 4 will use two 12-inch diameter, high-density polyethylene (HDPE) pipelines (one primary and one secondary) to convey stormwater from the basins to energy-dissipation structures (gabions). The pipelines will be constructed of butt-welded sections of HDPE. The primary and secondary pipes leaving basin 2 are approximately 435 feet long each, are anchored in place at the top of the bluff with concrete anchor blocks, and run parallel down the bluff where they direct stormwater through a gabion that is located about 30 feet upslope from Pussyfoot Creek (Dames and Moore 2000). The tertiary pipe added to basin 2 will provide added insurance that severe storms and full basin conditions will not result in overtopping the structure and unstable bluff. The primary and secondary pipes outflow to a single gabion that will disperse the flow as it enters Pussyfoot Creek about 100 feet upstream from where it joins a high-flow channel of the White River. The tertiary pipeline will direct stormwater to second gabion, located roughly 200 feet upstream of the high-flow channel. Redundant anchors will be added to all three discharge pipes leaving basin 2 in accordance with a pipe anchoring and monitoring plan. In addition, outflow pipes will be inspected and monitored to ensure that the pipes maintain their integrity and protect against the possibility that a break would degrade chinook habitat in Pussyfoot Creek.

The primary and secondary pipes for basin 4 will convey stormwater downslope and across a meadow to an energy dissipation structure above an intermittent side channel of the White River. Each pipe is approximately 1,300 feet long (D. Every, pers. comm., 2001). The primary pipe will be outfitted with a flow splitter to divert about 0.3 cfs of stormwater to the compensatory wetland via a six-inch pipeline (See Figure 4.3-1 of the PFEIS). This stormwater will overland flow to the wetland. The wetland also contains an overflow structure and pipeline that reconnects to the main outlet of basin 4 (See Figure 4.3-1 of the PFEIS).

To reduce the potential discharge of warm water into Pussyfoot Creek during high precipitation storm events in the summer the Tribe has committed to pumping water from basin 2 for landscape irrigation and other purposes. The exact quantity of water to be pumped each year would be based on factors such as average annual rainfall and evaporation rates and would sufficiently draw-down the reservoir so that enough storage is available to fully contain the maximum summer storm event. Pumping would likely occur from June through September.

Stormwater Management Effectiveness Monitoring and Conservation Measures. The Tribe will implement several monitoring and conservation measures to detect and track the potential effects of stormwater management on bluff stability and fish habitat, and to minimize those potential effects on chinook salmon (D. Every, pers. comm., 2000). Additional details of the final monitoring and response commitments will be contained in a final plan, completed in consultation with NMFS and FWS. The plan will be submitted within 90 days of receipt of the signed Opinion (D. Every, pers. comm., 2001). The following list summarizes the monitoring and response measures committed to by the Tribe:

- The lined detention basins will be inspected at least once per week and after any storm event of 0.5 inches or greater. The inspection will include checking for evidence of vandalism and other sources of damage that could affect the operation or integrity of the stormwater system. The condition of the components, such as outlet structures, berms, sumps, and any exposed liner material will be visually inspected. Any observed damage will be evaluated and repaired as appropriate.
- Water depth within the basin will be recorded each week, as measured from a permanent sight-gauge installed in the basin, near the outlet structure (i.e., a staff gauge mounted on a 4-inch by 4-inch post, pre-marked at each foot of elevation, graduated to $1/10^{th}$ of a foot).
- If visual inspections or water elevation monitoring reveal any significant changes in site conditions, the Facility Manager will be notified. The Facility Manager will retain technical assistance, if required, to interpret data or evaluate the impact on system integrity and operation.
- For detention basin 2, the sump that collects any leakage from between the double liner will be inspected weekly. The water level, if any, will be recorded by the calibrated marks, and the difference from the previous inspection will be used to calculate the rate of water accumulation. In addition, a float will signal that the water has reached a certain level within the sump and that additional liner inspections are required. Water will be pumped from the sump back into the detention basin as needed to continue monitoring leakage rates. If the rate of accumulation exceeds an agreed threshold, then a condition survey will be implemented and responses taken, as needed.
- The Tribe and Clearchannel commit to conducting a condition survey of the detention basin liners every 5 years after installation or any time that the weekly inspections signal a problem that needs attention. The inspection will be conducted by qualified personnel who will check for signs of damage or deterioration and determine the appropriate repair or solution. A report will be written to include the results of the inspection and the recommendations. A copy of that report will be provided to NMFS with the monitoring

reports for that year (unless an emergency exists, in which case NMFS will be notified immediately). Upon concurrence of the proposed solutions by the NMFS, the agreed-upon repairs will be implemented.

- The HDPE outlet pipes will be monitored for both damage and deterioration as a part of a regular monitoring program. The manufacturer's data indicates that the expected useful life of the pipe in an above-ground location is 50 years. Monitoring will check for signs of deterioration, such as weather-checked surfaces, splits, and localized vibration that could cause unusual wear or fatigue. Visual inspections of condition will be conducted at least once per week and after any storm event of 0.5 inches or greater. Monitoring will occur along the pipe route and exposed sideslopes for signs of stress cracking, subsidence, slumping, or void formation. Steep slopes along the alignment will also be inspected for evidence of water seepage or flow associated with the pipes. The discharge could be shifted to the emergency backup pipe to repair the main pipes. Pipes would be replaced before the expected end of their useful life or sooner if monitoring determines that replacement is necessary.
- The gabions (energy dissipation structures) will be visually inspected for damage, sediment accumulation, and erosion of downgradient drainage pathways. Inspections will occur at least annually, and immediately after slides or other events immediately upslope that could affect their function.
- If visual inspections reveal any significant changes in site conditions, the facility manager will be notified. The facility manager will retain technical assistance, if required, to interpret data or evaluate the impact on system integrity and operation.
- To monitor bluff stability over time, the Tribe and Clearchannel commit to establishing and maintaining a system comprised of permanent markers at surveyed locations and distances from the bluff edge and toe. Measurements will be taken annually to ascertain bluff recession over time. In addition, observations will include searching for soil cracks that indicate a developing bluff stability problem. The final monitoring and contingency plan will include measures to insure minimal impact on Pussyfoot Creek and the White River.

A construction stormwater pollution prevention plan is provided in the PFEIS and incorporated by reference. A revised Draft Operational Stormwater Pollution Prevention Plan was submitted to NMFS in February 2001, and is also incorporated by reference. According to the PFEIS, these two plans meet the EPA's requirements for stormwater management and erosion and sediment control, and are in accordance with the EPA's multi-sector general permit. In addition to what is included in these plans, the Tribe has committed to inspecting the oil/water separators once a week and removing materials accumulated for proper offsite disposal as needed. The Operational Plan includes a commitment to conduct water quality sampling at the outfall of each detention and water quality facility. Samples will be analyzed for total suspended solids (TSS) and total petroleum hydrocarbons (TPH). Presently, the Tribe and Clearchannel propose to review best management practices if TSS or TPH values exceed 100 mg/l and 10 mg/l, respectively. The final Monitoring and Contingency Plan, however, will specify the details of timing and location, and will also establish thresholds for pollutants. For example, if TPH exceeds 10 mg/l, then sampling will include polyaromatic hydrocarbons (PAHs). The temperature of the stormwater outflow and the water in basin 2 will also be monitored to prevent a discharge of water above thresholds established by the NMFS and FWS. Temperature monitoring is covered in detail in the next section because it also involves tracking changes within Pussyfoot Creek. The final monitoring plan will include a detailed list of likely responses to data obtained during monitoring, and will include provisions for adaptive management.

Pussyfoot Creek Monitoring and Habitat Enhancement. The Tribe and Clear channel have committed to the following measures associated with monitoring, improving, and protecting Pussyfoot Creek:

- In May and June of 2000, 20 pieces of woody debris were placed into the reach of Pussyfoot Creek below the stormwater outlet for basin 2. The objective of this project was to partially mitigate for the potential loss of large woody debris (LWD) recruitment from the tree removal that occurred before consultation was initiated. The wood will be monitored to determine its effectiveness in creating fish habitat (D. Every, pers. comm., 2001).
- The Tribe and Clearchannel have committed to a community mitigation fund for the project, supplied by a percentage of gross ticket sales (1.8 percent). The scope of this fund will be broadened to include funding for salmon habitat projects (D. Every, pers. comm., 2000). No such projects are currently planned.
- Water quality will be monitored both upstream and downstream of the outlet pipes for detention basin 2 as discussed below. The Tribe and Clearchannel commit to monitoring water temperatures in Pussyfoot Creek to ensure stormwater releases from the detention basin discharging to Pussyfoot Creek or reduced flows attributed to the Amphitheatre do not result in temperature increases over time that degrade the environmental baseline for chinook salmon. The Tribe proposes to evaluate changes to the environmental baseline for salmon based upon NMFS' Matrix of Pathways and Indicators (MPI).
- Five thermographs will be located in the following areas: (1) the detention basin, within 5 feet of the outlet pipe; (2) Pussyfoot Creek, above the beaver dam impoundment area and 150 feet downstream of the road crossing of the stream; (3) Pussyfoot Creek, 50 feet below the main detention basin diffuser; (4) Pussyfoot Creek, midway between the diffuser and beaver dam currently found on the former road; and (5) Pussyfoot Creek at the downstream end of the culvert under SR 164. Thermographs with a one-year battery life will be set to monitor water temperatures on roughly an hourly basis (no greater than

78 minutes and no less than 42 minutes) for no less than 10 years. The thermographs will be deployed from 01 June to 15 October of each year. Additionally, a standard, calibrated thermometer will be placed into the detention basin near the basin outlet. If water temperatures in the detention basin exceed 57° F when a discharge of water occurs from the basin, the thermograph data will be downloaded 48 hours later. Otherwise, thermograph data will be downloaded at monthly intervals. Thermographs will be returned to the stream within 6 hours of removal. The batteries in the thermographs will be replaced each year, prior to placement into the stream.

- The Tribe will consider that discharge from the stormwater basin has increased stream temperature in Pussyfoot Creek if the water temperature at the thermograph downstream of the diffuser is statistically greater than the water temperature at the thermograph upstream of the diffuser. No specific threshold temperature has been identified. Increases in water temperature that do not result in a degradation of the environmental baseline will not be considered an impact by the Tribe. If, however, the discharge of stormwater from the Amphitheatre is observed to increase water temperature to levels that degrade the environmental baseline, then the Tribe commits to taking measures to prevent these impacts. Measures may include, but are not restricted to, shading the detention basin, pumping the water at an earlier date from the basin, more frequent pumping of the basin, and partial pumping of the basin. The Tribe is willing to alter the placement of thermographs and the period of monitoring, with the Service's approval.
- Benthic fauna will be monitored upstream and downstream of the basin 2 stormwater outfall using the most recent benthic index of biological integrity (B-IBI) protocols set by the Washington Department of Ecology (D. Every, pers. comm., 2001).
- The Tribe and Clearchannel commit to regularly inspect and repair or replace the gabion as needed. Inspections will be at least annually, and immediately after slides or other events immediately upslope that could affect their function.

Reporting. All monitoring of the project and its effects on chinook salmon as described in these conservation measures will be reported to the NMFS annually, or for another agreed-upon time frame, as appropriate. The report will be submitted to NMFS no later than the 31 January of each year following issuance of the permits and authorizations required for the Amphitheatre. If operations at the Amphitheatre change so that the monitored impacts can no longer arise, then that portion of the monitoring program can be terminated following approval by NMFS. The monitoring plans can be changed as needed by agreement with NMFS.

Waste Handling, Treatment and Transport

The Tribe is proposing to begin operations of the Amphitheatre with a temporary wastewater storage and disposal plan, while a permanent means of managing wastes at the facility is pursued. The temporary plan involves transporting wastes from the Amphitheatre to the King County Metro Treatment Plant at 1200 Monster Road SW in Renton, Washington. A permanent solution proposed by the applicant is to connect the Amphitheatre to an existing sewer line operated by the Muckleshoot Utility District, for conveyance to King County's Renton Treatment Plant via the Auburn Way South sewer system. The City of Auburn has decline to allow connection to their trunk line at the present time (P. Krauss, Planning Director, pers. comm., 2000). Therefore, for the purpose of this Opinion, NMFS assumes that the temporary sewage hauling plan will be implemented for the foreseeable future.

Sewage flows for the Amphitheatre have been estimated to range from 250 gallons per minute, based on per capita generation of 6 gallons per person per show, to 390 gallons per minute based on fixture units (Barghausen 1997). The design capacity for the Amphitheatre's sewage collection systems and an onsite pump station was based on an estimated flow of 138,000 gallons per day and an average flow rate of 300 gallons per minute (0.67 cubic feet per second (cfs)). The peak flow rate for the Amphitheatre is estimated to be 390 gallon per minute (0.87 cfs).

Proposed sewage management plan. Conventional facilities, including flush water closets and urinals, lavatories and commercial sinks, and institutional-type dishwashers and disposal units will be constructed and used during the interim period. Event generated sewage and wastewater would be temporarily stored on site in above-ground storage tanks. Wastewater generated during events at the Amphitheatre would be routed to a single duplex pump station located east of the main stage. The wastewater received by the pump station would be pumped approximately 500 feet north in a buried 4-inch polyvinyl chloride (PVC) forcemain, then approximately 500 feet west in the road easement of SE 404th Street. The pipeline would then be routed to the ground surface and discharge into temporary above ground wastewater storage tanks at the intersection of SE 404th Street and the Amphitheatre's north access road.

Six 21,000-gallon vapor-tight steel storage tanks (Baker tanks), located adjacent to SE 404th Street, would provide approximately 126,000 gallons of wastewater storage capacity. The storage tanks will be installed on a paved pad surrounded by a containment curb that will drain to a sump, which can collect spills and be readily cleaned. Each tank would be interconnected by two 8-inch flexible pipes, allowing primary settling in the first 21,000-gallon unit and overflow of wastewater to the remaining tanks for liquid storage.

The tanks would provide adequate storage capacity for typical events. All sanitary waste will be collected from the portable units a minimum of once per week by a licensed sanitary waste management contractor. The tanks would be emptied daily during multi-day events to maintain sufficient storage capacity, while the tanks could be emptied less frequently during single day events. The emergency containment system for the sewage storage tanks can support more than 32,000 gallons, which represents more than 25 percent of the total capacity of the tanks and more than the capacity of one tank. They are connected in series with a pipe between each adjacent pair near the top, such that one must fill before another tank gets any input. Each tank has a valve to allow it to be pumped out, such that a leak in one tank will not drain the others. In addition to the curbed containment area, there will be a sump that will facilitate pumping any spillage to a cleanup truck or back to an intact Baker tank.

Large-capacity sewage tank trucks (4,000 to 6,000 gallon tankers) would be used to haul wastes from the Amphitheatre site to an offsite disposal point in King County's regional sewer system. The vacuum trucks removing the sewage from the Baker Tanks will utilize quickly secured and released cam-lock connections in order to reduce the chance of leaks or spill from their flexible pipes (D. Every, pers. comm., 2000). Should a spill occur, it would be contained by the design of the facility, readily diluted by water available on-site, and disinfected by chemicals carried on the vacuum truck. The diluted, disinfected spill would then be readily pumped into the vacuum truck.

Sewer Truck Route. The most likely route for sewage tanker trucks would be to leave the Amphitheatre site and turn left onto SR 164 (Auburn Enumclaw Road), drive northwest to the junction of SR 164 and SR 18, turn onto SR 18 and drive west to the junction of SR 18 and SR 167 (East Valley Freeway), turn onto SR 167 and drive north to the junction of SR 167 and SW Grady Way, turn onto SW Grady Way and drive west to the junction of SW Grady Way and Monster Road, and finally turn onto Monster Road and drive north to the King County Metro Treatment Plant in Renton. The route covers a distance of 22.9 miles and crosses the following waterways starting from the Amphitheatre site and moving north to the treatment plant:

- Stream 0048-Pussyfoot Creek (tributary of White River); Discharge point at RM 0.9 of Pussyfoot Creek. Not crossed by the truck route, but a spill on the site could drain into Pussyfoot Creek.
- Stream 0046 (tributary of White River); Discharge point at RM 0.8.
- Stream 0051-Hill Creek (outlet of Lake Dolloff, tributary of Green River); Discharge point at RM 3.9.
- Stream 0051-Hill Creek (outlet of Lake Dolloff, tributary of Green River); Discharge point at RM 2.2.
- Stream 0051-Hill Creek (outlet of Lake Dolloff, tributary of Green River); Discharge point at RM 1.8.
- Stream 0001-Green River (Green River basin); Discharge point at RM 24.

- Stream 0015 Mill Creek (tributary of Spring Brook Creek, Green River basin); Discharge point at RM 4.2.
- Stream 0005-Spring Brook/Garrison Creek (tributary of Black River, Green River basin); Discharge point at RM 7.2.
- Stream 0022- Garrison/Harrison Creek (tributary of Spring Brook Creek, Green River Basin); Discharge point at RM 0.1.
- Stream 0020- Spring Brook Basins/Spring Brook Creek (tributary of Spring Brook Creek, Green River Basin); Discharge point at RM 0.3.
- Stream 0006-Panther Creek (outlet of Panther Lake, tributary of Spring Brook Creek, Green River basin); Discharge point at RM 1 to 1.7 (length of wetland adjacent to east side of highway)
- Stream 0005-Spring Brook Creek (tributary of Black River, Green River basin); Discharge point at RM 0.7.

Spill Response Measures. The system has several safeguards incorporated into the design to contain accidental spills, including flow monitors, alarms and a sump pump. Only licensed contractors will transport sewage from the Amphitheatre to the treatment plant. Operators removing the sewage from the Baker tanks will use quick cam-lock connections to reduce the chance of leaks or spill during transfer. The valve on the tanks will be closed after the truck is filled and the open end of the valve will be vacuumed clean before it is detached. The hose will also be vacuumed clean before it is detached at the vacuum truck.

In the event of a spill during transport, the following will occur:

- Storm drains would be blocked or covered to contain the sewage and prevent its entry into waterways.
- Appropriate and accessible locations in waterways and at discharge points would be diked to contain the spill.
- Water may be used to dilute the spill when fully contained within the on-site tank pad.
- Lime or other disinfectants would be spread over the spill to kill bacteria and limit odor.
- Sewage ponded on the road surface or contained in roadside ditches and settling basins would be pumped into containers for removal.
- An experienced licensed hazardous waste clean-up company will be contacted immediately following a spill.

Water Supply

The Tribe and SFX propose to use groundwater sources to supply water to the Amphitheatre. Water withdrawal to meet the needs the needs of these facilities is considered as part of the proposed action. Water for the Amphitheatre would be supplied by a combination of two wells, which are connected to the water distribution system that serves development in sections 1, 2, and 12. Water for the Amphitheatre will be pumped from the two wells and stored in a 915,000 gallon reservoir located near the Tribal Administration Center. These two wells draw from the aquifer that is hydraulically connected with the White River. Water demand for the Amphitheatre is estimated at 138,000 gallons per day based upon a peak attendance event (RW Beck 1998). Only five to six peak events are anticipated per year, with average events requiring proportionately less water.

The future demand on the Tribe's water system over the next 20 years, including the Amphitheatre and planned residential development of 34 homes per year (actual rate is 15 to 25 homes per year) is estimated to be 0.23 mgd. Given that Wells 3 and 4 each supply about 0.29 mgd, the Tribe's water supply appears to be sufficient to meet planned future water requirements for the life of the project (30-50 years) (Carlson 2000). Reservoir storage will be used to meet the short-term peak demand requirements for the Amphitheatre.

In making its water decisions, the Tribe has committed to meeting any additional water needs for the Amphitheatre beyond what has already been disclosed in the PFEIS through the development of sources with the least impact on chinook salmon (D. Every, pers. comm., 2000). The Tribe has also stated that it does not intend to divert surface water from either Pussyfoot Springs or the White River for future water supply sources. The Tribe, along with Clearchannel commits to water conservation education and promotion at the Amphitheatre, as well as implementation of water conservation measures at the Amphitheatre, to the extent practicable.

Highway Improvements

The proposed action would modify SR 164 to provide left and right turn lanes into the site at two existing driveways at SE 404th Street and SE 408th Street. These improvements are designed to reduce congestion and keep queues to a minimum on SR 164. Two new driveways at SE 400th Street and Center Drive will also be built. At the new access road at SE 400th Street, a stacking lane on southbound SR 164 is proposed for right turns into the site. The entrance at SE 408th Street would require an extra lane on northbound SR 164 to accommodate left turns into the site. Channelization plans will be finalized with the WSDOT after the final EIS is completed.

The highway improvements are expected to add about 2 acres of impervious surface to two subbasins (D. Every, pers. comm., 2001). New turn lanes in the north subbasin will add about 0.8 acres new impervious area to a tributary of Jones Creek (# 0047). The remaining new impervious surface area from the highway improvements drain to a tributary of Pussyfoot Creek.

Stormwater from the SR 164 channelization improvements will be treated in two stormwater facilities designed to meet the standards of the 1998 the King County SWDM (King County 1998). Flow control facilities will meet the performance standards for Level 2 flow control, which will match pre-development discharge durations for 50 percent of the 2-year peak flow, up to the full 50-year peak flow.

Highway improvements, including the two associated detention basins, would be positioned to avoid filling any new wetlands. Areas affected are existing or former pasture areas. The detention basin in the north subbasin will occupy some shrub-dominated area. This basin will be either a wetpond type located west of SR 164 and south of 400th, or a bioswale design to accommodate a narrow right-of-way east of SR 164 and north of 400th. In either case, the basin would discharge back to the roadside drainage ditch. The intakes would also have a spill-control manhole. No improvements to the conveyance system are anticipated.

Access permits from WSDOT have been applied for by the Tribe for the channelization modifications to SR 164 at the four driveways serving the site, and the Tribe would pay for the costs of these improvements.

According to the PFEIS, project-induced traffic during capacity events will increase along SR-164 (between SR-18 and SR-169), SR-167 (between SR-164 and Renton), SR-169 (between SR-164 and SR-18) and SR-18 (between SR-164 and I-5; and between SR-169 and SR-164). No actions on SR-164, other than the channelization improvements discussed previously, are proposed as part of the Amphitheatre project.

Access/Trespass Issues

There are three roads that provide access to the White River Valley from the vicinity of the proposed Amphitheatre. One is an extension of SE 408th Street that extends to the White River in the vicinity of the mouth of Pussyfoot Creek and First Creek. The second is an extension of SE 404th Street that crosses the Amphitheatre site and descends to the meadow below the bluff and then to the River. Both of these roads have gates on them, and access will be controlled to prevent general access to or from the Amphitheatre site via these roads. The third nearby road is an extension of a road to private homes that connects to SR 164 just north of SE 400th Street. This road connects on the valley floor and joins other dirt roads there.

No camping will be allowed at the site except for the annual powwow, during which camping will occur on the parking lots. The Amphitheatre site will have a perimeter fence that will prevent people from coming up from the river valley to a concert or going down to the valley from the site on concert event days. The perimeter will also be patrolled and the gate on the road from 408th to the mouth of Pussyfoot Creek will be locked (D. Every, pers. comm., 2000). A parking ordinance will also be established by the Tribe to prohibit unauthorized parking on the Reservation near the Amphitheatre facilities.

The Tribal Enforcement staff routinely checks the White River Valley for trespassers, poaching, and other illegal activities. This monitoring frequently involves the fording of two creeks, Pussyfoot and Second Creeks. Enforcement staff schedules and creek crossings are not anticipated to change with the opening of the Amphitheatre. The Tribe commits to monitoring these regular creek crossings on Amphitheatre event days to determine whether such crossings increase in direct relation to events (D. Every, pers. comm., 2001). The details of such monitoring, including establishment of the baseline information, will be in the final monitoring and contingency plan submitted to the NMFS within 90 days of completion of the Opinion. The Tribe and Clearchannel propose to notify NMFS and FWS if a statistically significant increase in crossings is observed so that appropriate solutions to minimize the effects of the crossings can be taken. If crossing structures become necessary (e.g., bridges), funding may be obtained through the Mitigation funds.

Additionally the Tribe and Clearchannel commit to posting signs at and near the Amphitheatre, and will report all occurrences of prohibited take of listed species to NMFS. If the Tribe assesses a fine for activities that cause take, those monies will be dedicated to rectifying the take, if feasible. Otherwise fees will be dedicated to habitat restoration and water conservation projects funded through the Amphitheatre Mitigation Fund, as stated previously (D. Every, pers. comm., 2000).

Construction Schedule

Remaining construction activities are expected to be completed in the year 2002, subject to obtaining all necessary permits. Completion of the Amphitheatre complex is project to take about 7 months, plus an additional 2 to 3 months for start-up and owner equipment set-up. Delivery traffic and employee traffic volumes are described in detail in the PFEIS.

<u>2. Drug and Alcohol Counseling Center</u>

A new drug and alcohol counseling center (counseling center) will be built on nine acres on the northwest corner of the Enumclaw Plateau portion of the land transfer site (see Figure 2-1 of the PFEIS). The counseling center would include a main building of approximately 8,160 square feet, a caretaker's home, parking for about 20 cars, and access roads. Altogether, these facilities would occupy slightly less than one acre of the approximately nine acres allocated for them.

Sewer and water for the counseling center would be provided by a separate well and septic system than that used at the Amphitheatre. Water demand will be met by a new, dedicated well constructed on site. An estimated 1,300 to 1,630 gallons per day of water would be needed at the facilities and is based upon a staff of 15 and about 50 others using the facilities each day (D. Every, pers. comm., 2001). The proposed well for the counseling center facilities will be located in a shallow aquifer (D. Every, pers. comm. 2001).

The counseling center septic system will be designed to meet King County standards (D. Every, pers. comm., 2001). The system will be located about 250 feet upslope of the meadow, about 900 feet from the White River, and about 600 feet from Jones Creek north of the site. The system will be designed using pressure distribution, and having a calculated flow of 1,050 gallons per day.

David Every (pers. comm., 2000) provided the following information regarding construction of the counseling center. Construction will not begin by the Tribe until after the Amphitheatre FEIS is released, and is expected to be complete in 5 to 8 months (anticipated to be primarily 2001). Earthwork is planned for the summer dry season. This is a small project compared to the Amphitheatre, requiring a small construction force of people and equipment at any one time. About one acre of ground will be disturbed during construction. The entire site covers nine acres plus the wooded slope to the west.

Best management measures for erosion control will be implemented. A storm drainage report produced by Barghausen Engineers indicates there is no permanent water on the site, and no wetlands or stream drainage will be affected by the construction. Stormwater will be collected in a 4-foot deep, 0.15 million gallon (0.23-acre) detention basin sized to comply with the 1998 King County manual requirements (Table 4). Flow control facilities will meet the performance standards for Level 2 flow control, which will match pre-development discharge durations for 50 percent of the 2-year peak flow, up to the full 50-year peak flow. Stormwater from this basin will discharge to the grassy meadow below the bluff, disperse overland, and then soak into the sandy soil. At no time will any stormwater from the site discharge into any surface water feature.

Table 4. Drug and alcohol counseling center stormwater detention basin.

Surface Area (acres)	Capacity (million gals)	Total Acres Treated	Impervious Surface (acres)
0.23	0.15	9.0	1.0

3. Remaining Transfer Lands

The remaining 217 acres of transfer lands are to be managed as open space and fish or wildlife habitat (BIA and WSDOT 2000). These lands include the 9-acre Porter property along SR 164, 25 acres of bluff slope, a portion of the 11 acre-terrace below the bluff, and 172 acres of floodplain and valley.

The 11 acre-terrace below the bluff will contain the 1-acre mitigation wetland, with the rest will be maintained much as it is now except for occasional use for Tribal cultural events. That use may include building a long house at some time in the future (D. Every, pers. comm.,2000, email dated 12-14- 00). There are relatively few land use constraints on the terrace, other than access. However, the wetland mitigation site for the Amphitheatre will occupy one acre and will constrain two additional acres because of existing wetlands and the configuration of the mitigation site.

The remaining 172 acres are all within the White River Valley and straddle the river floodplain and Pussyfoot Creek. It has poor access for any active use. A significant part of it is forested; any future timber harvest will require approval by BIA.