TACOMA POWER

3628 South 35th Street
Tacoma, Washington 98409-3192

TACOMA PUBLIC UTILITIES

September 8,2005

VIA Electronic Filing

Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Re: City of Tacoma, Cowlitz River Project, FERC No. 2016
License Article 410 Water Quality Monitoring Plan

Dear Secretary:

License Article 410 requires Tacoma Power to submit a Water Quality Monitoring Plan within one year of issuance of the Order Amending New License dated July 9, 2005. This order added the terms and conditions from NOAA Fisheries biological opinion for the Cowlitz River Hydroelectric Project that was issued on March 23, 2004. Tacoma Power requested and was granted two extensions of time to file the plan. The order granting the last request was issued on May 25, 2005, and required that the plan be filed by September 9, 2005. The enclosed plan, prepared in consultation with NOAA Fisheries and Washington Department of Ecology, is submitted to fulfill that requirement.

If you have any questions regarding this submittal, please do not hesitate to contact Debbie Young, Natural Resource Manager, at (253) 502-8340 or Tom Martin, License Implementation Coordinator, at (253) 502-8298.

Sincerely,

Patrick D. McCarty
Generation Manager

Enclosures

cc: Federal Energy Regulatory Commission, Portland Regional Office (wlattachrnent)
Richard Domingue, NOAA Fisheries (wlattachrnent)
Chris Maynard, Washington Department of Ecology (wlattachrnent)
Deborah Cornett, Washington Department of Ecology(w/attachment)
Fisheries Technical Committee (wlattachment)
Debbie Young (wlattachrnent)
Tom Martin (wlattachment)

bc: Mark LaRiviere (w/attachment)
Sarah Hahn (w/attachment)
Pam Klatt (w/attachment)
Don Weitkamp (w/attachment)
Brian Mattax (w/attachment)
Binders (3) (w/attachment)

City of Tacoma,
Department of Public Utilities, Light Division
Cowlitz River Project
FERC No. 2016

DRAFT

License Article 410

Lower Cowlitz River Water Quality Monitoring Plan

I. INTRODUCTION

This plan is prepared in compliance with the requirements of License Article 410 of the Federal Energy Regulatory Commission's (FERC) Order Amending New License for FERC Project No. 2016, issued and effective July 9, 2004. This license article requires the City of Tacoma, Department of Public Utilities, Light Division (Tacoma Power) to develop and file a plan for monitoring water quality in the lower Cowlitz River within six (6) months of issuance of the order requiring this plan. On December 17, 2004, Tacoma Power requested an extension of time to file this plan because of extensive comments received from NOAA Fisheries. On January 18, 2005, FERC issued an order extending the filing date until April 8, 2005. In order to allow appropriate time to adequately address comments received from NOAA Fisheries, Tacoma Power requested additional extensions of time to file this plan on March 28, 2005 and May 9, 2005. On May 25, 2005, FERC issued an order that extended the filing date until September 9, 2005. A revised draft Lower Cowlitz River Water Quality Monitoring Plan was submitted to NOAA-Fisheries and the Washington Department of Ecology for review and comment on July 8, 2005. Their comments and Tacoma Power's response to the comments are located in Appendix E.

1.1 PROJECT DESCRIPTION

The Cowlitz Project (FERC No. 2016) is Tacoma Power's largest electricity generating facility and is located on the Cowlitz River, Lewis County, Washington. The Project consists of two dams, the Mayfield Dam at river mile (RM) 52 and Mossyrock Dam, upstream at RM 65. In addition to the Project generating electricity and providing flood control, Tacoma operates three major parks, manages approximately 14,000 acres of wildlife lands, and owns and funds operation of the Cowlitz Salmon Hatchery (RM 50) and the Cowlitz Trout Hatchery (RM 42). The Barrier Dam, associated with the Cowlitz Salmon Hatchery is located at RM 49.5. The original 50-year license for the Cowlitz Project was issued on December 28, 1951. A new thirty-five year license was issued by FERC and became effective on July 18, 2003.

The Mayfield development completed in 1963 includes a 250-foot-high, 850-foot-long, concrete arch and gravity dam that impounds Mayfield Lake, which has a maximum surface area of 2,250 acres. In addition to the Cowlitz River, inflows from the Tilton River also contribute to Mayfield Lake, which supports public and private recreational facilities. An 854-foot-long power tunnel passes through the right abutment of the dam and terminates at a concrete forebay structure. Four penstocks continue from the forebay structure to the four generating units, which have an installed capacity of 162-megawatts (MW).

The Mossyrock development completed in 1968 includes a 606-foot-high double curvature concrete arch dam that creates Riffe Lake, a 23-mile long, 11,830-acre reservoir with 52 miles of shoreline. Riffe Lake supports several parks and other recreational facilities. Three penstocks, varying in length from 248 to 285 feet, extend down to the powerhouse, which is adjacent to the base of the dam. The powerhouse contains two generating units with room for a third, and has a total installed capacity of 300 MW. Transmission lines link the Mossyrock and Mayfield developments.

1.2 ARTICLE 410 OF FERC LICENSE

As required by condition 1(g) of the incidental take statement, within 6 months of issuance of this order the licensee shall file for Commission approval a water quality monitoring plan for the lower Cowlitz River. The plan shall be developed in consultation with NOAA Fisheries and the Washington Department of Ecology. The plan shall include monitoring of water temperature, dissolved oxygen concentration and percent saturation, total dissolved gases concentration and percent saturation, total nitrogen and ammonia concentrations, and total and ortho-phosphorus concentrations. The plan shall be provided to the Fisheries Technical Committee and tribes for a 30-day review. The final plan shall have documentation of consultation and copies of comments and recommendations, and specific description of how the final plan accommodates all comments and recommendations.

1.3 PROJECT WATER QUALITY MONITORING ISSUES

The basic objective for Cowlitz River water quality monitoring under the FERC license is to identify and measure changes to water quality that may be introduced by operation of the Cowlitz River Project. To accomplish this objective the water quality monitoring plan addresses the following issues:

- Dissolved nutrients introduced to the Cowlitz River by operation of the Cowlitz River Project, including the Cowlitz Salmon Hatchery and Cowlitz Trout Hatchery.
- Water temperature changes produced by operation of the Cowlitz River Project.
- Total dissolved gas (TDG) supersaturation produced by operation of the Cowlitz River Project.

2. BACKGROUND

Prior to the construction of Tacoma Power's hydroelectric dams on the Cowlitz River, water flowed unimpeded to the lower Cowlitz River from the upper watershed. The construction of the dams modified the natural downstream flow of the water in the Cowlitz River, and due to the impoundments created behind the dams, altered some of the natural water quality parameters of the lower Cowlitz River. As part of the original license for the Project, Tacoma Power constructed and funded operation of the Cowlitz Salmon Hatchery and Cowlitz Trout Hatchery, which are used to mitigate for loss of fish habitat as a result of inundation caused by the Mayfield and Mossyrock dams. These hatcheries are operated under National Pollutant Discharge Elimination System (NPDES) general permits for upland finfish hatching and rearing that are administered by the Washington Department of Ecology (WDOE). These permits limit the allowable concentration of settleable solids, total suspended solids, and total residual chlorine in discharges from the hatcheries, and set a minimum testing schedule to evaluate compliance with these limits. In accordance with the NPDES permits; Washington Department of Fish and Wildlife (WDFW) routinely monitors water quality at the Cowlitz hatcheries and reports the results to WDOE quarterly. A hatchery audit, which included an assessment of compliance with the NPDES permits, was funded by Tacoma Power (Harza Northwest, 1997). Another evaluation of compliance with the NPDES permits was conducted while developing this plan.

As part of its relicensing effort for the Cowlitz River Project, Tacoma Power developed and conducted studies to evaluate the Project's effects on water quality and water temperature. These studies were developed in consultation with federal and state fisheries and water quality agencies participating in the process, and are documented in the 1999 Technical Study Reports (Harza, 2000). These studies included:

- Water quality monitoring
- Continuous water temperature monitoring
- Water temperature modeling

The results of these studies and WDOE's recent assessment of water quality, as they pertain to lower Cowlitz River water quality, are summarized below.

2.1 1997-2000 RELICENSING WATER QUALITY STUDIES

The water quality monitoring study included periodic monitoring of water quality, including turbidity, a study to evaluate total dissolved gas (TDG) levels in the Cowlitz River during spill events, and a study of longitudinal variations in water temperature, pH, dissolved oxygen (DO), and specific conductance in Riffe Lake and Mayfield Lake during the summer of 1997. These water quality studies were a comprehensive effort to 1) describe existing water quality in the study area, 2) describe the limnology of Riffe Lake, Mayfield Lake, and Swofford Pond, 3) evaluate compliance with State of Washington water quality standards, and 4) determine the effects of the Cowlitz River Project on water quality.

Periodic measurements of water quality began in December 1996 and continued into January 2000. This study included monthly in situ measurements of water temperature, DO, pH, specific conductance, and TDG; and collection of samples and subsequent analysis for turbidity, total suspended solids (TSS), nutrients (nitrate plus nitrite, ammonia, total phosphorus, and ortho-phosphorus), chlorophyll-a, phytoplankton, and zooplankton. In addition, selected sites were monitored monthly for fecal coliform concentrations and oil and grease during May through October, and quarterly for metals, alkalinity, anions, and cations. Specific monitoring sites (Figure 1) were selected for each of the parameters monitored. Monitoring sites were located in:

- Streams tributary to Riffe Lake and Mayfield Lake (Cowlitz River, Rainey Creek, Tilton River, and Winston Creek)
- Within the Project impoundments (Riffe Lake, Mayfield Lake, and Swofford Pond)
- The effluents of the Cowlitz Salmon Hatchery and Cowlitz Trout Hatchery
- The Cowlitz River (between Lewis County PUD's Cowlitz Falls Project tailrace and the City of Longview)

In order to more closely evaluate potential effects of spill at the Mossyrock and Mayfield dams, a special study was developed and implemented to monitor TDG levels during a spill event. In early January 1997, a storm event caused spill to occur at both Mossyrock and Mayfield dams. This special study was implemented on January 3 concurrent with spills at both Project dams and the Cowlitz Falls Dam, which is operated by the Lewis County PUD just upstream of Riffe Lake. Spills continued to occur beyond the monitoring period for the special study and were monitored as part of other water quality studies conducted in early January 1997.

A study of longitudinal variation in the water quality (water temperature, DO, pH, and specific conductance) of Riffe Lake and Mayfield Lake was conducted on August 23 and 24, 1997. This study included monitoring water quality in the Mayfield powerhouse tailrace.

The results of the studies discussed above are documented in the 1999 *Technical Study* Reports (Harza, 2000), although data collection continued for a short time after this report was prepared. Appendix A presents a summary of water quality data collected and inflows for the lower Cowlitz River during these studies. Appendix B includes a memo providing further analysis of turbidity data that was collected during the periodic sampling study. Results of these studies demonstrate that the water quality in the Cowlitz River downstream of Mayfield Dam routinely satisfies the applicable Washington State standards for a Class A waterbody. However, two water quality parameters were found to occasionally exceed their corresponding applicable criteria in this reach of the river. TDG was found to exceed the 110-percent criterion and mercury exceeded the allowable mercury concentrations to protect fishes from chronic exposure to contaminants.

2.2 WDOE PROPOSED 200212004 303(D) LIST

The WDOE (2005) 200212004 water quality assessment for development of the 303(d) list of water quality limited waterbodies supports the above conclusion drawn from Tacoma Power's water quality studies. The proposed 303(d) list does not include any portion of the Cowlitz River between Mayfield Dam and Interstate 5 (1-5) as water quality limited for any water quality parameter.

2.3 HATCHERY AUDITS

Tacoma Power assessed the water quality discharged from the Cowlitz Salmon Hatchery and Cowlitz Trout Hatchery (Harza Northwest, 1997). This assessment included a review of the historical water temperature data for the water supplied to each of the hatcheries from the Cowlitz River and of the sediment concentration data collected for NPDES permits. For the Cowlitz Salmon Hatchery, these assessments were done for the five-year period of 1991 through 1995. The same period was used for the assessment of sediment concentrations at the Cowlitz Trout Hatchery, but trout hatchery data limitations resulted in the water temperature assessment being done on the six-year period of 1988 through 1993.

Based on this historical assessment, the temperature of water supplied by the Cowlitz River was 4 to 13ºC at the Cowlitz Salmon Hatchery and 4 to 16ºC at the Cowlitz Trout Hatchery. River temperatures were coolest in January through March and warmest in June through October. The temperature of water supplied by the river was 16ºC or less during the entire assessment period.

Assessment of the hatchery effluent sediment concentrations in 1991 through 1995 indicates that the Cowlitz Salmon Hatchery generally complied with the NPDES requirements, although the Cowlitz Trout Hatchery frequently had sediment concentrations above NPDES-allowable limits. The trout hatchery effluent exceeded the allowable TSS concentration in over 90 percent of the months during the 1991 through 1995 period.

In 1996, new pollution abatement facilities were constructed at the salmon and trout hatcheries. In addition, cleaning procedures were revised at the Cowlitz Salmon Hatchery. In order to assess whether these new facilities and procedures resulted in compliance with the sediment limits set in the NPDES permits, Tacoma Power evaluated data reported for 2003 and 2004 on the monthly Discharge Monitoring Reports for both hatcheries. Appendix C presents the data reported for each hatchery along with the NPDES requirements. These data indicate that both hatcheries comply with the NPDES permits and that settleable sediment and TSS concentrations were an order of magnitude lower than the allowable limit during most months.

2.4 CONTINUOUS WATER TEMPERATURE MONITORING

Tacoma conducted a continuous water temperature monitoring study between October 1996 and October 1999. This study included monitoring temperature at four sites in the lower Cowlitz River. This study is discussed in section 1.1 of the 1999 Technical Study Reports (Hatza, 2000). Appendix D presents results of a monthly percent exceedence analysis of the hourly temperature values recorded at each of the lower Cowlitz River monitoring sites. Table 1 summarizes the monitoring periods and range of hourly temperatures recorded. This summary indicates that water temperature generally remains well below the 18.0°C criterion, the limit at which human-caused increases can exceed no more than 0.3°C.

Table **1.** Summary of continuous water temperatures reported for lower **Cowlitz River monitoring sites.**

Site	River Mile	First Month-Year	Last Month-Year	Min Temp (°C)	Max Temp (°C)
MAYPH[1]	52.0	Mar-99	Oct-99	5.7	13.4
COMAD[2]	50.6	Oct-96	Oct-99	5.1	14.0
COWI5[3]	29.9	Jun-98	Oct-99	5.1	16.0
LONGV[4]	5.1	Oct-98	Oct-99	4.8	16.4

Source: Harza, 2000

1 Cowlitz diver at Mayfield Powerhouse tailrace

2 Cowlitz River below Mayfield Dam at USGS gauge No. 14238000

3 Cowlitz River at 1-5 Bridge

4 Cowlitz River at Longview (RM 5.1)

2.5 WATER TEMPERATURE MODELING

In order to evaluate the potential effects of changing Project operations, Tacoma Power funded development and use of a CE-QUAL-W2 model. This modeling effort is documented in Section 1.3 of the 7999 *Technical Study Reports* (Hatza, 2000). CE-QUAL-W2 modeling indicates that operating the Project according to the Cowlitz River Settlement Agreement and the new license would have little effect on water temperatures (FERC, 2001). The model indicates that mid-summer discharges from the Mayfield powerhouse would be about 1°C warmer than would occur if the project were operated as it typically was under the previous license. However, temperatures in Project-affected reaches of the Cowlitz River will still remain cooler than the 18°C criterion for Class A waters (FERC, 2001).

3. ONGOING AND PLANNED WATER QUALITY MONITORING

In this section, we discuss various monitoring programs that are ongoing or planned for the lower Cowlitz River. These monitoring programs include:

- An assessment of TDG that was developed to comply with the Water Quality Certification Condition Addendum, Appendix C-1, made as part of the new FERC license
- Water quality monitoring conducted at the Cowlitz Salmon Hatchery and Cowlitz Trout Hatchery to aid in management of the hatcheries and document compliance with NPDES permit restrictions
- Planned water quality monitoring for Article 410 of the new FERC license

3.1 401 WATER QUALITY CERTIFICATION ADDENDUM TDG MONITORING STUDY

The Cowlitz River Project is only expected to cause TDG supersaturation when spill occurs at Mayfield Dam and/or Mossyrock Dam. The spillway at Mossyrock has seldom been used due to the storage capacity of its reservoir, and is unlikely to be used except during extreme conditions, during which the TDG criteria would be unlikely to apply.[1] Spill does occasionally occur at Mayfield Dam, but only under very high runoff conditions that do not occur in most years. TDG monitoring is only of value to evaluate effects of operating the Cowlitz River Project during periods when spill would potentially occur.

In accordance with the 401 Water Quality Certification Addendum of the new FERC license, Tacoma Power has developed, under separate cover, a study plan to monitor TDG for the Mossyrock and Mayfield dams. This plan (Rottler, 2005) was developed in consultation with the WDOE and is designed to evaluate the effects of spill at the Project dams on TDG in the Cowlitz River. Tacoma Power filed a draft of this plan, and an amendment to the plan with FERC on August 6, 2003, and February 18, 2005, respectively. The plan was approved by FERC as submitted on August 11, 2005.

In its TDG Plan, Tacoma Power proposes a method for evaluating the effects of spill at its Mossyrock and Mayfield dams on TDG levels in the Cowlitz River. As part of the plan approach, Tacoma Power will establish temporary monitoring sites within Riffe Lake, Mayfield Lake, and the lower Cowlitz River. Table 2 summarizes the proposed sampling program for various spill conditions at the dams.

Table 2. Summary of proposed temporary TDG monitoring.

Location	Order of Sampling [a]	Total Sampling Time [b]
Spill at Mossyrock Dam only		
Riffe Lake at Mossyrock Dam (RM 65.5)	2	Continuous
Lateral transect at Onion Rock Bridge (RM 65.25)	3	Continuous at highest
Harmony Bridge (RM 61)	4	1 hour
Mayfield Lake at Mayfield Dam (RM 52)	1	Continuous

[1] The 110-percent TDG criterion is not applicable for flow events that exceed the seven-day, ten-year frequency flood.

Location	Order of Sampling [a]	Total Sampling Time [b]
Right bank downstream of Mayfield Dam (RM 51.75)	5	1 hour
Left bank at USGS Gage below Mayfield Dam (RM 50.6)	6	Continuous
Right bank at Cowlitz Salmon Hatchery river intake (RM 50)	7	Continuous
Spill at Mayfield Dam only		
Mayfield Lake at Mayfield Dam (RM 52)	1	Continuous
Right bank downstream of Mayfield Dam (RM 51.75)	6	1 hour
Left bank at USGS Gage below Mayfield Dam (RM 50.6)	3	Continuous
Right bank at Cowlitz Salmon Hatchery river intake (RM 50)	4	Continuous
Right bank downstream of Barrier Dam at boat launch (RM 49.25)	5	1 hour
Right bank at Cowlitz Trout Hatchery river intake (RM 43)	2	Continuous
Spill at Mossyrock and Mayfield Dams		
Riffe Lake at Mossyrock Dam (RM 65.5)	2	Continuous
Lateral transect at Onion Rock Bridge (RM 65.25)	3	continuous at highest
Harmony Bridge (RM 61)	5	1 hour
Mayfield Lake at Mayfield Dam (RM 52)	1	Continuous
Right bank downstream of Mayfield Dam (RM 51.75)	6	1 hour
Left bank at USGS Gage below Mayfield Dam (RM 50.6)	3	Continuous
Right bank at Cowlitz Salmon Hatchery river intake (RM 50)	4	1 hour or Continuous
Right bank downstream of Barrier Dam at boat launch (RM 49.25)	5	1 hour
Right bank at Cowlitz Trout Hatchery river intake (RM 43)	2	Continuous

Source: Rottler, 2005

[a] With this order of sampling (assigned priority), spill at both dams would require at least two people to conduct TDG testing.

[b] Goal of 1 hour sampling periods is minimum of 45 minutes of reliable data collected in 5 minute intervals. Continuous sampling will consist of instruments recording water temperature, TDG, and barometric pressure at 15-minute intervals. The local barometric pressure also will be recorded at the Mayfield Dam site and used to calculate TDG percent saturations for non-continuous monitoring sites.

3.2 HATCHERY MANAGEMENT MONITORING

Collectively the Cowlitz Salmon Hatchery and Cowlitz Trout Hatchery, operational since 1967, represent the preeminent check on the water quality of the lower Cowlitz River, as high density rearing of salmonids requires supply of extraordinary high-quality water. The majority of the water supplied to each of the hatcheries comes directly from the Cowlitz River. The WDFW monitors water quality at both hatcheries, along with the temperature of water supplied to the hatcheries from the Cowlitz River. WDFW's monitoring of water quality at each hatchery is to ensure compliance with NPDES limits on effluents, and it routinely reports its monitoring results to WDOE. Monitoring of river temperatures currently consists of making daily measurements at the river intakes to both hatcheries. Tacoma Power will be installing continuous temperature and dissolved oxygen recording monitors at the river intakes of the Cowlitz Salmon Hatchery and the Cowlitz Trout Hatchery as a component of remodeling both of the facilities in the next few years.

3.3 ARTICLE 410 WATER QUALITY MONITORING PLAN

In this section, we discuss Tacoma Power's proposed water quality monitoring plan for the lower Cowlitz River to satisfy Article 410 of the new FERC license for the Project.

3.3.1 OBJECTIVES

The objectives of this plan are to:

- Supplement water quality data collected during relicensing studies for the lower Cowlitz River.
- Compare these supplemental water quality measurements with the applicable State of Washington standards.

3.3.2 STUDY AREA

Baseline studies conducted during the relicensing of the Cowlitz River Hydroelectric Project established sample sites for the lower Cowlitz River. Monitoring water quality at these previously established sites, which are readily accessible, will provide a cost-effective means of detecting changes in the water quality downstream of the Project and will yield consistent data for long-term comparisons. The monitoring sites for the post-licensing study are presented in Table 3.

Table 3. Water quality monitoring locations and site codes for the lower **Cowlitz River.**

Location	Site Code[a]	Distance downstream of Mayfield Dam (miles)
Cowlitz River at **USGS** gage below Mayfield Dam (RM 50.6)	COMAD	1.4
Cowlitz River at Interstate-5 bridge (RM 29.9)	COW15	22.1

[a] From Harza (2000)

3.3.3 METHODS

The present study will repeat the monitoring of the required parameters at two previously monitored locations in the lower Cowlitz River. At each of these stations, *in situ* measurements will be made and water samples will be collected for laboratory analysis. *In situ* measurements of water temperature, dissolved oxygen concentration and percent saturation, total dissolved gas pressure and percent saturation will be made with a Hydrolab MiniSonde 4a or similar meter. Water samples will be collected from near the surface for analysis of nitrates plus nitrites, ammonia, total phosphorus, and ortho-phosphate. The samples will be processed in an analytical laboratory. Methods used for sample collection and analysis will be consistent with protocols implemented during the 1997-2000 periodic monitoring program (Harza, 2000).

3.3.4 MONITORING SCHEDULE

Water quality samples will be collected at the proposed Cowlitz River sites every other month for two years beginning with the month following FERC-approval of this plan.

3.3.5 NOTIFICATIONS AND ACTIONS

In the event monitoring activity conducted under the plan yields a measurement, or a series of measurements, that amount to a violation of the state water quality standards, Tacoma's employee or Tacoma's agent will:

- Immediately notify the Natural Resources Manager, Generation Section, Tacoma Power, 3628 So. 35th Street, Tacoma, WA 98409-3192, (253) 502-8340.
- Immediately notify the Washington Department of Ecology's Southwest Regional Office (SWR) Federal Permit Coordinator, PO Box 47775, Olympia, WA 98504-7775, (360) 407-6926.

Tacoma or Tacoma's agent will make an immediate effort to determine if any state water quality standards violation(s) found in the course of monitoring activities under this plan is the result of Tacoma's actions, including discharges into the Cowlitz River. If a direct cause and effect is found, Tacoma will implement the following corrective actions:

- Cease the activity causing the pollution as much as practical within operational constraints of the Cowlitz River Project.
- Assess the possible cause(s) of the water quality problem and implement appropriate measures to correct the problem and/or prevent further environmental damage.
- In the event of finding distressed or dying fish coincidental to the non-compliant measurement, Tacoma or Tacoma's agent will collect fish specimens and additional water samples in the affected area and, within the first hour of such conditions, collect additional water samples for analysis of DO and total sulfides.
- In the event of a fish kill, immediately notify the Washington Department of Ecology, Southwest Region Spill Response Office at (360) 407-6300, the SWRO Federal Permit Coordinator, and the Washington Department of Fish and Wildlife Enforcement Office. Notification will include a description of the nature and extent of the problem, any actions taken to correct the problem, and any proposed change in operations to prevent further problems.
- In the event of a fish kill, immediately notify Michelle Day of National Marine Fisheries Service at (503) 736-4734. If Ms. Day cannot be reached at that number, call her cell phone at (503) 351-4393. If Ms. Day cannot be reached via cell phone, leave a message for her; then call Keith Kirkendall at (503) 230-5431. NMFS Law Enforcement Office shall also be contacted at 800-853-1964. Notification shall include a description of the nature and extent of the problem, any actions taken to correct the problem and any proposed changes in operations to prevent further problems.

3.3.6 REPORTING

Tacoma Power will prepare annual reports that describe water temperature and water quality in the lower Cowlitz River. Each report will consolidate water temperature and water quality data collected in the lower Cowlitz River by incorporating data from this plan that addresses Article 410 of the new FERC license, the TDG Plan that addresses the 401 Water Quality Certification Condition Addendum, Appendix C-1, of the new FERC license (Rottler, 2005), and monitoring of river source water and effluents for the Cowlitz Salmon Hatchery and Cowlitz Trout Hatchery. Annual reports that include the quarterly monitoring results will present a more complete picture of what is occurring in the river verses quarter reports. The reports will discuss the monitoring protocol, present the monitored values for each water quality parameter, and discuss results that do not comply with applicable state water quality standards. The monitoring results will be segregated into quarterly periods that are biologically meaningful by using the following periods:

- November 1 through January 31 to represent coho spawning and Chinook incubation
- February 1 through April 30 to represent steelhead spawning and spring Chinook migration
- May 1 through July 31 to represent summer rearing
- August 1 through October 31 to represent Chinook spawning

By January 31 of the year following the initial monitoring period of November 1 through October 31 for Article 410, the first annual report will be prepared and distributed to the Cowlitz Fisheries Technical Committee. The second annual report will expand on data presented in the first annual report and be distributed to the Cowlitz Fisheries Technical Committee by January 31 of the following year. If the data collected during the entire two-year monitoring period is not included in the second annual report, a third (final) report will be prepared and distributed within 90 days of the end of the last quarter that monitoring takes place for Article 410. In addition to the standard information provided in the annual reports, the final report will include an evaluation of the need for continued water quality monitoring (as proposed herein) and a recommendation of whether the plan should be discontinued, reduced, or expanded. Each of these reports will be filed with FERC along with comments received within 60 days of its being distributed and will be posted on Tacoma Power's website.

4. REFERENCES

FERC (Federal Energy Regulatory Commission). 2001. Final Environmental Impact Statement Cowlitz River Hydroelectric Project (No. 2016-044) Washington. November 2001.

Harza. 2000. Cowlitz River Hydroelectric Project, FERC No. 2016. 1999 Technical Study Reports. Prepared for Tacoma Power. March 2000.

Harza Northwest. 1997. Cowlitz Salmon and Trout Hatcheries Audit Report. February 1997

Rottler, D. 2005. Cowlitz River Project Total Dissolved Gas Transect Study Plan (First Revision). Report prepared for the Washington Department of Ecology. Tacoma Power. February 16, 2005.

WDOE. 2005. Washington State's water quality assessment [303(d) & 305(b) report], 2004 submittal web page. http://www.ecv.wa.aov/programs/wq/303d/2002/2002-index.html, updated June 2005, accessed June 10,2005. Washington Department of Ecology.

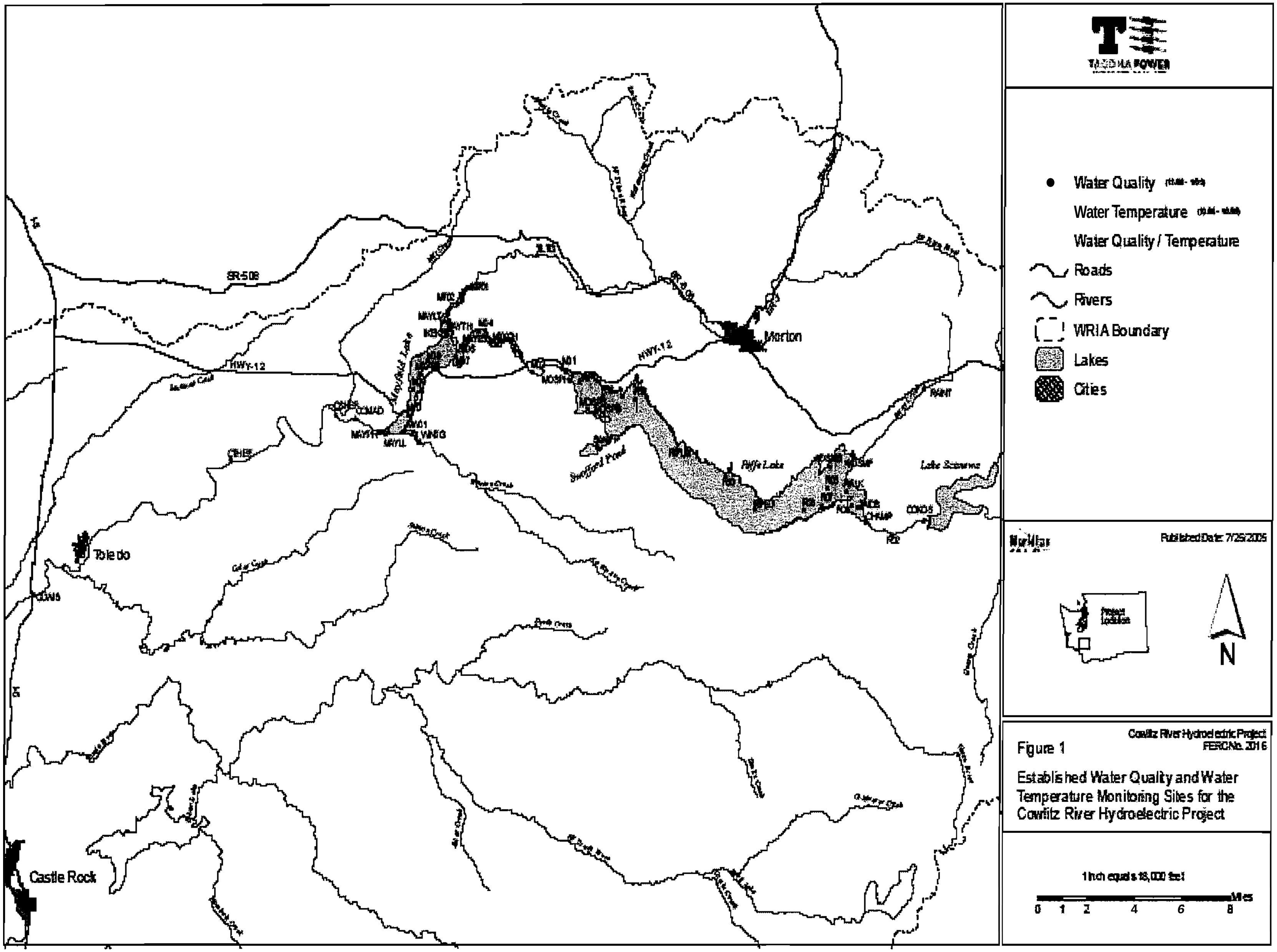


Figure 1. Established water quality sample sites for the Cowlitz River Hydroelectric Project.

Appendix A
Summary of Lower Cowlitz River water quality data from 1997 – 2000

(Source: Tacoma Power relicensing water quality database)

Site cross-reference for lower Cowlitz River water quality monitoring stations

Site	Site Description	RM	RM of Mouth	RM to Columbia R.	Elevation (feet)
MAYPH	Cowlitz River at Mayfield powerhouse	52.0	0.0	52.0	260
COMAD	Cowlitz River downstream of Mayfield Dam (USGS Gauge)	50.6	0.0	50.6	236
CSHIN	Cowlitz River at Cowlitz Salmon Hatchery intake	49.8	0.0	49.8	250
CSHEF	Cowlitz Salmon Hatchery effluent to Cowlitz River	49.6	0.0	49.6	250
CTHIN	Cowlitz River at Cowlitz Trout Hatchery intake	43.0	0.0	43.0	160
CTHEF	Cowlitz Trout Hatchery effluent to Blue Creek	0.9	41.9	42.8	180
COW15	Cowlitz River at 1-5 Bridge	29.9	0.0	29.9	70
LONGV	Cowlitz River at Kelso Regional Water Treatment Plant intake	5.1	0.0	5.1	10

Summary of water quality data collected for the lower Cowlitz River, 1997-2000. (Source: Cowlitz River Project Relicensing database)

Site	Monitoring Type	Min	Max	Aver.	Number of Samples	First Date	Last Date
Dissolved Oxygen (mg/l)							
MAYPH	L1	11.8	11.8	11.8	1	1/3/1997	1/3/1997
MAYPH	P	10.0	12.3	11.1	8	41611999	112412000
COMAD	P	9.3	12.9	11.2	30	51611997	112412000
CSHIN	L1	12.8	12.8	12.8	1	1/3/1997	1/3/1997
CSHEF	P	10.4	12.9	11.6	23	51611997	41611999
CTHEF	P	8.3	12.3	10.2	23	5/6/1997	41611999
COW15	P	10.4	12.4	11.5	31	51611997	112412000

Site	Monitoring Type	Min	Max	Aver.	Number of Samples	First Date	Last Date
COW15	S	12.9	12.9	12.9	1	3/9/1999	3/9/1999
LONGV	P	9.9	12.9	11.2	12	10/6/1998	1/24/2000
Total Dissolved Gas (%)							
MAYPH	L1	102	102	102	1	1/3/1997	1/3/1997
COMAD	P	98	107	103	24	5/6/1997	1/24/2000
CSHIN	CSH	112	112	112	1	1/8/1997	1/8/1997
CSHIN	L1	110	110	110	1	1/3/1997	1/3/1997
CSHEF	P	101	107	103	24	5/6/1997	4/6/1999
CTHIN	CTH	111	111	111	1	1/9/1997	1/9/1997
CTHEF	P	98	104	101	24	5/6/1997	4/6/1999
COW15	P	101	109	104	24	5/6/1997	1/24/2000
COW15	S	102	102	102	1	3/9/1999	3/9/1999
pH (standard units)							
MAYPH	L1	7.4	7.4	7.4	1	1/3/1997	1/3/1997
MAYPH	P	6.5	7.3	6.9	6	4/6/1999	1/24/2000
COMAD	P	6.7	7.6	7.2	30	5/6/1997	1/24/2000
CSHIN	L1	7.3	7.3	7.3	1	1/3/1997	1/3/1997
CSHEF	P	6.8	7.4	7.2	24	5/6/1997	4/6/1999
CTHEF	P	6.7	7.3	7.1	24	5/6/1997	4/6/1999
COW15	P	6.9	8.0	7.5	30	5/6/1997	1/24/2000
COW15	S	7.4	7.4	7.4	1	3/9/1999	3/9/1999
LONGV	P	7.2	7.4	7.3	11	10/6/1998	1/24/2000
Specific Conductance (µS/cm)							
MAYPH	L1	40	40	40	1	1/3/1997	1/3/1997
MAYPH	P	40	49	44	8	4/6/1999	1/24/2000
COMAD	P	40	55	46	31	5/6/1997	1/24/2000
CSHIN	L1	40	40	40	1	1/3/1997	1/3/1997
CSHEF	P	42	55	47	24	5/6/1997	4/6/1999

Site	Monitoring Type	Min	Max	Aver.	Number of Samples	First Date	Last Date
CTHEF	P	46	72	55	24	5/6/1997	4/6/1999
COW15	P	42	56	47	30	5/6/1997	1/24/2000
COW15	S	43	43	43	1	3/9/1999	3/9/1999
LONGV	P	53	97	72	12	10/6/1998	1/24/2000
Total Phosphorus **(mg P/l)**							
COMAD	DUPE	0.008	0.008	0.008	1	11/4/1997	5/5/1998
COMAD	P	<0.005	0.025	0.007	24	2/4/1997	1/24/2000
CSHEF	P	<0.005	0.044	0.019	24	5/6/1997	4/6/1999
CTHEF	P	<0.005	0.073	0.037	24	5/6/1997	4/6/1999
COW15	P	<0.005	0.028	0.009	24	5/6/1997	1/24/2000
Ortho-phosphate **(mg P/l)**							
COMAD	DUPE	0.008	0.008	0.008	1	11/4/1997	5/5/1998
COMAD	P	<0.005	0.016	0.006	24	2/4/1997	1/24/2000
CSHEF	P	<0.005	0.028	0.013	24	5/6/1997	4/6/1999
CTHEF	P	<0.005	0.077	0.032	24	5/6/1997	4/6/1999
COW15	P	<0.005	0.016	0.008	24	5/6/1997	1/24/2000
Nitrate plus Nitrite **(mg N/l)**							
COMAD	DUPE	0.140	0.140	0.140	1	11/4/1997	5/5/1998
COMAD	P	<0.100	1.200	0.168	24	2/4/1997	1/24/2000
CSHEF	P	<0.100	0.300	0.127	24	5/6/1997	4/6/1999
CTHEF	P	<0.100	1.200	0.205	24	5/6/1997	4/6/1999
COW15	P	<0.100	0.370	0.141	24	5/6/1997	1/24/2000
Ammonia **(mg N/l)**							
COMAD	DUPE	0.006	0.006	0.006	1	11/4/1997	5/5/1998
COMAD	P	<0.005	0.140	0.024	24	2/4/1997	1/24/2000
CSHEF	P	0.005	0.240	0.076	24	5/6/1997	4/6/1999

Site	Monitoring Type	Min	Max	Aver	Number of Samples	First Date	Last Date
CTHEF	P	0.029	0.400	0.160	24	5/6/1997	4/6/1999
COW15	P	<0.005	0.110	0.019	24	5/6/1997	1/24/2000
Turbidity (NTU)							
COMAD	DUPE	6.6	6.6	6.6	1	11/4/1997	5/5/1998
COMAD	P	0.3	14	2.8	24	2/4/1997	1/24/2000
CSHEF	P	0.5	12	2.9	24	5/6/1997	4/6/1999
CTHEF	P	0.6	13	2.7	24	5/6/1997	4/6/1999
COW15	P	0.5	17	4.4	24	5/6/1997	1/24/2000
TSS (mgll)							
COMAD	DUPE	4	4	4	1	11/4/1997	5/5/1998
COMAD	P	<1	11	2	24	2/4/1997	1/24/2000
CSHEF	P	<1	10	2.2	24	5/6/1997	4/6/1999
CTHEF	P	<1	10	2.8	24	5/6/1997	4/6/1999
COW15	P	<1	20	4.5	24	5/6/1997	1/24/2000
Alkalinity (mgll as CaCO3)							
COMAD	DUPE	22	24	23	2	11/4/1997	5/5/1998
COMAD	P	18	31	24	8	2/4/1997	1/24/2000
Cadmium (mg/l)							
COMAD	DUPE	<0.00002	0.00006	0.00004	2	11/4/1997	5/5/1998
COMAD	P	<0.00002	0.00007	0.00003	8	2/4/1997	1/24/2000
Chromium (mg/l)							
COMAD	DUPE	<0.0005	<0.0005	<0.0005	2	11/4/1997	5/5/1998
COMAD	P	<0.0005	<0.0005	<0.0005	8	2/4/1997	1/24/2000
Copper (mg/l)							
COMAD	DUPE	<0.001	<0.002	<0.002	2	11/4/1997	5/5/1998
COMAD	P	<0.001	<0.002	<0.001	8	2/4/1997	1/24/2000
Iron (mgll)							

Site	Monitoring Type	Min	Max	Aver	Number of Samples	First Date	Last Date
COMAD	DUPE	0.06	0.26	0.16	2	11/4/1997	5/5/1998
COMAD	P	0.02	0.30	0.13	8	2/4/1997	1/24/2000
Lead (mgll)							
COMAD	DUPE	0.001	0.001	0.001	2	11/4/1997	5/5/1998
COMAD	P	<0.001	0.001	0.001	8	2/4/1997	1/24/2000
Nickel (mgll)							
COMAD	DUPE	<0.001	<0.002	<0.002	2	11/4/1997	5/5/1998
COMAD	P	<0.001	0.001	0.001	8	2/4/1997	1/24/2000
Mercury (mg/l)							
COMAD	DUPE	<0.0002	<0.0002	<0.0002	2	11/4/1997	5/5/1998
COMAD	P	<0.0002	0.0003	0.0002	8	2/4/1997	1/24/2000
Zinc (mgll)							
COMAD	DUPE	<0.002	0.004	0.003	2	11/4/1997	5/5/1998
COMAD	P	<0.002	0.031	0.009	8	2/4/1997	1/24/2000

Type: CSH = Cowlitz Salmon Hatchery study, CTH = Cowlitz Trout Hatchery study, DUPE = duplicate, L1 = longitudinal TDG study conducted on January 3,1997, and P = periodic study

Appendix B

MEMORANDUM

To: Tom Martin

CC: Pam Klatt, Don Weitkamp

From: Brian Mattax

Date: August 15, 2005

Re: Cowlitz River Basin Turbidity

Purpose: On July 20, 2005, Tacoma Power met with Washington Department of Ecology (WDOE) and NOAA Fisheries to discuss and reach agreement on the Lower Cowlitz River Water Quality Monitoring Plan. At that meeting, WDOE indicated that it would like to see the plan address turbidity in greater detail. This memo was developed to provide insight into turbidity conditions in the Cowlitz River Basin, particularly in the area affected by the Cowlitz River Hydroelectric Project.

Data Used: From December 1996 to April 1997, Tacoma Power conducted preliminary periodic sampling that included monthly monitoring of turbidity at four sites. These sites included Riffe and Mayfield lakes immediately upstream of the respective dams, and the Tilton River and Winston Creek. This periodic sampling program was expanded to include a total of 16 monitoring stations in the Cowlitz River Basin for the period of May 1997 to April 1999. The results of the periodic sampling effort are documented in Section 1.2, *Periodic Water Quality Monitoring* of the *1999 Technical Study Reports.* Sampling conditions at only four sites from December 1996 to April 1997 limits evaluations that this data can be used for; therefore, we primarily focused on data collected during the 2-year period of May 1997 to April 1999.

Site-specific turbidity ranges and averages are presented along with the frequency of turbidity measures that were greater than 5.0 NTU in Table 1. Turbidity measured during the study ranged from near zero nephelometric turbidity units (NTU) to 37 NTU, and most of the measures were less than 5 NTU.

Table 1. Summary of periodic turbidity (NTU) measures along with the frequency of turbidity greater than 5 NTU for each of the stations monitored, December 1996 through April 1999.[a]

Monitoring Site	Min	Max	Average[b]	Frequency of Values >5 NTU
Streams unaffected by Project				
Cowlitz R. upstream of Riffe Lake (COKOS)	0.8	17	5.6	42%
Rainey Cr. At Glenoma Trout Farm intake (RAINT)	0.1	37	2.2	4%
Tilton R. upstream of Bear Canyon (TILTG)[c]	0.2	4.3 (10.5)	1.3	0% (10%)
Winston Cr. Near mouth (WMSG)[c]	0.5	14 (14)	3.0	17% (17%)
Project impoundments				
Swofford Pond (SWOFP)	0.8	18	3.7	21%
Riffe Lake, upper end (RIFLU)	0.4	8.8	1.6	4%
Riffe Lake, middle (RIFLM	0.4	6.9	1.6	4%
Riffe Lake, lower end (RIFLL)[c]	0.4	3.8 (10)	1.5	0% (11%)
Mayfield Lake, Cowlitz arm (MAYLC)	0.4	17	2.7	12%
Mayfield Lake, Tilton arm MAYLT)	0.4	11.4	2.2	12%
Mayfield Lake, lower end (MAYLL)[c]	0.5	7.9 (27)	2.4	12% (28%)
Riffe Lake outflow				
Mossyrock powerhouse tailrace (MOSPH)	0.4	**16**	2.6	8%
Lower Cowlitz River				
Cowlitz R. downstream of Mayfield Dam (COMAD)	0.3	14	2.7	12%
Cowlitz R. at Interstate-5 bridge (COWI5)	0.5	17	4.4	29%
Hatchery effluents				
Cowlitz Salmon Hatchery effluent (CSHEF)	0.5	12	2.9	21%
Cowlitz Trout Hatchery effluent (CTHEF)	0.6	13	2.7	8%

[a] In cases where duplicate samples were taken, turbidity values are based on the average of the duplicates.
[b] All averages are based on the May 1997 to April 1999 period to facilitate comparisons between sites.
[c] Values within ()s are for the December 1996 to April 1999 period.

Results: The study results indicate that three conditions generally lead to elevated turbidity within the basin.

1. High runoff events can lead to elevated turbidity in streams and the Project's reservoirs when they are not thermally stratified.

2. Glacial melt leads to relatively high turbidity in the Cowlitz River upstream of Riffe Lake. As this cold water enters Riffe Lake it plunges to depth as a density current and typically has little effect on near surface turbidity in the lake.
3. During late summer and early fall, turbidity sometimes exceeds 5 NTU in Swofford Pond. These high turbidities correspond with some of the highest phytoplankton densities.

Additional insight into longitudinal differences in turbidity may be evident through review of longitudinal plots of the data sets collected monthly from May 1997 to April 1999. These sampling periods were generally 4 days long, and were originally scheduled to occur during the first full week of the respective month. There was no attempt made to sample only during steady or near-steady state conditions. Therefore, it is possible that differences in hydrological or operational conditions may have influenced turbidity during the sampling periods. Time series plots of hydrological conditions and Riffe Lake water surface elevations are presented in figures 1 and 2, respectively. Review of these figures provides insight to the degree of change that occurred during and previous to each of the sampling periods.

Turbidity data for each of the monthly monitoring periods between May 1997 and April 1999 are displayed in Figure 3 as longitudinal plots. These plots appear to further support the conclusions discussed above regarding turbidity conditions during high runoff events and glacial melt and facilitate evaluation of the likely effects of Swofford Pond, and the effluents of the Cowlitz salmon and trout hatcheries:

- The plot for a very high runoff period (i.e., January 4-7, 1999) shows the highest turbidities for many of the sites within the basin.
- The plots for several of the summer and early fall monitoring periods (e.g., October 6-9, 1997, August 3-6, 1998, and September 7-10, 1998) suggest that the effect of glacial melt from the headwaters of the Cowlitz River appears to be reduced substantially by Riffe Lake, which has a long hydraulic residence time. Turbidity does not typically substantially increase between Riffe Lake and Interstate-5 during these periods.
- Although review of the plot for November 3-6, 1997 could lead one to initially believe that fall drawdown of Riffe Lake led to increasing turbidity in the Cowlitz River, closer examination of the conditions that occurred during and prior to the sampling event do not support this conclusion. During this sampling period, Cowlitz River daily mean inflows to Riffe Lake ranged from about 6,000 to 10,000 cfs, but they were as much as 30,000 cfs a few days prior to the sampling period (figure 1). A turbid pulse surely occurred around this peak flow event and may have routed its way through Riffe Lake and led to the turbid conditions in the Mossyrock tailrace, thus it is not evident that drawdown of Riffe Lake led to the elevated turbidity.
- During January and March of 1998, turbidity was relatively high in the Cowlitz River at Interstate-5, although turbidity was less than 5 NTU at the gage downstream of Mayfield Dam and the effluents of the Cowlitz Salmon and Trout hatcheries. Therefore, there is no evidence that the high turbidity conditions more than 20 miles downstream of Mayfield Dam were caused by any Project effects.

- Inflows from Swofford Pond, and the effluents of the Cowlitz salmon and trout hatcheries do not appear to substantially increase the turbidity of the Cowlitz River (e.g., September 7-10, 1998), as expected due to their low flow rates.

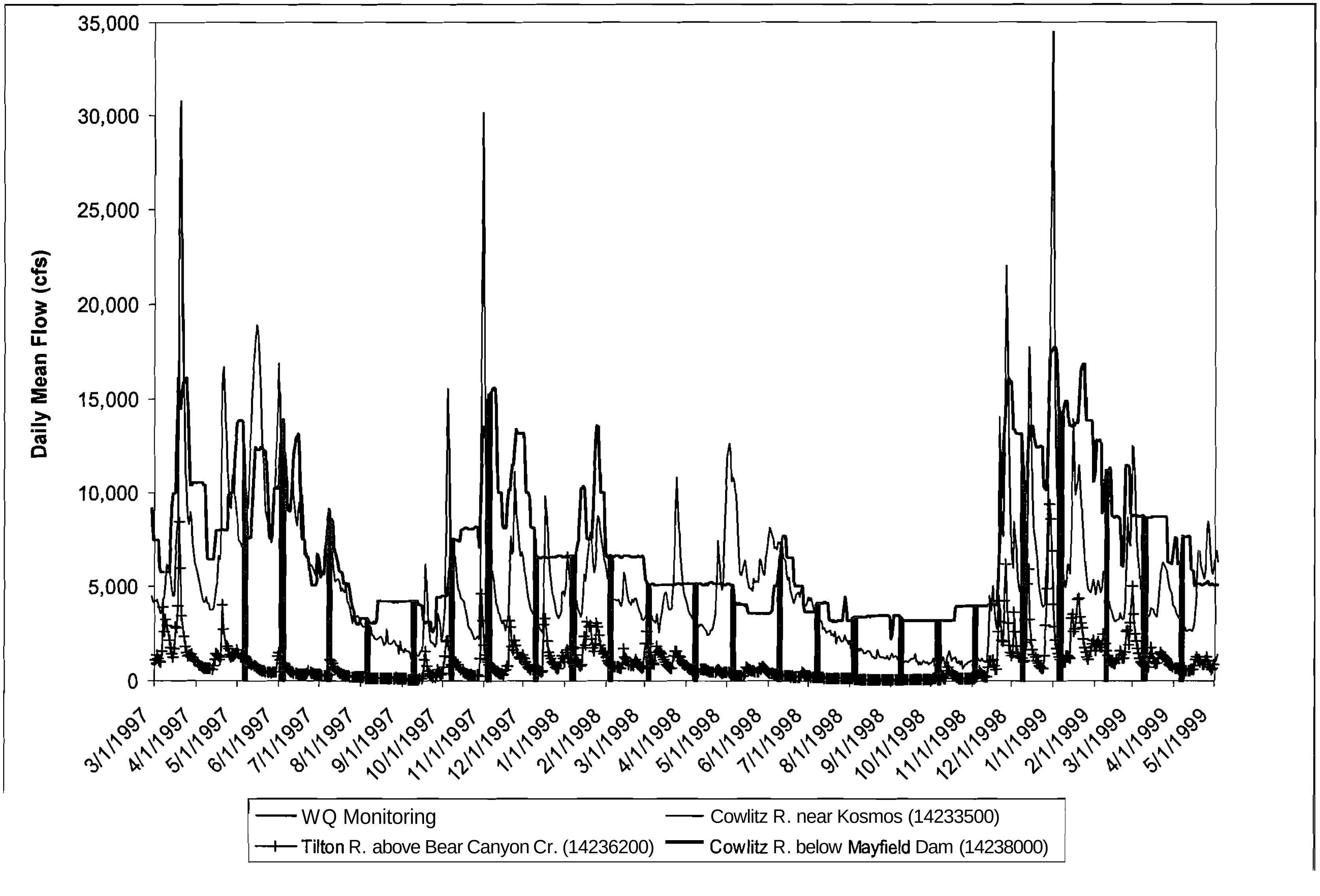


Figure 1. Cowlitz River Basin hydrological conditions, March 1997 to May 1999.

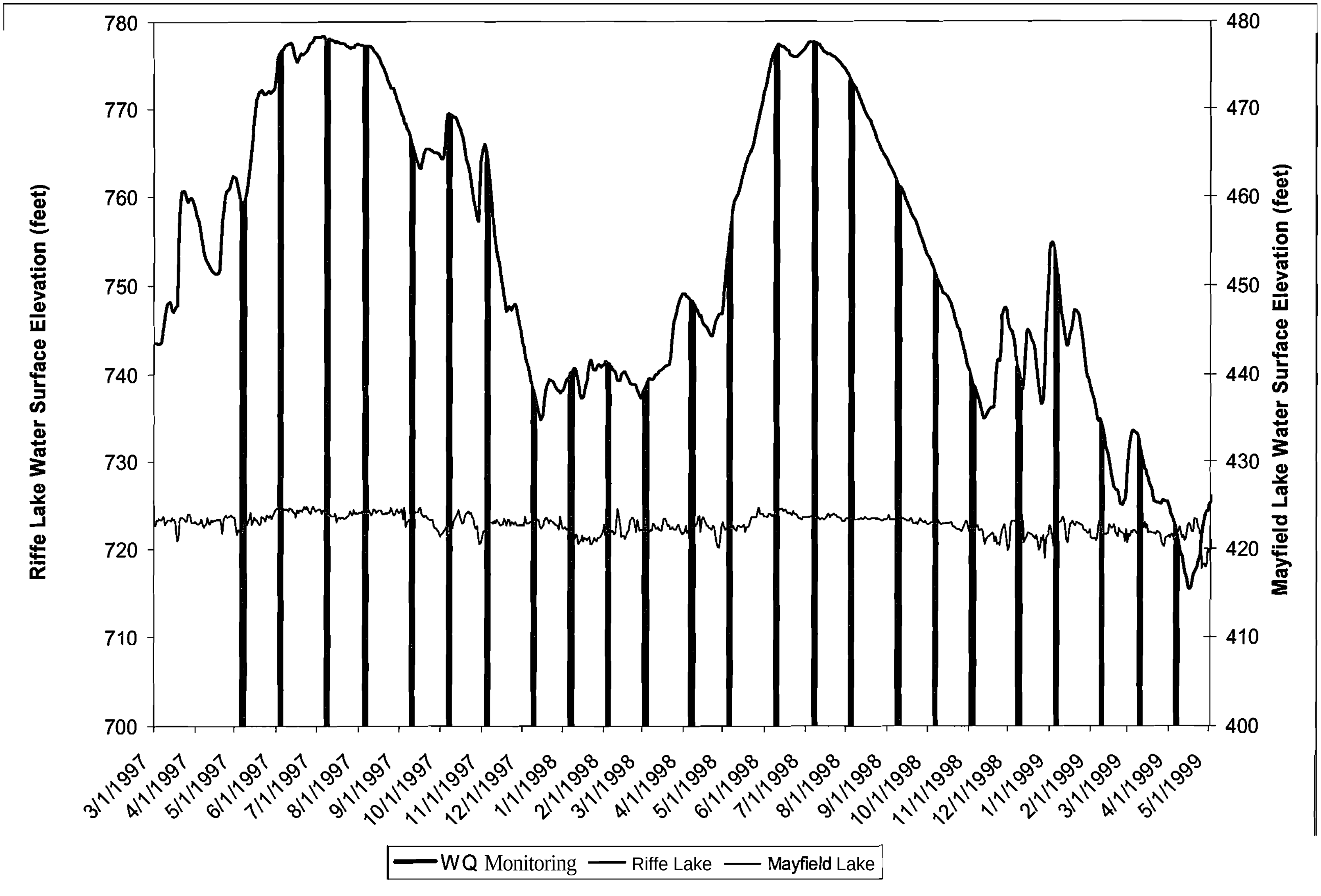


Figure 2. Riffe Lake water surface elevations, March 1997 to May 1999.

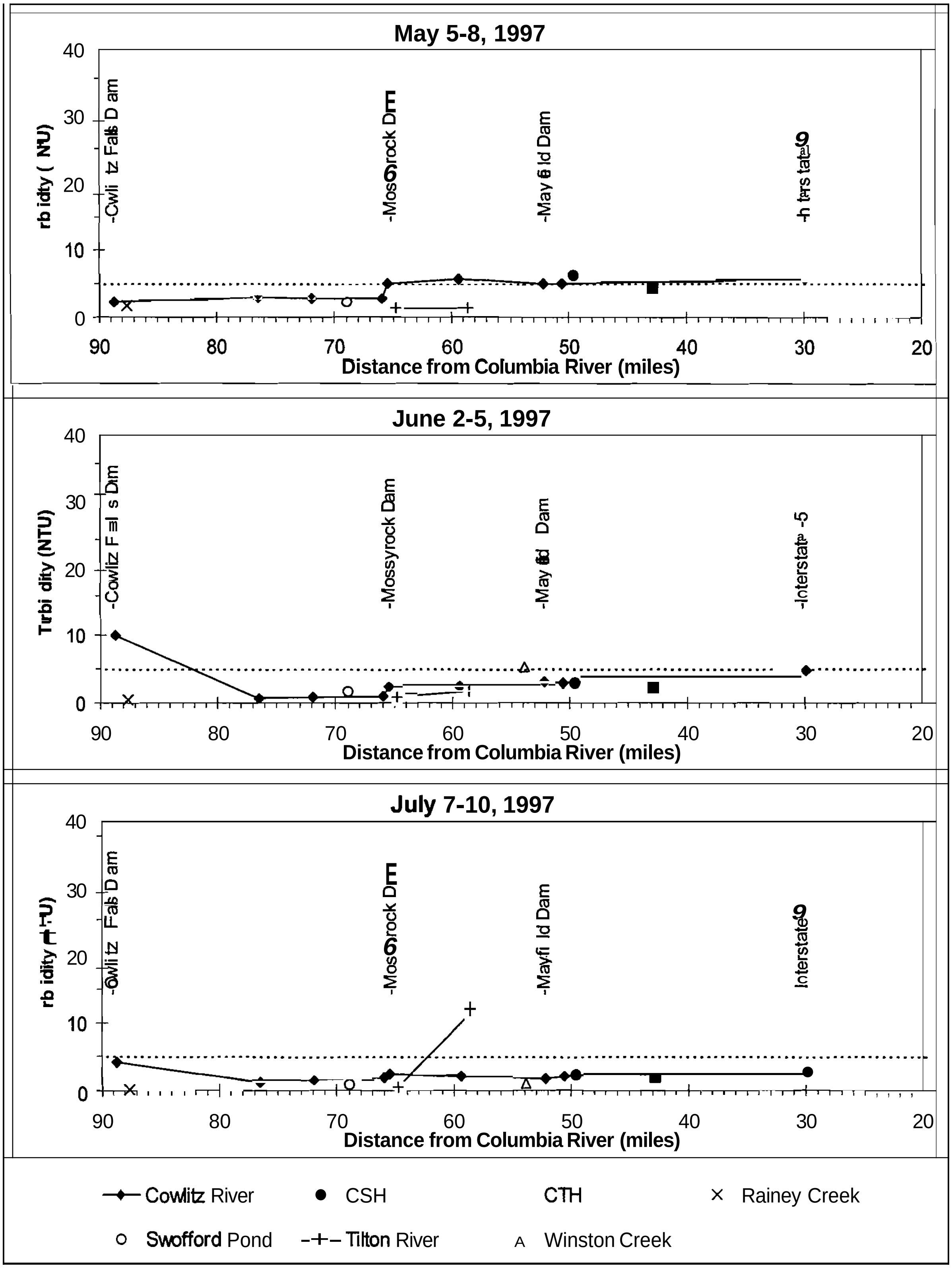


Figure 3(a). Longitudinal plot of periodic turbidity measures, May 1997 to April 1999.

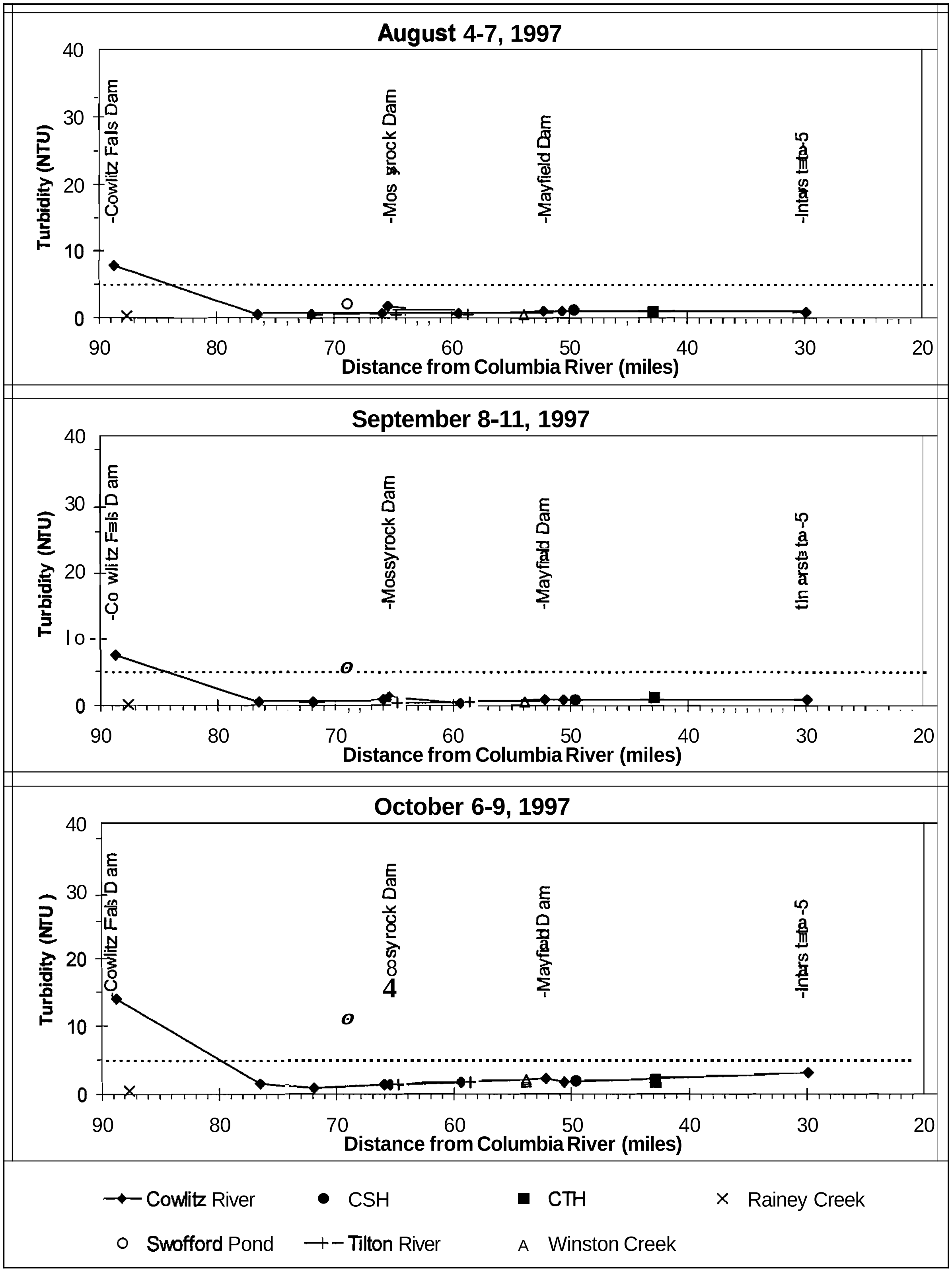


Figure 3(b). Longitudinal plot of periodic turbidity measures, May 1997 to April 1999.

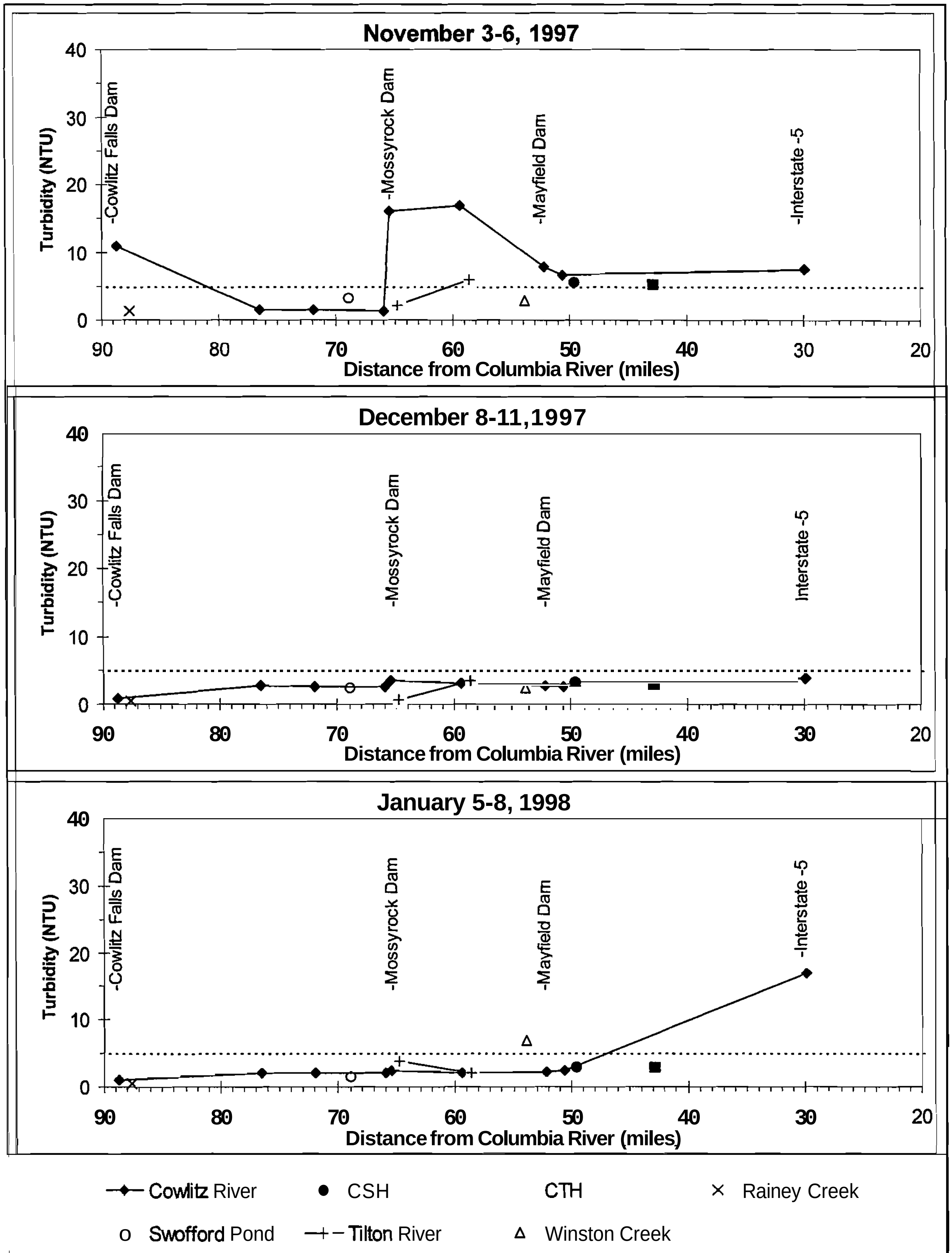


Figure 3(c). Longitudinal plot of periodic turbidity measures, May 1997 to April 1999.

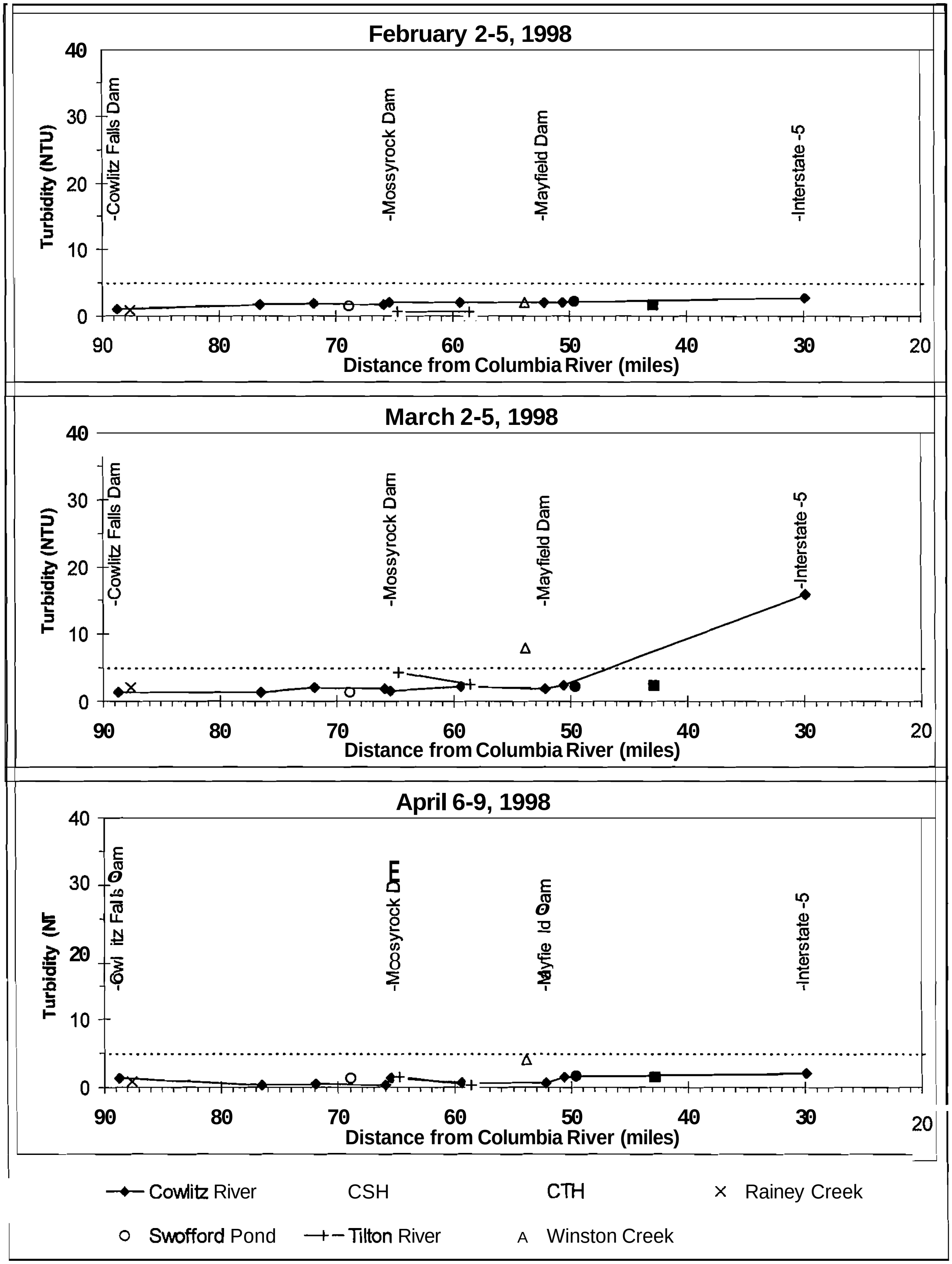


Figure 3(d). Longitudinal plot of periodic turbidity measures, May 1997 to April 1999.

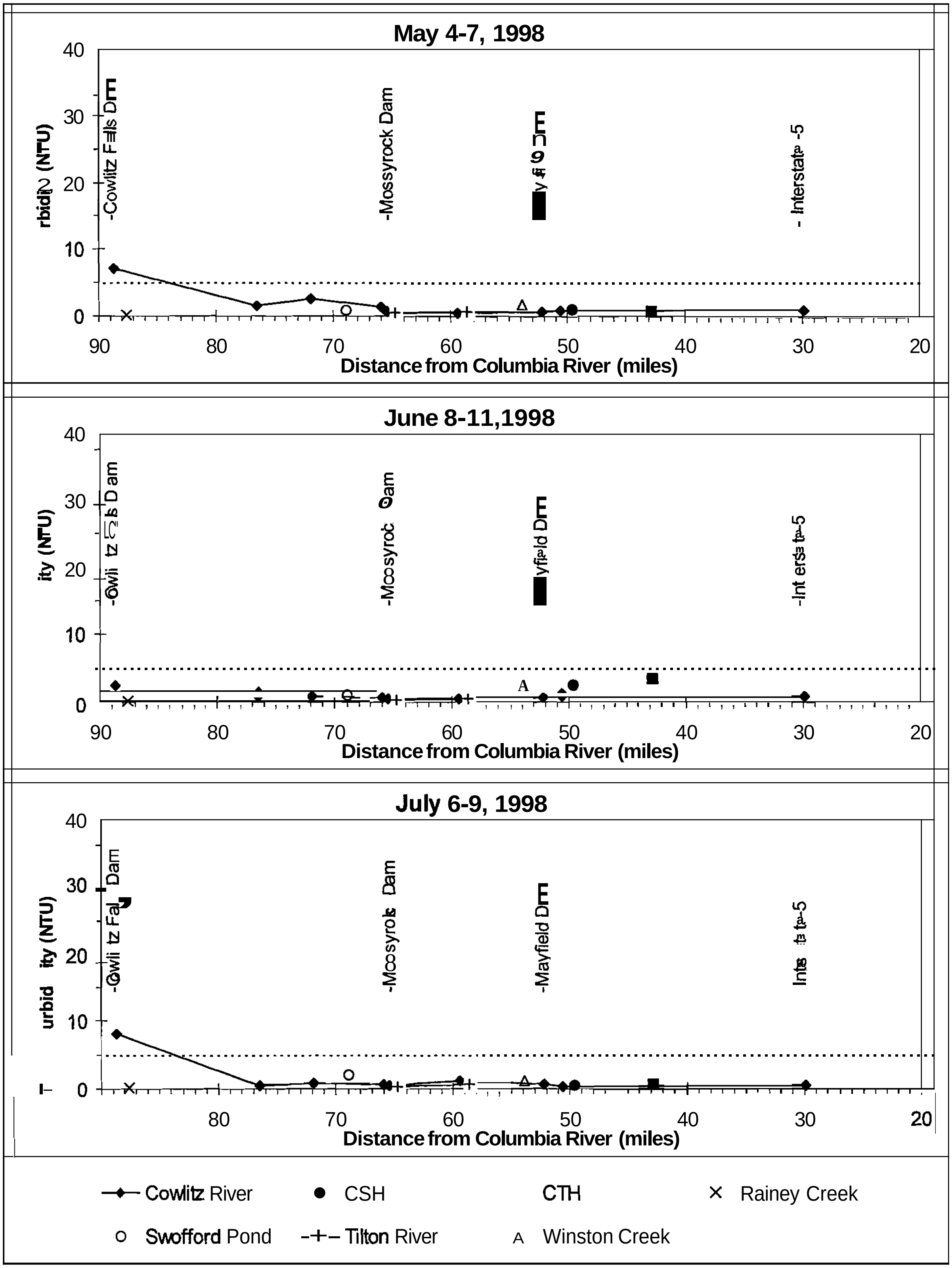


Figure 3(e). Longitudinal plot of periodic turbidity measures, May 1997 to April 1999.

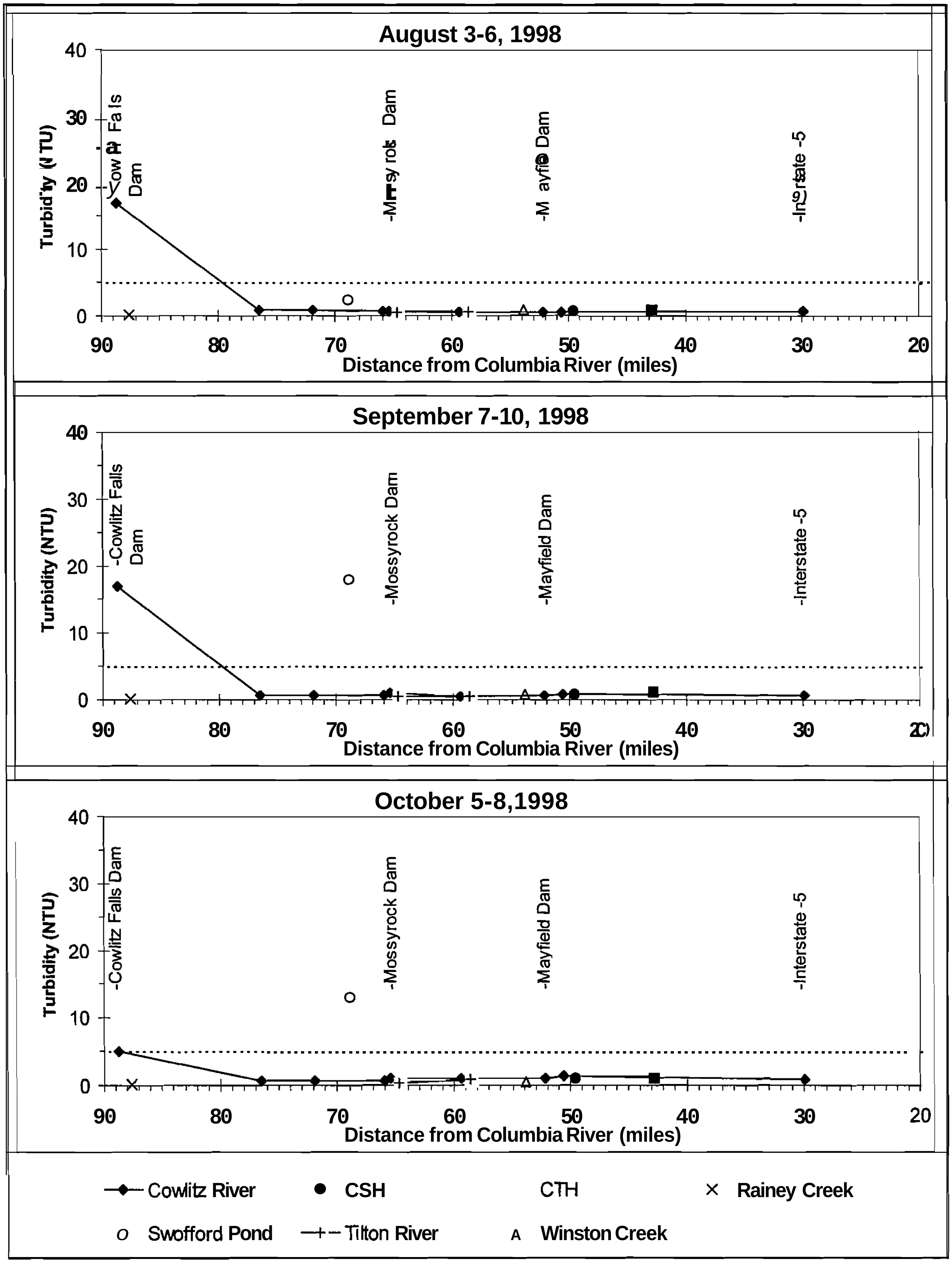


Figure 3(f). Longitudinal plot of periodic turbidity measures, May 1997 to April 1999.

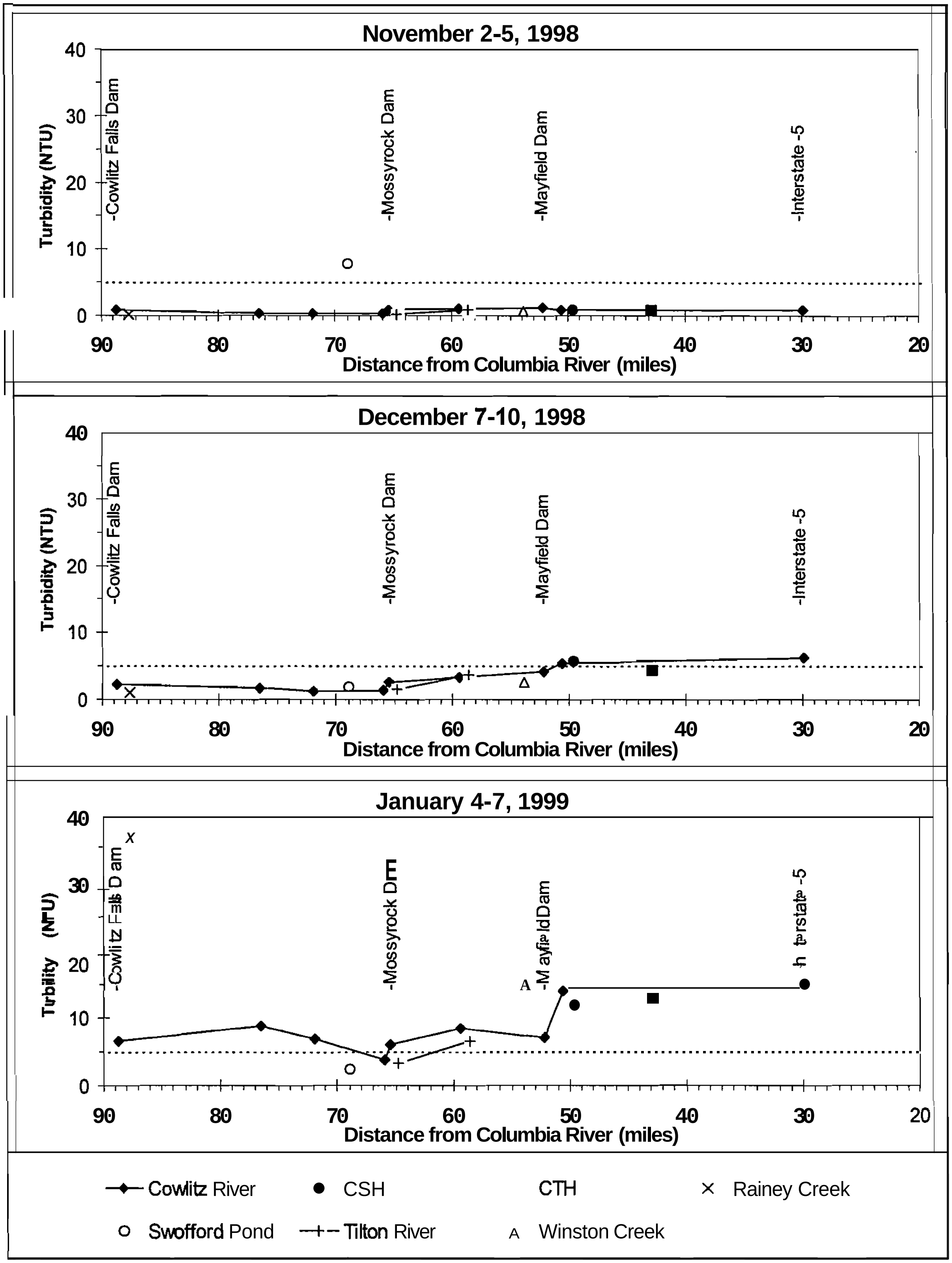


Figure 3(g). Longitudinal plot of periodic turbidity measures, May 1997 to April 1999.

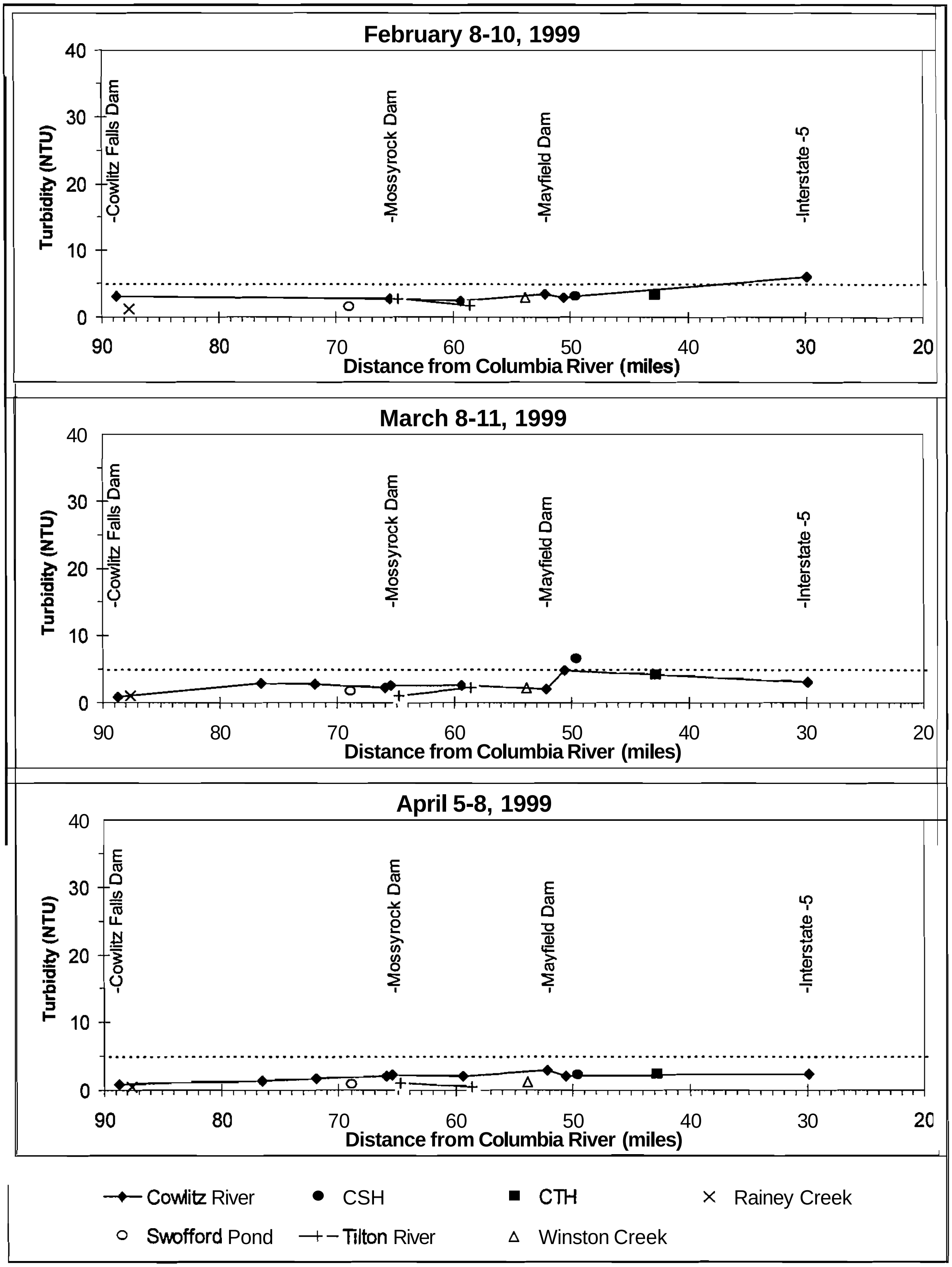


Figure 30. Longitudinal plot of periodic turbidity measures, May 1997 to April 1999.

Appendix C
Cowlitz Salmon Hatchery and Cowlitz Trout Hatchery Daily Discharges, 2003

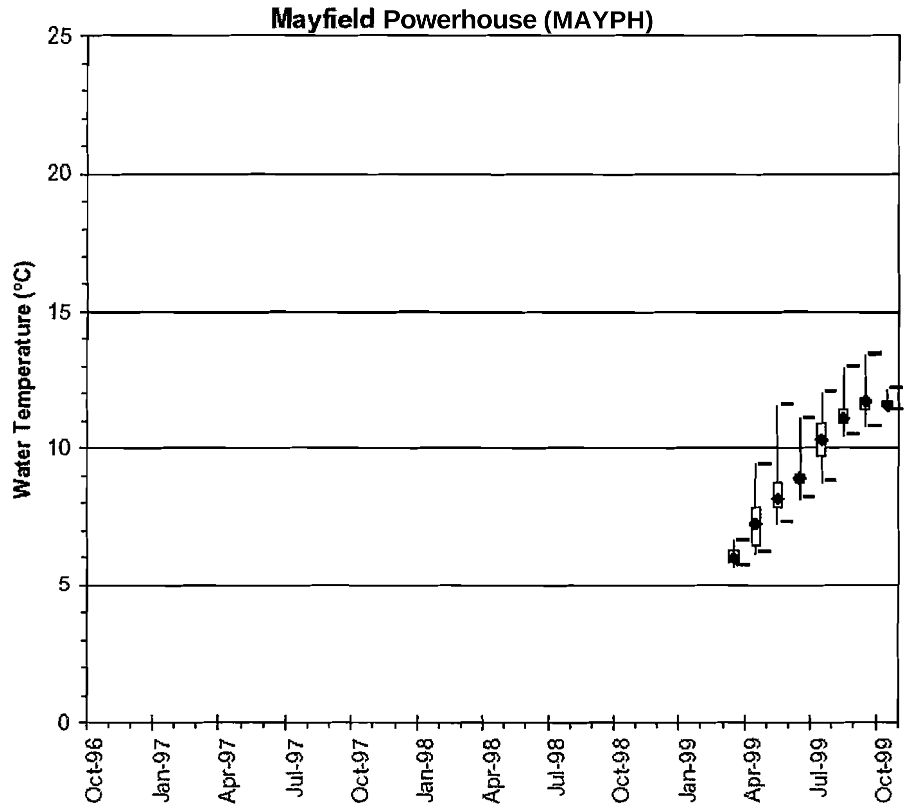
(Source: 2003 NPDES Discharge Monitoring Reports)

	Facility settleable solids	Facility TSS	Facility TSS	Pond Drawdown settleable solids	Pond Drawdown TSS	Offline Settling Basin settleable solids	Offline Settling Basin TSS
NPDES upper limits	net aver. of 0.1 ml/l	net aver. of 5.0 mg/l	net max of 15.0 mg/l	max of 1.0 ml/l	max of 100 mg/l	max of 1.0 ml/l	max of 100 mg/l
Month-Year							
Cowlitz Salmon Hatchery							
Jan-03	0.003	-0.40	-0.40	---	---	0.04	5.80
Feb-03	0.005	1.60	1.60	---	---	0.02	6.80
Mar-03	0.002	0.10	0.40	0.01	7.90	0.01	13.20
Apr-03	0.003	-0.40	-0.40	0.02	5.81	0.04	20.06
May-03	0.000	-0.20	-0.20	0.01	2.75	0.04	12.20
Jun-03	0.000	-1.20	-1.00	---	---	0.05	15.20
Jul-03	0.000	-0.80	-0.80	---	0.00	0.05	5.60
Aug-03	0.000	0.40	0.40	---	---	0.03	2.00
Sep-03	0.003	0.00	0.00	---	---	0.02	3.20
Oct-03	0.000	0.30	0.40	---	---	0.03	11.60
Nov-03	0.000	-0.60	-0.60	---	---	0.02	---
Dec-03	0.003	1.80	1.80	---	---	0.02	9.80
Cowlitz Trout Hatchery							
Jan-03	-0.020	0.20	0.20	---	---	0.01	1.40
Feb-03	0.070	-3.60	-3.60	---	---	0.10	5.60
Mar-03	0.061	-1.00	-1.00	---	---	0.08	5.40
Apr-03	0.012	-0.40	-0.40	0.30	4.00	0.01	3.20
May-03	0.010	-0.60	-0.60	0.01	1.60	0.01	2.40
Jun-03	0.021	2.60	2.80	---	---	0.00	2.00
Jul-03	0.046	0.20	0.20	---	---	0.01	1.60
Aug-03	0.015	1.00	1.00	---	---	0.005	1.20
Sep-03	0.013	0.20	0.60	---	---	0.008	1.00
Oct-03	0.046	0.00	0.00	---	---	0.20	1.60
Nov-03	0.007	0.20	0.20	---	---	0.003	1.40
Dec-03	0.025	0.60	0.60	---	---	0.001	3.20

— indicates no value reported.

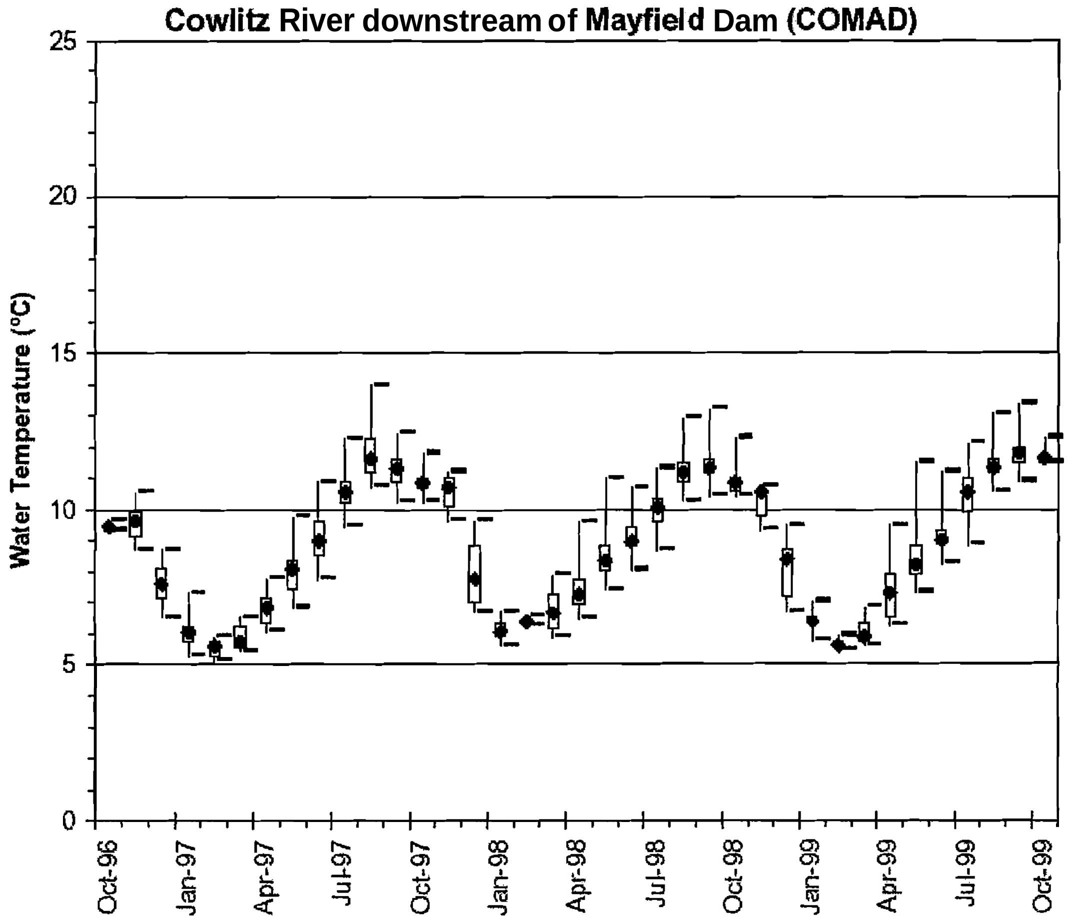
Appendix D
Lower Cowlitz River Hourly Water Temperature Percent Exceedences
(Source: Harza, 2000)

		Percent Exceedence				
Date	N	100%	75%	50%	25%	0%
Oct-96	0					
Nov-96	0					
Dec-96	0					
Jan-97	0					
Feb-97	0					
Mar-97	0					
Apr-97	0					
May-97	0					
Jun-97	0					
Jul-97	0					
Aug-97	0					
Sep-97	0					
Oct-97	0					
Nov-97	0					
Dee-97	0					
Jan-98	0					
Feb-98	0					
Mar-98	0					
Apr-98	0					
May-98	0					
Jun-98	0					
Jul-98	0					
Aug-98	0					
Sep-98	0					
Oct-98	0					
Nov-98	0					
Dec-98	0					
Jan-99	0					
Feb-99	0					
Mar-99	539	5.7	5.8	6.0	6.3	6.6
Apr-99	720	6.1	6.4	7.2	7.8	9.4
May-99	744	7.2	7.8	8.1	8.8	11.6
Jun-99	719	8.1	8.8	8.9	9.1	11.1
Jul-99	744	8.8	9.7	10.3	10.9	12.0
Aug-99	744	10.5	10.9	1 . 1	11.4	12.9
Sep-99	719	10.8	11.4	11.7	11.9	13.4
Oct-99	408	11.4	11.6	11.6	11.7	12.2



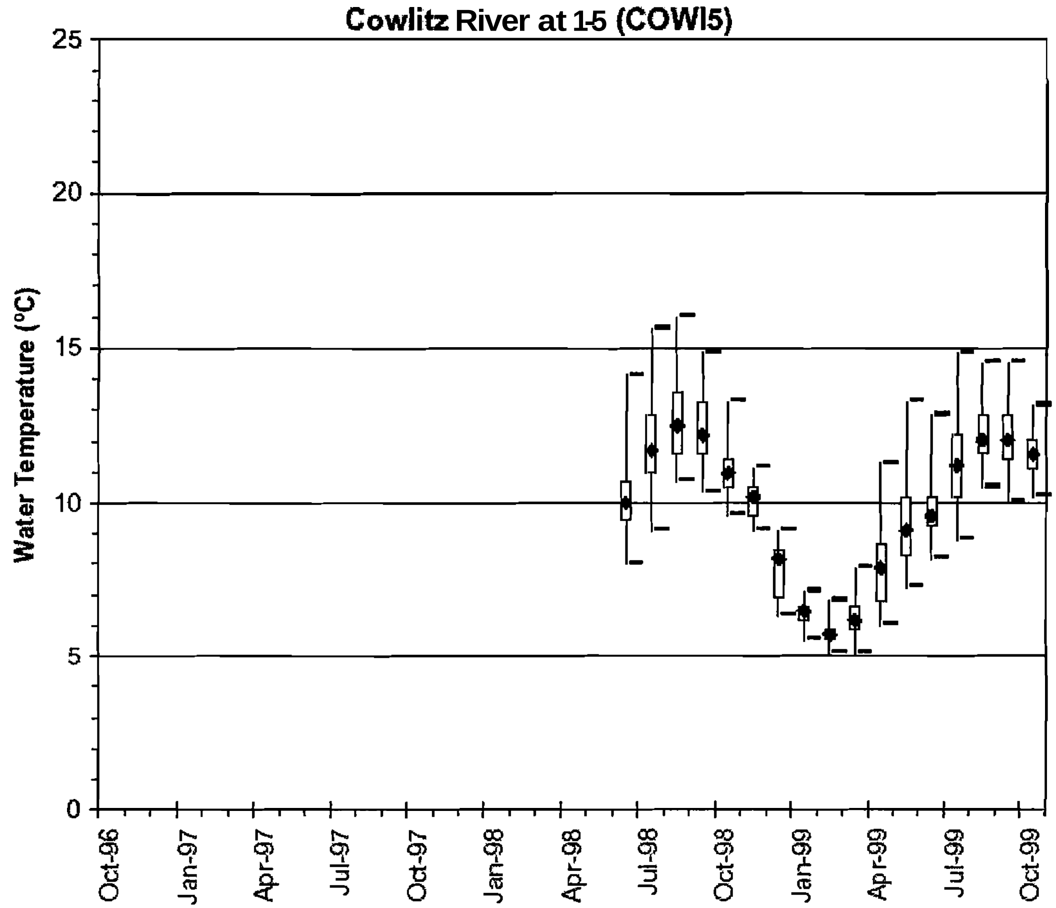
Percent exceedences of hourly water temperature measurements.
Bars indicate minimums and mazimums, boxes indicate 25 and 75 percent exceedences and circles indicate median values.

		Percent Exceedence				
Month	N	100%	75%	50%	25%	0%
Oct-96	49	9.3	Q.3	9.5	9.5	9.6
Nov-96	720	8.7	9.1	9.6	9.9	10.6
Dec-96	744	6.5	7.1	7.6	8.1	8.7
Jan-97	744	5.3	5.7	6.1	6.2	7.3
Feb-97	672	5.1	5.3	5.6	5.7	5.9
Mar-97	744	5.4	5.6	5.7	6.2	6.5
Apr-97	720	6.1	6.4	6.8	7.1	7.8
May-97	744	6.8	7.5	8.1	8.4	9.8
Jun-97	719	7.8	8.5	9.0	9.6	10.9
Jut-97	575	9.5	10.2	10.6	10.9	12.3
Aug-97	637	10.7	1 . 2	11.6	12.3	14.0
Sep-97	720	10.2	10.9	11.3	11.6	12.4
Oct-97	744	10.2	10.7	10.9	11.0	11.8
Nov-97	720	9.6	10.1	10.7	11.0	11.2
Dec-97	744	6.7	7.0	7.8	8.8	9.6
Jan-98	744	5.6	5.9	6.1	6.4	6.7
Feb-98	672	6.2	6.4	6.4	6.4	6.5
Mar-98	744	5.9	6.2	6.7	7.3	7.9
Apr-98	720	6.5	7.0	7.3	7.7	9.6
May-98	744	7.4	8.0	8.4	8.8	11.8
Jun-98	720	8.0	8.8	9.0	9.4	10.7
Jut-98	398	8.7	9.6	10.1	10.4	11.3
Aug-98	467	10.3	10.9	11.2	11.5	12.9
Sep-98	720	10.4	112	11.3	11.6	13.2
Oct-98	744	10.4	10.6	10.9	11.0	12.3
Nov-98	719	9.3	9.8	10.6	10.6	10.7
Dec-98	744	6.7	7.2	8.4	8.7	9.5
Jan-99	743	5.8	6.4	6.4	6.5	7.0
Feb-9	9672	5.4	5.6	5.6	5.8	5.9
Mar-99	743	5.6	5.8	5.9	6.4	6.9
Apr-99	719	6.2	6.5	7.3	7.9	9.5
May-99	744	7.3	7.9	8.2	8.9	11.5
Jun-99	719	8.2	8.9	9.0	9.3	11.2
Jul-99	744	8.9	9.9	10.6	11.0	12.1
Aug-99	744	10.6	11.2	11.3	11.6	13.1
Sep-94	720	20.9	11.5	11.8	12.0	13.4
Oct-99	408	11.5	12.5	11.6	11.6	12.3



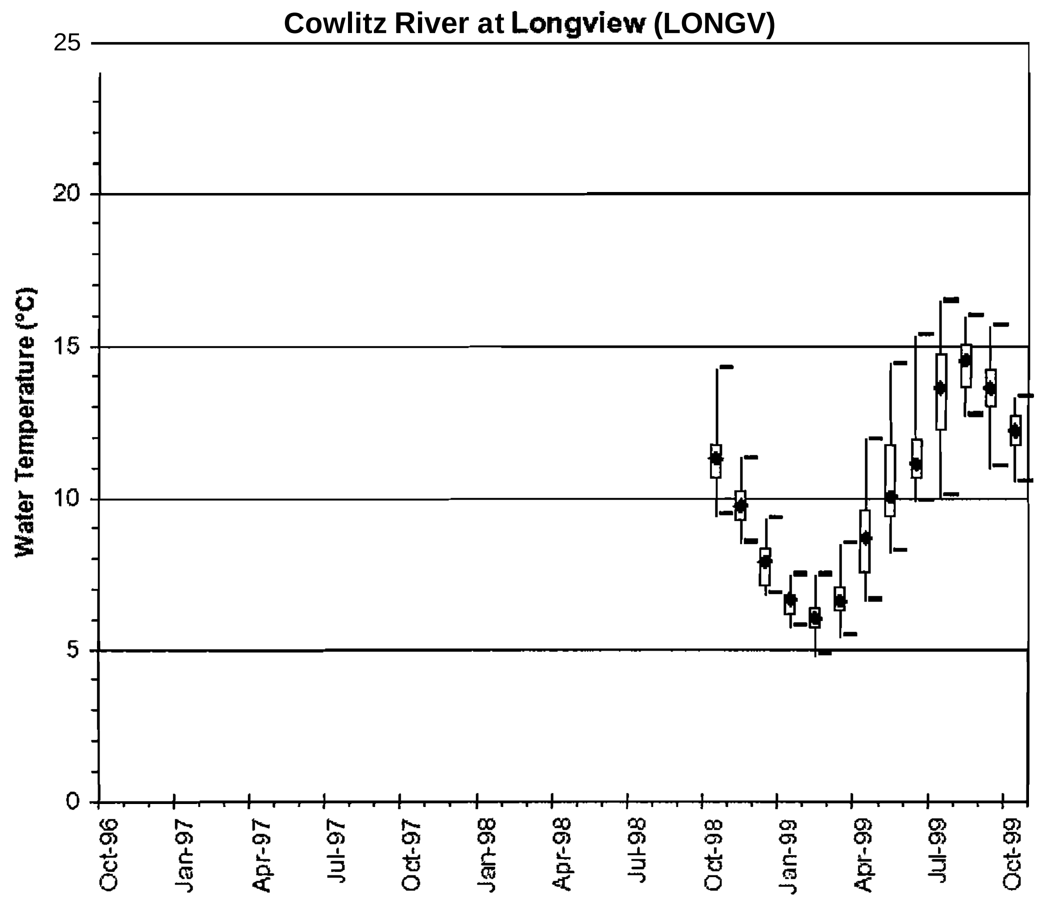
Percent exceedences of hourly water temperature measurements. Bars indicate minimums and mazimums, boxes indicate 25 and 75 percent exceedences and circles indicate median values.

		Percent Exceedence				
Date	N	100%	75%	50%	25%	0%
Oct-96	0					
Nov-96	0					
Dec-96	0					
Jan-97	0					
Feb-97	0					
Mar-97	0					
Apr-97	0					
May-97	0					
Jun-97	0					
Jul-97	0					
Aug-97	0					
Sep-97	0					
Oct-97	0					
Nov-97	0					
Dec-97	0					
Jan-98	0					
Feb-98	0					
Mar-98	0					
Apr-98	0					
May-98	0					
Jun-98	513	8.0	9.4	10.0	10.7	14.1
Jul-98	744	9.1	11.0	11.7	12.8	15.6
Aug-98	744	10.7	11.6	12.5	13.6	16.0
Sep-98	719	10.3	11.6	12.2	13.3	14.8
Oct-98	744	9.6	10.5	11.0	11.4	13.3
Nov-98	720	9.1	9.6	10.2	10.5	11.1
Dec-98	743	6.3	6.9	8.2	8.5	9.1
Jan-99	744	5.5	6.2	6.5	6.6	7.1
Feb-99	671	5.1	5.5	5.7	5.8	6.8
Mar-99	744	5.1	5.8	6.2	6.6	7.9
Apr-99	720	6.0	6.8	7.9	8.6	11.3
May-99	743	7.2	8.3	9.1	10.2	13.3
Jun-94	719	8.2	9.3	9.6	10.2	12.8
Jul-99	744	8.8	10.2	11.2	12.2	14.8
Aug-99	743	10.5	11.6	12.0	12.8	14.5
Sep-99	720	10.0	11.4	12.0	12.8	14.5
Oct-99	408	10.2	11.1	11.6	12.0	13.1



Percent exceedences of hourly water temperature measurements.
Bars indicate minimums and mazimums, boxes indicate 25 and 75 percent exceedences and circles indicate median values.

		Percent Exceedence				
Date	N	100%	75%	50%	25%	0%
Oct-96	0					
Nov-96	0					
Dec-96	0					
Jan-97	0					
Feb-97	0					
Mar-97	0					
Apr-97	0					
May-97	0					
Jun-97	0					
Jul-97	0					
Aug-97	0					
Sep-97	0					
Oct-97	0					
Nov-97	0					
Dec-97	0					
Jan-98	0					
Feb-98	0					
Mar-98	0					
Apr-98	0					
May-98	0					
Jun-98	0					
Jul-98	0					
Aug-98	0					
Sep-98	0					
Oct-98	607	9.4	10.7	11.3	11.8	14.2
Nov-98	720	8.5	9.3	9.7	19.2	11.3
Dec-98	743	6.8	7.1	7.9	8.4	9.3
Jan-99	342	5.7	6.2	6.7	6.8	7.4
Feb-99	463	4.8	5.7	6.0	6.3	7.4
Mar-99	743	5.4	6.3	6.6	7.1	8.5
Apr-99	719	6.6	7.6	8.7	9.6	11.9
May-99	744	8.2	9.4	10.1	11.8	14.4
Jun-99	720	9.9	10.7	11.1	11.9	15.3
Jul-99	743	10.1	12.2	13.6	14.7	16.4
Aug-99	744	12.7	13.6	14.5	15.0	15.9
Sep-99	720	11.0	13.0	13.6	14.2	15.6
Oct-99	408	10.5	11.8	12.2	12.7	13.3



Percent exceedences of hourly water temperature measurements.
Bars indlcate minimums and mszimums, boxes indicate 25 and 75 percent exceedences and circles indlcste median values.

Appendix E
Comments on Draft Water Quality Monitoring Plan and Tacoma Power's Response

Washington Department of Ecology Comments

Tacoma Power developed its approach to evaluating the effects of its Cowlitz Project including water quality and water temperature through extensive consultations with federal and state resource agencies (including WDOE), Native American tribes, and other stakeholders. Consultation for the relicensing of the Project began in 1996 and continued through the completion of a Settlement Agreement on the terms for the next license term in September of 2000. Extensive documentation of the meetings and communications over this time period already exists in the FERC files. WDOE was an active participant in these consultations and much of the information referred to in the WDOE comment letter is based on data that was available at the time that relicensing studies were going on and prior to the WDOE's January 15, 2002 certification of the Project under Section 401 of the federal Clean Water Act (WQC). This WQC was appealed by Friends of the Cowlitz, CPR-Fish, and the Cowlitz Indian Tribe, which led to the Pollution Control Hearings Board ruling that affirmed WDOE's issuance of the 401 Certification with additional monitoring by Tacoma Power of downstream side channels and potential de-watering of salmon redds.

Temperature at Inter-State 5 (1-5)

> *The 2004 state list of impaired waters (303(d) list) (http://www.ecy.wa.gov/programs/wq/303d/2002/tools.html) shows exceedances of water quality criterion for temperature below the confluence of the Toutle River. These exceedances were discovered after Tacoma Power received the 401 water quality certification from Ecology as part of their relicensing process. Tacoma Power will need to investigate if flow regulation contributes to high temperature in this reach. A management plan will need to be developed to fix-any temperature exceedance caused by the utility.*
>
> *Tacoma Power should provide a continuous monitor in various flow regimes above and below the confluence with the Toutle River. These monitors should take hourly, continuous samples during the expected seasons when temperatures are elevated: July through October.*
>
> *These monitors would have to be operated until several representative low-flow, higher temperature years occur. The utility would then use this information to recalculate the flowtemperature model to assess if the dam is contributing to temperature exceedances.*

The WDOE included the Cowlitz River on its proposed 2004 Washington State list of impaired waters, 303(d) list, based on a 19.2°C 7-day mean of daily maximum temperatures for the period of August 7-13, 2001 at its long-term monitoring station located at Kelso. This monitoring station is located at river mile (RM) 4.9, which is approximately 47.1 miles downstream of the Mayfield Dam (RM 52.0). The Toutle River basin, which originates on the north slope of Mount Saint Helens, contributes its flow to the Cowlitz River at RM 20.0. Although 2004 listing of temperature was an addition to the 303(d) list, historical data had previously indicated that temperatures were relatively warm downstream of the Toutle River confluence for quite some time. Table 1 presents the annual maximum values of spot temperature measurements for the Cowlitz River downstream of the Toutle River confluence that were available prior to WDOE's January 15, 2002 certification of the Project under the federal Clean Water Act. Annual maximum values were as high as 23.0°C at Castle Rock and 19.0°C at Kelso. Although one of the values of 23.0°C was measured in 1980, the year that Mount Saint Helens erupted, another measurement of 23.0°C occurred 3 years later and the 19°C measurement at Kelso was reported for the drought year of 1992. Review of this data along with the understanding that the spot measurements were often taken before the warmest part of the day makes it evident that water temperatures have been elevated in the lower reaches of the Cowlitz River for quite some time and that this is not a new discovery nor the result of Tacoma Power operations.

Tacoma Power consulted with WDOE and other stakeholders while developing its approach to evaluate Project effects on water temperatures for relicensing of the Project. Based on these consultations, Tacoma Power developed and conducted a water temperature monitoring study and a CE-QUAL-W2 temperature modeling study of Riffe Lake and Mayfield Lake. These studies are documented in the *1999 Technical Study Reports.* The monitoring study indicates that deep-water releases from Riffe Lake cooled the river by about 4 to 10°C during the summer under the previous license operations. Although some warming occurred in Mayfield Lake and the Cowlitz River between Mayfield Dam and Interstate-5, the extent of warming (including natural warming) was less than the cooling effect of Riffe Lake. Two other evaluations of historical data also show that the Project had a cooling effect on Cowlitz River temperatures under the previous license[2]. Results of the CE-QUAL-W2 modeling study indicate that operating the Project as licensed will increase mid-summer Cowlitz River temperatures downstream of Mayfield Dam by about 1°C compared to conditions under the previous license[3]. It should be noted that the modeled temperature is still below the standard that applies to the Cowlitz River. As the water flows downstream, any effects the Project has on its temperature will diminish, which results in even smaller effects downstream, particularly downstream of the Toutle River confluence which contributes close to 20 percent of the flow in July and August. Therefore, it is unreasonable to expect Tacoma Power to conduct monitoring to evaluate the effects of its Project on temperatures downstream of the Toutle River. As previously discussed, Tacoma Power consulted with WDOE and developed and conducted studies that were effective at evaluating the effects of its Project on Cowlitz River temperatures. In addition, Tacoma Power intends to install continuous temperature and dissolved oxygen recording monitors at the Cowlitz River intakes of the Cowlitz Salmon Hatchery and the Cowlitz Trout Hatchery as a component of remodeling both of the facilities over the next few years.

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[2] State of Washington Department of Ecology. 1973. Analysis and summary of temperatures of streams in Washington prior to 1968. Prepared by G.T. Higgins and G.W. Hill. Olympia, WA. Miscellaneous Report No. 73-003; University of Washington School of Aquatic & Fishery Sciences, Columbia Basin Research. Northwest regional temperature data analysis web page. http://www.cbr.washington.edu/data/Streams/, updated August 5, 2005, accessed August 31, 2005.

[3] FERC. 2001. Final Environmental Impact Statement, Cowlitz River Hydroelectric Project (No. 2016-044), Washington. November 2001, Washington, D.C.

Table 1. Annual maximum of point measurements of Cowlitz River temperature, 1970-2001 (Sources: USGS and WDOE)

Year	Cowlitz R. at Castle Rock (USGS)	Cowlitz R. at Kelso (USGS)	Cowlitz R. at Kelso (WDOE)
1970	11.0	---	---
1971	13.9	13.7	13.7
1972	11.1	18.3	17.0
1973	4.4	17.7	17.7
1974	12.1	13.2	13.2
1975	17.0	17.8	17.8
1976	15.5	---	---
1977	18.1	11.9	11.9
1978	16.3	14.7	14.7
1979	---	15.6	15.6
1980	23.0	16.4	---
1981	19.0	16.3	---
1982	17.0	18.5	12.6
1983	23.0	14.5	14.8
1984	16.0	17.0	15.4
1985	---	12.8	15.3
1986	---	13.6	16.7
1987	---	---	14.3
1988	---	---	17.6
1989	---	---	14.5
1990	---	---	16.6
1991	---	---	14.6
1992	---	---	19.0
1993	---	---	14.9
1994	---	---	14.6
1995	---	---	16.2
1996	---	---	16.3
1997	---	---	16.9
1998	---	---	16.6
1999	---	---	14.4
2000	---	---	14.4
2001	---	---	17.3

Fecal Coliform Bacteria at 1-5

> *The 2004 state list of impaired waters (303(d) list) shows exceedances of water quality criterion for fecal coliform bacteria below the confluence of the Toutle River. Ecology is requesting that Tacoma Power provide a written analysis of the impacts that fluctuations in flow may be contributing to septic system failures, flooding agricultural lands, and other sources which may be identified.*

The proposed 2004 303(d) list for WRIA 26 identifies two excursions of the fecal coliform criterion out of 36 samples collected between 1991 and 1996 at the ambient monitoring station at Kelso, 26B070 (River Mile 4.9). Exceedances of the fecal coliform criterion at this location nearly 50 miles downstream of Mayfield Dam do not show any indication of a relationship to

Tacoma Power's Cowlitz River Project. Project operations do not generate fecal coliform bacteria, or produce conditions that are known to enhance propagation of fecal coliform bacteria. Multiple agricultural and municipal potential sources of fecal coliform bacteria are present between the Cowlitz River Project and the monitoring location that are likely responsible for the two recorded exceedances of the criterion. Tacoma Power does not have the authority or capability to take any action that is likely to influence fecal coliform bacteria concentrations in downstream reaches of the Cowlitz River. Furthermore, determining the source of elevated fecal coliform levels nearly 50 miles from its Project is not the responsibility of Tacoma Power.

Riffe Lake Turbidity

A potential exists for dam operations to cause exceedances of the water quality criteria for turbidity in both Riffe Lake and water released from Riffe Lake. This could happen when the lake is drawn down, sediment is exposed, and rain and wind erode the sediment into the lake. Tacoma Power should design a study to identify:

1. A method for determining background turbidity conditions.
2. The duration and intensity of rain and wind events likely to cause erosion and thus changes in turbidity.
3. Draw down levels that may cause erosion from wind and rain resulting in exceedances of the water quality criteria for turbidity.

If water quality criteria for turbidity is found to be exceeded, the utility can design a protocol, including compliance monitoring locations, to monitor turbidity during the critical rain and wind events and critical drawdown levels.

Turbidity data for the Cowlitz River has been previously collected by Tacoma Power upstream of the Project, within the Project, and downstream of the Project. Tacoma Power collected these data at monthly intervals between May 1997 and April 1999 according to the study plan that was developed in consultation with the WDOE and other stakeholders. Data for key locations are summarized in Table 2. These data indicate that turbidity levels exceeding 5 NTU in the Cowlitz River upstream from the project (42 %) occurred more frequently than within and immediately downstream of the project. Turbidity levels exceeding 5 NTU were also higher well downstream of the Project at the Interstate-5 Bridge than at the Project discharge (Mayfield Dam). These frequencies indicate the Project decreases rather than increases turbidity in the Cowlitz River. These data also indicate that there are sources of turbidity to the Cowlitz River both upstream and downstream of the Project. Appendix B of the Cowlitz River Water Quality Monitoring Plan presents more information on the results of the turbidity study at the Cowlitz River Project.

Table 2. Summary of turbidity (NTU) and frequency of greater than 5 NTU for 2-year period at key monitoring stations, May 1997 through April 1999.

Monitoring Site	Min	Max	Mean	Frequency >5 NTU
Project Inflow				
Cowlitz R. upstream from Riffe Lake (COKOS)	0.8	17	5.6	42%
Project Locations				
Mossyrock powerhouse tailrace (MOSPH)	0.4	16	2.6	8%
Mayfield Lake, lower end (MAYLL) [a]	0.5	7.9	2.4	12%
Project Discharge				
Cowlitz R. downstream of Mayfield Dam (COMAD)	0.3	14	2.7	12%
Downstream from Project				
Cowlitz R. at Interstate-5 bridge (COWI5)	0.5	17	4.4	29%

Polychlorinated biphenyls (PCBs)

The state 303(d) list shows exceedances of water quality criterion for PCBs in fish tissue. The fish samples were taken in 1995 below the confluence of the Toutle River from cutthroat trout and from mountain whitefish. PCBs are bioaccumulative and long-lasting in the environment.

Tacoma Power should thoroughly assess and document present and past practices of PCB use, storage, past spills, and upstream sources.

If heritage contamination is found to be influenced, or caused by Tacoma Power, further characterization will need to occur.

Tacoma Power has reviewed its records for the Cowlitz River Project to seek information indicating the potential release of materials contaminated with PCBs. No evidence has been found of transformer fluid spills or other releases of materials at the Cowlitz River Project that might have released PCBs to the Cowlitz River.

There are six devices located in the Mayfield switchyard that use fluid containing PCBs. Each device contains approximately one quart of this fluid. These devices are scheduled to be removed from the project before the end of September, 2005. They will be replaced with PCB-free devices. This will complete the program to eliminate the use of all PCB fluids at the project. In addition, no PCBs are stored at the project.

It is assumed there are numerous other sites within the Cowlitz River watershed, both upstream and downstream, where fluids containing PCBs may be used and potentially released into the river. Tacoma Power does not have the capacity or the authority to identify these sources.

Aquatic Invasive Plants

The state *303(d)* list shows the presence of the aquatic *invasive* plant, Eurasian water *milfoil* (Myrophyllum *spicatum)* about two river miles downstream from the Blue Creek trout hatchery.

Tacoma Power should:

- Inventory the extent of infestation;
- Assess impacts to recreation, aquatic resources, navigation and safety; and
- Investigate whether controlled *flow* releases from the dam contribute to the problem, and if they are, provide a managementplan for eradication or control.

Eurasian watermilfoil (Myriophyllum *spicatum*) is an non-native and invasive aquatic macrophyte that is currently found in many lentic and lotic waters of Washington State, as well as many other states. It was introduced to Chesapeake Bay in the 1880s and has since spread throughout most of North America. Its presence and abundance has not been identified as related to hydropower operations, other than potential control by substantial drawdowns of reservoir levels over prolonged periods.

Tacoma Power continues to make its best efforts to eradicate Eurasian watermilfoil weeds within the project boundary and on its property. These efforts have reduced the spread of milfoil, but have not eradicated it, which is not uncommon among such efforts. Tacoma Power cannot exert control on the site referenced in the comments since the site is not its property. As such, management of the invasive weeds is the responsibility of the property owner(s). In addition, high usage of the lower Cowlitz River by boats launched from various boat launches is a very likely contributing factor to this site, over which Tacoma Power has no control. For its part, invasive plant warning signs are posted at the boat launches within the project boundary advising boaters to check their boat and remove any vegetation before launching. These postings will be monitoring and maintained or replaced as necessary. Tacoma Power will continue control efforts on any infestations on its property.

NOAA Fisheries

No written comments were received at the time of this submittal. However, in an August 2, 2005 telephone conversation between Tom Martin of Tacoma Power and Rich Domingue of NOAA Fisheries, Mr. Domingue indicated that the e-mail he received from Tom on July 29, 2005, which stated that Tacoma Power was committed monitoring temperature and dissolved oxygen with permanent water quality monitoring stations at the remodeled hatcheries, satisfied all of his issues with the plan. He indicated that written confirmation of that would be forthcoming, but as noted above, it has not been received.

Appendix F
Consultation on Water Quality Monitoring Plan

Date	Agencies	Participants	Type of Communication	Topics
12/9/04	NOAA Fisheries	Keith Kirkendall	Letter	• NOAA Fisheries comments on the draft plan
12/13/04	NOAA Fisheries NOAA Fisheries NOAA Fisheries Tacoma Power Tacoma Power Tacoma Power Tacoma Power Tacoma Power	Michelle Day Rich Domingue Steve Fransen Pat McCarty Debbie Young Mark LaRiviere Tom Martin Steve Fischer	Meeting at NOAA Fisheries office	• Discuss NOAA Fisheries' comments on draft water quality monitoring plan
1/12/05	NOAA Fisheries Tacoma Power	Rich Domingue Tom Martin	Telephone call	• Follow-up to 12/13/04 meeting
1/31/05	NOAA Fisheries Tacoma Power	Blane Bellerud Tom Martin	Telephone call	• Discussed plan with newly assigned person
3/2/05	Blane Bellerud Pat McCarty Debbie Young Tom Martin	NOAA Fisheries Tacoma Power Tacoma Power Tacoma Power	Meeting	• Discuss NOAA Fisheries's comments from 1/12/05 telephone conversation
3/8/05	WDOE Tacoma Power	Deborah Cornett Tom Martin	Telephone call	• Advised of meeting with NOAA Fisheries
3/18/05	NOAA Fisheries	Blane Bellerud	E-mail	• Comment on revised draft and draft letter with additional NOAA Fisheries comments
3/23/05	WDOE Tacoma Power	Deborah Cornett Tom Martin	E-mail	• Update on discussions with NOAA Fisheries • Request for meeting with WDOE
3/25/05	WDOE	Chris Maynard	E-mail	• WDOE request for an extension to allow time for them to comment
3/25/05	NOAA Fisheries Tacoma Power	Blane Bellerud Tom Martin	E-mail	• Advised NOAA Fisheries of concern with draft comments and notice of extension request
3/28/05	WDOE Tacoma Power	Deborah Cornett Tom Martin	E-mail	• Transmittal of draft plan and NOAA Fisheries comments
4/14/25	NOAA Fisheries Tacoma Power	Blane Bellerud Tom Martin	E-mail	• Update on status of extension request • Plan revisions

Date	Agencies	Participants	Type of Communication	Topics
5/16/05	NOAA Fisheries NOAA Fisheries WDOE Tacoma Power	Blane Bellerud Michelle Day Deborah Cornett Tom Martin	E-mail	• Status of extension request • Notification of plan revision
6/27/05	NOAA Fisheries WDOE Tacoma Power	Blane Bellerud Deborah Cornett Tom Martin	E-mail	• Status of revised draft • Scheduling meeting
7/07/05	NOAA Fisheries NOAA Fisheries WDOE Tacoma Power	Blane Bellerud Michelle Day Deborah Cornett Tom Martin	E-mail	• Submittal of revised draft
7/20/05	NOAA Fisheries WDOE WDOE Parametrix Tacoma Power	Rich Domingue Chris Maynard Deborah Cornett Don Weitkamp Tom Martin	Meeting	• Review plan • Discuss agencies' concerns • Visit sampling sites
7/29/05	NOAA Fisheries WDOE WDOE Parametrix Tacoma Power Tacoma Power Tacoma Power	Rich Domingue Deborah Cornett Chris Maynard Don Weitkamp Debbie Young Mark LaRiviere Tom Martin	E-mail	• Confirming Tacoma Power's intention to install permanent monitoring sites at each of the two hatcheries' water intakes.
8/2/05	WDOE Tacoma Power	Deborah Cornett Tom Martin	Voice Mail	• Inquiring as to status of WDOE's comments
8/2/05	NOAA Fisheries Tacoma Power	Rich Domingue Tom Martin	Telephone call	• Confirming receipt of 7/29/05 e-mail • NOAA Fisheries's confirmation that the permanent monitoring commitment satisfied all their concerns with the plan
8/8/05	Tacoma Power NOAA Fisheries	Tom Martin Rich Domingue	E-mail	• Notification of NOAA Fisheries plans to send a letter in response to the draft plan
8/24/05	NOAA Fisheries Tacoma Power	Rich Domingue Tom Martin	Telephone call	• Inquiry as to status of letter
8/24/05	WDOE Tacoma Power	Chris Maynard Tom Martin	Telephone call	• Inquiry as to status of plan comment response.
8/25/05	WDOE	Deborah Cornett	Letter	• WDOE comments on plan

Abbreviations

NOAA Fisheries	National Marine Fisheries Service or NOAA Fisheries
Parametrix	Parametrix – a consulting firm
WDOE	Washington Department of Ecology