YAKIMA/KLICKITAT FISHERIES PROJECT
KLICKITAT ONLY

Monitoring and Evaluation
Annual Report 2004
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The Confederated Tribes and Bands of
The Yakama Nation

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Monitoring and Evaluation 2004 Annual Report

Preface

The monitoring and evaluation activities described in this report were designed by consensus of the scientists with the Yakama Nation (YN) Fisheries Program. Klickitat Subbasin Monitoring and Evaluation (M&E) activities have been subjected to scientific and technical review by members of the Yakima/Klickitat Fisheries Project (YKFP) Science/Technical Advisory Committee (STAC) as part of the YKFP's overall M&E proposal. Yakama Nation YKFP biologists have transformed the conceptual design into the tasks described. YKFP biologists have also been involved with the Collaborative Systemwide Monitoring and Evaluation Project (CSMEP) and are working towards keeping Klickitat M&E activities consistent with CSMEP recommendations.

This report summarizes progress and results for the following major categories of YN-managed tasks under this contract:

1. Monitoring and Evaluation – to gather baseline information in order to characterize habitat and salmonid populations pre-habitat restoration and pre-supplementation.
2. Ecosystem Diagnosis and Treatment (EDT) Modeling - to identify and evaluate habitat and artificial production enhancement options.
3. Ecological Interactions – to determine presence of pathogens in wild and naturally produced salmonids in the Klickitat Basin and develop supplementation strategies using this information.
4. Genetics – to develop YKFP supplementation broodstock collection protocols for the preservation of genetic variability, by refining methods of detecting within-stock genetic variability and between-stock genetic variability.

Acknowledgements

YN Fisheries/YKFP technicians (Sandy Pinkham, Rodger Begay, Isadore Honanie, Roger Stahi, William Wesley, Chelsey Moss, Bennie Martinez, and Russell Jackson, Jr.) collected most of the field data presented in this report. YN Fisheries/YKFP habitat restoration specialist Will Conley (under the Klickitat Watershed Enhancement Project, BPA Project # 199705600) and database manager Mike Babcock (under Klickitat Management Project, BPA Project # 198812035) provided data management assistance and database report development for many monitoring tasks, especially for sediment, water quality, and habitat data. YN Fisheries/YKFP biologists Jeff Spencer and Chris Frederiksen provided EDT modeling results. Ken Lujan with the U.S. Fish and Wildlife Service (USFWS) provided fish health results. Steve Gray and Dean Pyzik with Washington Department of Fish and Wildlife (WDFW) were cooperators in Lyle adult trap operation (under BPA Project # 200306500). Shawn Narum with Columbia River Inter-Tribal Fish Commission (CRITFC) provided genetic analysis information.

1. Monitoring & Evaluation

Overall Objective: Continue existing efforts to gather baseline information on habitat quantity and quality, and the demographics, life history and abundance of Klickitat spring chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*O. mykiss*), and other species of interest (including fall chinook salmon *O. tshawytscha* and coho salmon *O. kisutch*).

Task 1.a Klickitat juvenile & resident salmonid population surveys

Objective: Determine the spatial distribution and relative abundance of salmonids throughout the basin to guide design of initial enhancement program.

Methods: Electrofishing and snorkel surveys were conducted in selected key tributary and mainstream (above Castile Falls) reaches. Electrofishing surveys were conducted on 100-meter segments in four streams; these surveys used multiple pass depletion estimates to determine fish abundance. Abundance estimates were calculated using the removal estimator in Program Capture (White et al. 1982). Snorkel surveys were conducted at 12 locations associated with habitat restoration projects in the upper Klickitat subbasin; these surveys used a single-pass direct enumeration method.

Results: Population estimates were conducted in Bear, Summit, Swale, and Trout Creeks during this reporting period. Population estimates on six 100-meter segments in each of Bear, Trout, and Summit were completed (in conjunction with a Carcass Analog Project [BPA Project # 22002], along with a single 100-meter segment in Swale Creek. Species captured included steelhead/rainbow trout (*O. mykiss*) and brook trout (*Salvelinus fontinalis*). Data from Bear, Summit, and Trout creeks is present in Appendix A.

Snorkel surveys were conducted at twelve stream reaches associated with habitat restoration projects. These surveys will establish a baseline for monitoring population changes over time (pre- and post-restoration). The surveys included nine reaches in the mainstem Klickitat above Castile Falls conducted on June 23 and July 21, 2004 and three reaches in the Diamond Fork on June 18, 2004. Data from these surveys will be presented in future reports.

Task 1.b Klickitat mobile juvenile monitoring sites

Objective: To determine the feasibility of using rotary screw traps for long term monitoring of juvenile production in the upper and lower Klickitat River. Screw traps provide a means of estimating outmigration timing and magnitude on a daily, seasonal or annual basis.

Methods: Floating rotary screw traps located just above Lyle Falls (RM 2.8) and at the WDFW Klickitat Hatchery (RM 43) were operated on a year-round basis. A rotary trap located above Castile Falls (RM 64.6) was fished seasonally from late June until early November.

Trap efficiency studies were conducted at the Lyle Falls and the Castile Falls traps to determine the feasibility of establishing a fish-entrainment-to-river-discharge relationship. During each efficiency trial, a sample of fish (generally ranging from 50 to 500 fish) was marked with a fin clip and released a short distance upstream of the trap. The proportion of marked fish that were recaptured over the following week to ten days allowed for an estimate of the trap's catch rate.

Efficiency trials were conducted several times over the course of the year and at various streamflows.

Environmental and trap data is recorded along with bio-data on 10 to 30 of each salmonid species represented. The excess and non-salmonid fish are tallied by species. Bio-data consists of fork lengths, weights and smoltification stage. Environmental and trap data recorded includes weather conditions, water temperature and clarity, trap revolution speed, and debris load.

Results: Three rotary screw-traps were fished during the 2004 fiscal year. The five-foot trap located above Castile Falls was fished seasonally, from late June through early November. The five-foot trap located at the Klickitat Hatchery was fished throughout most of the year as was the eight-foot Lyle Falls trap. The Lyle Falls trap was not fished during periods of very high flows and debris loads, and during large releases of hatchery fish. The catch of each trap is summarized on a monthly basis and presented in Appendix B.

Developing flow/entrainment relationships and estimating trap efficiency is a continuing project goal. For the Castile Falls trap, efficiency testing conducted during the FY2003 and FY2004 reporting periods resulted in an average efficiency estimate of 32%. This testing was done over a relatively narrow range of flows (approximately 80-100 cfs) during the period in which the trap was fished. For the Lyle Falls trap, results of efficiency testing are presented in Appendix B.

Management and analysis of screw trap data progressed during this contract period with the ongoing development of an Access database for storage. Additional development and refinement of this database and its reporting capabilities, as well as refinement of screw trap data collection protocols, are planned for the near future and will facilitate better smolt production estimates from the available data.

Task 1.c Spawning ground surveys (redd counts)

Objective: Monitor spatial and temporal redd distribution of spring and fall chinook, coho, and steelhead and collect biological data from carcasses. Spawning ground surveys provide a means of monitoring annual adult escapement.

Methods: Regular foot and/or boat surveys were conducted within the known geographic range for each species. Individual redds were counted and their locations recorded using handheld GPS units. Counts of live fish and carcasses were also recorded. Carcasses were examined for sex determination, egg/milt retention, and presence of CWT tags or external experimental marks. Scale samples were also taken from carcasses.

Spawning ground surveys were conducted as follows: spring chinook - mid August through early October; fall chinook - late October through early to mid December; coho - mid October through mid February; steelhead - late January through early June. Attempts were made to cover the entire known spawning range of each species. Stream reaches were surveyed multiple times during the spawning periods, with most reaches receiving 3 passes.

Results: Spawner survey results are briefly discussed by species below. A tabular summary of spawning ground survey results by species is presented in Appendix C.

Spring Chinook

Spring chinook surveys were conducted between August 24 and October 4, 2004, covering

nearly 71 river miles. Natural spring chinook spawning occurs in the Klickitat mainstem between Castile Falls (RM 64) and the Klickitat Hatchery (RM 43). Additional spawning occurs above Castile Falls which has been seeded in recent years with excess adults that have returned to the hatchery. These fish are transported and released above Castile Falls. The fish transported in FY2004 included 320 females, 195 adult males and 85 jacks, for a total of 600 fish. These fish accounted for 63% of the total redd count (122 of 195). The remaining 73 redds were located in the 40 river miles between Beeks Canyon and Castile Falls.

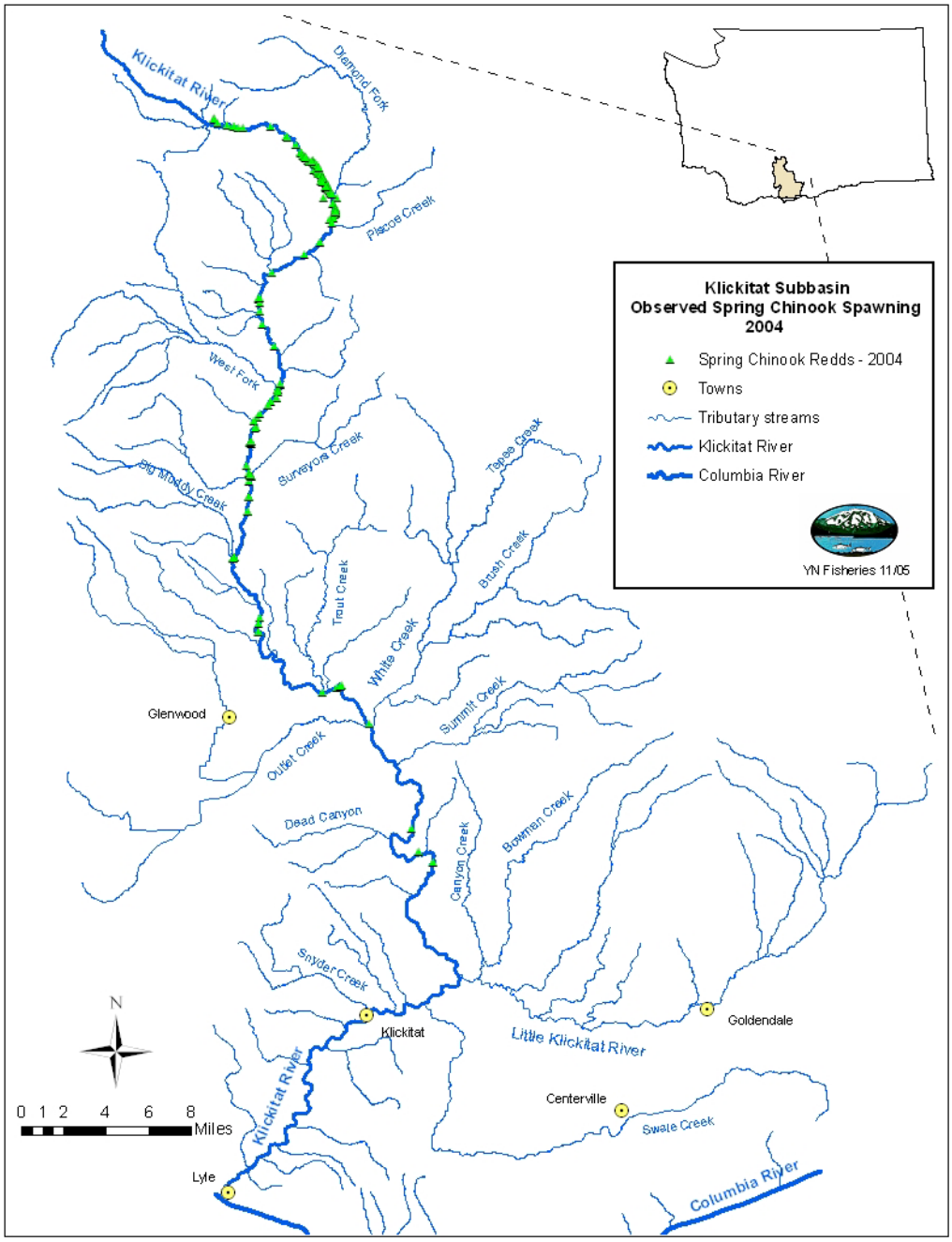


Figure 1. Observed spring chinook spawning distribution in the Klickitat subbasin in 2004.

Fall Chinook

Fall chinook are mainstem spawners and generally utilize the lower portion of the river, downstream of the Klickitat Hatchery. Surveys were conducted between October 13 and December 7. Three passes were completed through most known spawning reaches. The final redd count was 777. The highest redd densities were found in the 4.8 miles from Beeks Canyon downstream to the Little Klickitat confluence. This segment contained 335 or 43% of the total redd count; a density of 69.8 per mile. Fall chinook were found spawning from the Klickitat Hatchery downstream to the county park below Lyle Falls, a total of over 40 river miles; the average redd density was 16.0 redds per mile.

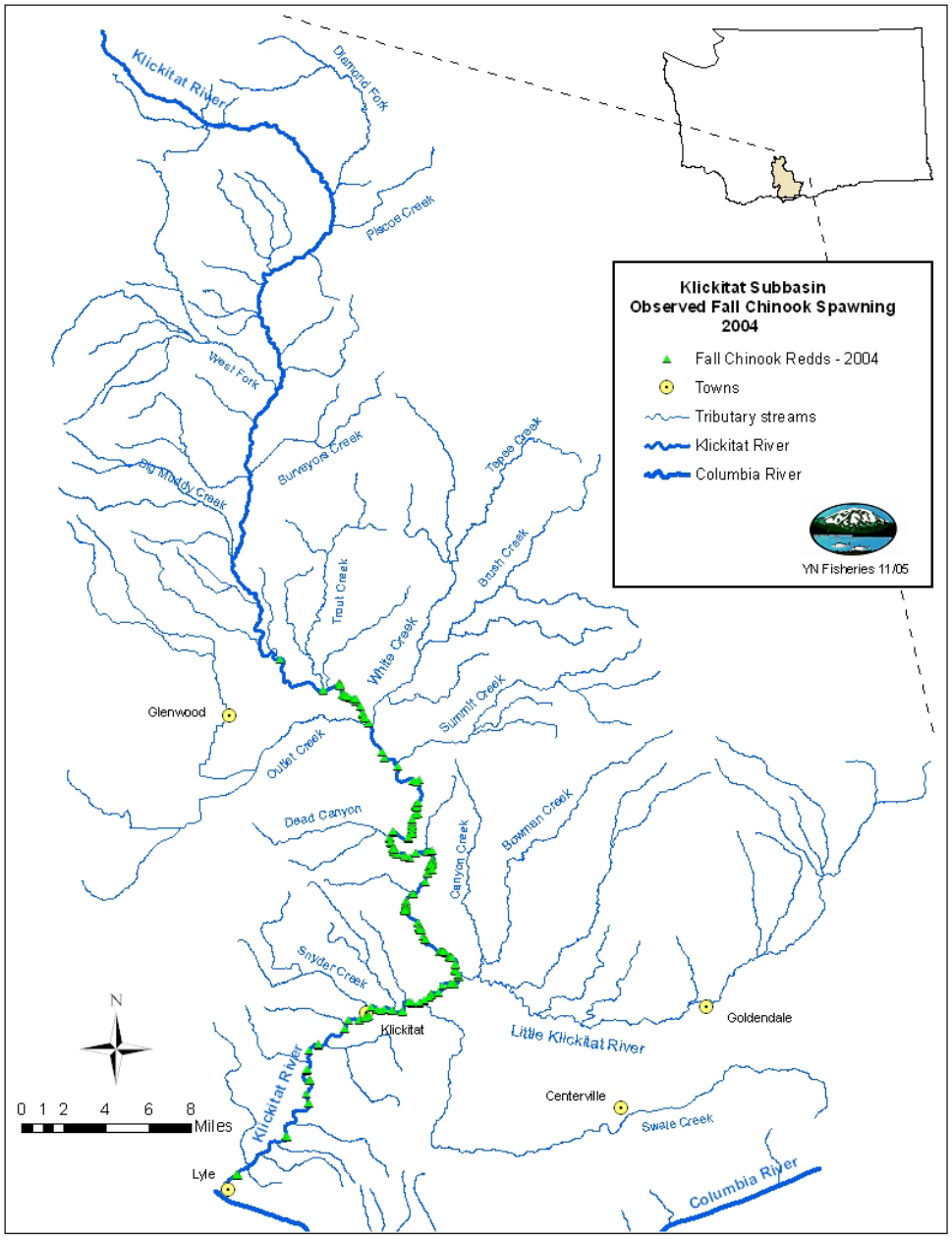


Figure 2. Observed fall chinook spawning distribution in the Klickitat subbasin in 2004.

Coho

Coho spawner surveys are generally conducted in conjunction with late fall chinook spawner surveys but extend into February. Coho spawning generally occurs in the lower reaches of most lower river tributaries and the mainstem below Parrott's Crossing (RM 49.4). Coho spawner surveys were conducted from October 20 through February 16, we completed 4 passes upstream of the town of Klickitat and 3 passes downstream. The final redd count was the lowest in many years with only 57 redds documented. Forty-six of the 57 were located in the county park riffle below Lyle Falls leaving only 11 redds above Lyle Falls. Nine of the redds were located in the mainstem and the remaining two were in the Little Klickitat.

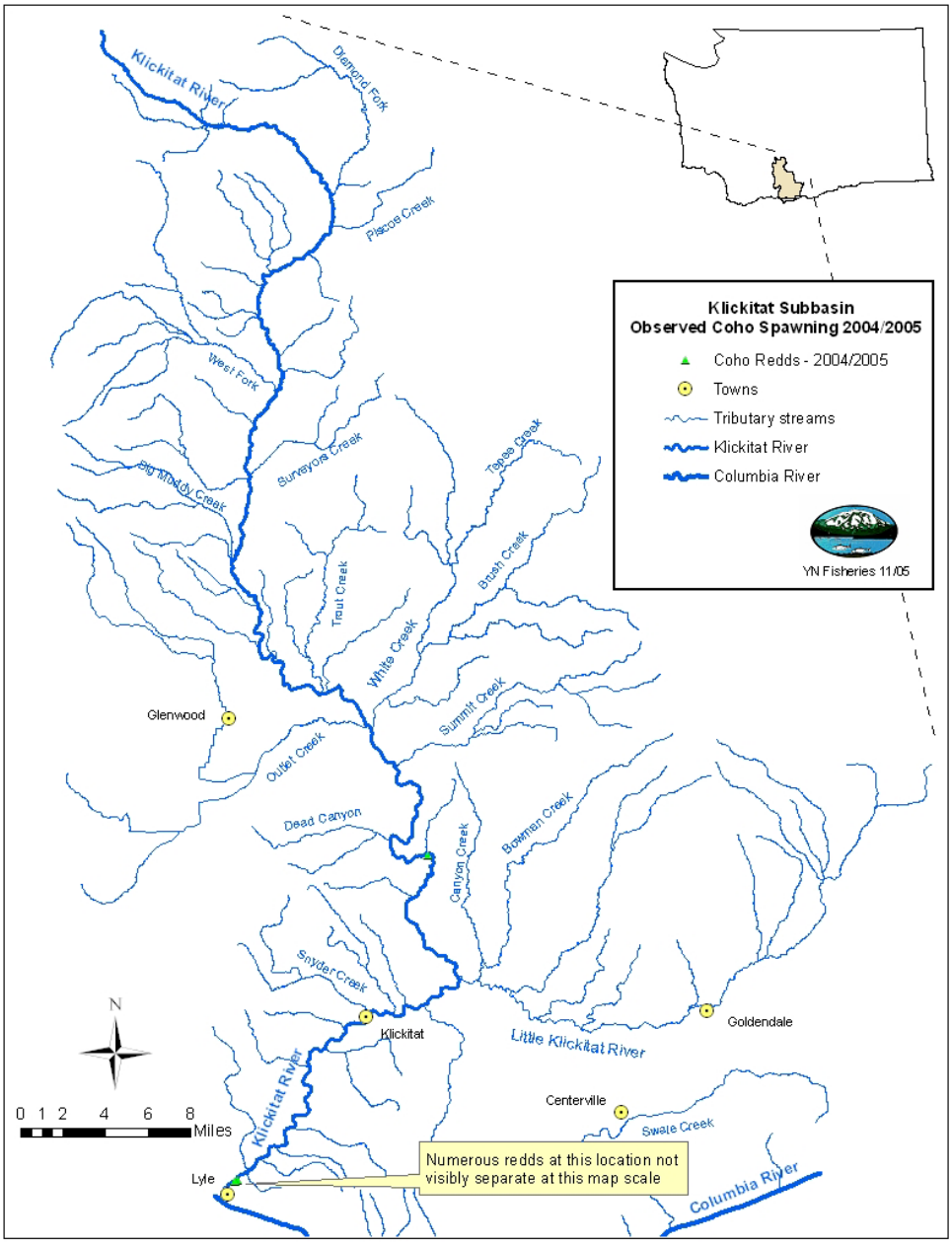


Figure 3. Observed coho spawning distribution in the Klickitat subbasin in 2004/2005.

Coho seem to have more of a problem passing Lyle Falls than chinook or steelhead. In low water years such as 2004 they seem to have very little success passing the falls. In recent years extremely high densities of fish have been observed at the mouth of Silva and Canyon Creeks which are both less than a mile below Lyle Falls. Even though neither of these tributaries are suitable for spawning, the fish congregate by the hundreds at these confluences.

Steelhead

Steelhead spawner surveys typically span two annual reporting periods due to the spawn timing (February through May). In this report we present final steelhead spawning data from spring 2004 and a progress report for spring 2005.

The final steelhead redd count for 2004 was 220, including 32 (15%) in the mainstem Klickitat and 188 (85%) in tributaries. The White Creek watershed accounted for a significant portion of the total number of observed redds (60%). Dead Canyon Creek accounted for nearly 8% of the total redd count, making it the second-ranking tributary watershed.

High spring flows and turbidity limit the effectiveness of the mainstem Klickitat steelhead redd surveys. We believe there is an unavoidable bias toward undercounting in the mainstem. The proportion of steelhead that spawn in the mainstem may be higher than is represented in the data.

Steelhead surveys for 2005 began during this reporting period. A very low snowpack during the winter of 2004-2005 resulted in low spring flows and limited access to some tributary streams for adult steelhead. Because of lower-than-normal flows and turbidity in the mainstem, survey visibility and effectiveness are higher than normal. It is anticipated that the proportion of total observed redds in the mainstem will be higher than most years (due to better ability to observe redds and possibly also due to an actual higher proportion of the spawning activity in the mainstem). It is also anticipated that the overall redd count will be significantly lower than in recent years. Final results will be presented in the FY2005 annual report.

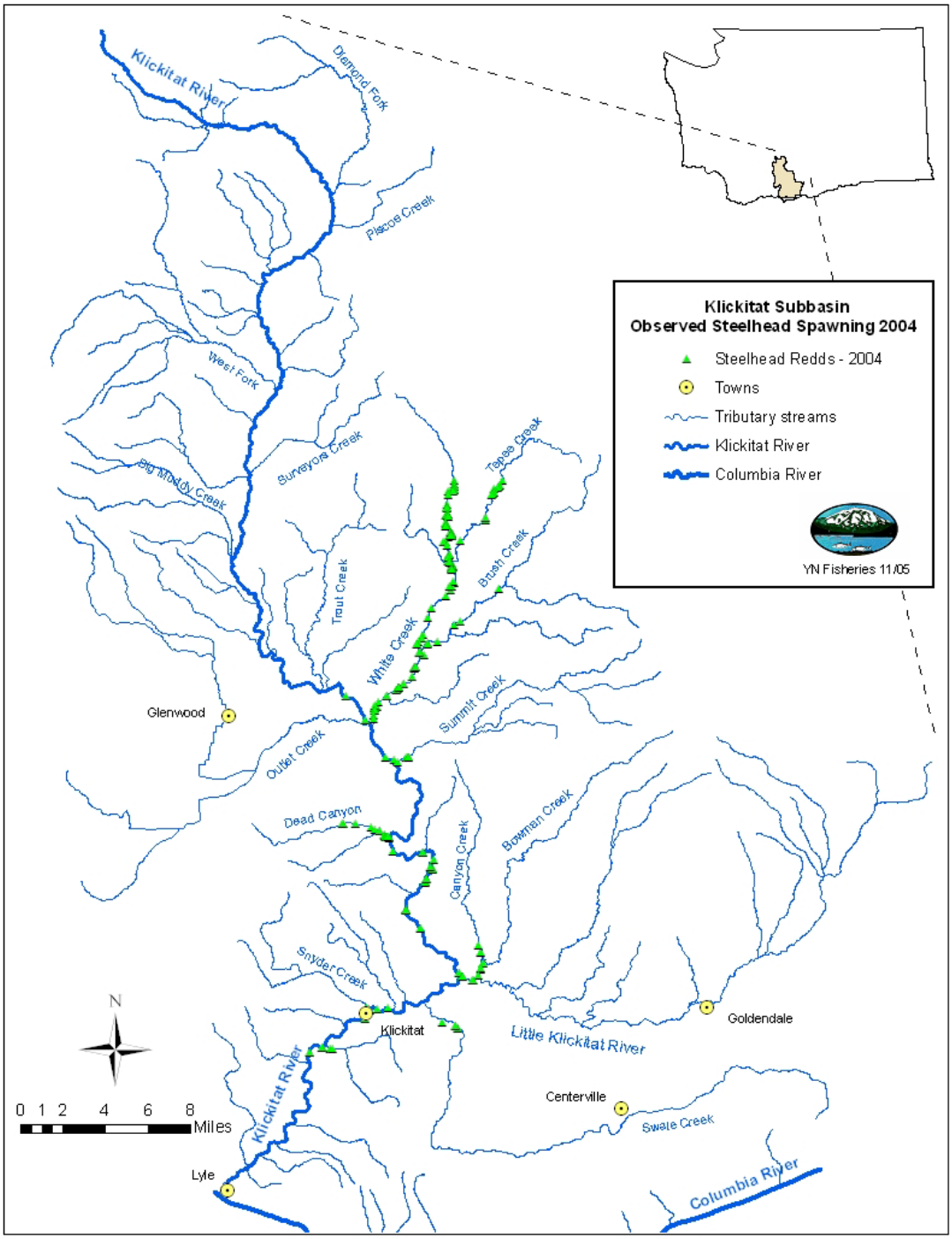


Figure 4. Observed steelhead spawning distribution in the Klickitat subbasin in 2004.

Task 1.d Scale analysis

Objective: Determine age and stock composition of juvenile and adult salmonid stocks.

Methods: Scale samples were obtained from adult carcasses encountered during spawner

surveys and from juveniles captured in screw traps. Scales were analyzed by YKFP/YN Fisheries Program staff. Results are forwarded to state and tribal fisheries managers for run reconstruction and forecasting.

Results: Scale samples were obtained from a total of 210 adult spring and fall chinook (*O. tshawytscha*) and coho (*O. kisutch*) carcasses during spawner surveys. A brief description of the results by species is below. Appendix D presents the age breakdown by sex with accompanying fork length averages and fork length ranges for each species sampled. Due to a lack of 100% adipose-clipping of hatchery stocks, origin (hatchery or wild) of fish sampled could not always be reliably determined.

Chinook

Scale samples were obtained from all intact adult carcasses (n = 28) found during spring chinook spawner surveys. Of the fish sampled, 67.7% were known hatchery fish and 32.3% were unmarked (either wild or unmarked hatchery fish). The majority of the fish sampled (71.4%) were 4-year-olds, with the remainder being 5-year-olds. The average fork lengths for 4-year-old females and 4-year-old males were 78.5 cm and 80.9 cm, respectively. The respective average fork lengths for female and male 5-year-old spring chinook were 85.6 cm and 96.0 cm.

Due to the large number of fall chinook carcasses encountered during spawner surveys, subsampling was used while collecting fall chinook scales. Every fifth fish was sampled, which resulted in a total of 174 samples. Of the fish sampled, 24.3% were known hatchery fish and 75.7% were unmarked (either wild or unmarked hatchery fish). The predominant age class for fall Chinook was 5-year-olds, at 50.6%. Proportions of the remaining age classes were as follows: 36.8% were 4-year-olds, 10.9% were 3-year-olds (with the majority of these being male), 1.2% were 6-year-olds, and 0.6% were 2-year-olds (with all of these being male). The average fork lengths for 4-year-old females and 4-year-old males were 87.0 cm and 83.3 cm, respectively. The respective average fork lengths for female and male 5-year-old fall chinook were 92 cm and 102.4 cm. See Appendix D for a more complete breakdown of the results.

Coho

We collected very few coho scale samples due to a very poor coho return. Of the 8 fish sampled, 3 were known hatchery fish and 4 were unmarked (either wild or unmarked hatchery fish). One carcass sampled was partially eaten and mark status could not be determined. All fish sampled were 3-year-olds. The average fork lengths for females and males were 72 cm and 74.4 cm, respectively. Complete results are presented in Appendix D.

Task 1.e Klickitat Hatchery Rotary Screw Trap Operation by Fish Culturists.

Objective: Monitor juvenile salmonid production and outmigration above the Klickitat Hatchery. Information generated from the Hatchery screw trap (RM 42.2) will be used to estimate natural production in the upper basin and provide information for future artificial production strategies. Onsite hatchery staff can efficiently monitor river and trap conditions.

Methods: Experienced fish culturists duty-stationed at the Klickitat Hatchery provided support to operate, maintain, and collect data from fish collected in the Hatchery rotary screw trap. Information collected will be incorporated into the M&E screw trap database. The use of a

hatchery staff member was needed to facilitate efficient use of Klickitat M&E project staff time, as this individual is on station, and can perform the required duties more efficiently. The bulk of the salary for this individual (82%) came from a non-BPA funding source.

Results: See Task 1.b above (Klickitat Mobile Juvenile Monitoring Sites) for discussion of results. Data from the Hatchery screw trap is also summarized and presented in Appendix B.

Task 1.f Sediment impacts on habitat

Objective: Monitor stream sediment loads associated with anthropogenic factors (e.g., logging, agriculture and road building), affecting streams basin wide. Excessive sediment loads can play a critical role in egg-to-fry survival, and can depress survival and productivity of many other life stages of salmonids.

Methods: Twelve samples were collected from representative spawning gravels at 11 sites throughout the basin using McNeil core gravel samples. See Appendix E for a map showing locations of sampling sites. A total of 132 samples were collected and sieved. Each sample was analyzed to estimate the percentage of fine particles present. Samples were collected and analyzed using TFW Salmonid Spawning Gravel Composition Survey methodology (Schuett-Hames et al. 1999a). Information gathered was incorporated into the EDT model and used to characterize sediment levels throughout the basin.

Results: A total of 11 sites in Diamond Fork Creek and the Klickitat River were sampled during 2004. Detailed results from sediment monitoring, including particle size distributions and percentages of fine sediments, are presented in Appendix E (results are also presented for 2 sites sampled in past years but not sampled in 2004). Some general trends that are indicated by the data are described below. Many of the sites discussed here have been sampled from 1998-2004; pending resolution of data-entry quality control issues, however, only results for 1998 and 2001-2004 are presented here.

At several of the sites, including Diamond Fork Lower Meadows, Klickitat River below White Cr., and Klickitat River at Stinson Flat, exhibit general increases in fine sediment levels through the years sampled (in both <1.7 mm and <6.75 mm particles). One site, Klickitat River at Parrott's Crossing, shows little change in <1.7 mm particles, while the percentage of <6.75 mm particles has increased over the past 3 years. Other sites, including Diamond Fork Upper Meadows and Klickitat River below Little Klickitat, have shown general decreases in fine sediment levels over the years sampled. Several other sites, including Diamond Fork Confluence, Klickitat River at Cow Camp, and Klickitat River at Leidl Bridge, exhibit fluctuating fine sediment levels with no long-term trend readily apparent.

Task 1.g Klickitat fish passage obstruction inventory assessment

Objective: To locate and describe existing salmonid fish migration barriers (artificial and natural barriers).

Methods: Data that was collected in past years by YN Fisheries staff and other agencies (e.g. WA Dept. of Transportation, WDFW) has been compiled in an ongoing manner. If necessary, field surveys using WDFW Fish Passage Barrier Assessment and Prioritization Protocol

(WDFW 1998) were planned to locate and assess both natural and artificial passage problems not identified through existing reports, etc.

Results: Existing data has been compiled for use in YN Fisheries Geographic Information Systems (GIS) databases; these databases are currently being developed and reviewed for quality assurance. Primary development of the GIS database is being accomplished by Klickitat Watershed Enhancement Project staff, with Klickitat M&E staff providing data as they are collected. Ongoing identification and documentation of any additional passage barriers is continuing.

No additional culverts were identified for survey using WDFW Fish Passage Barrier Assessment and Prioritization Protocol during this reporting period. To date a total of 82 culverts at 68 locations within the Klickitat subbasin have been inventoried by YKFP/YN Fisheries staff.

Task 1.h Klickitat water quality inventory

Objective: Record water quality measurements on selected tributaries and within selected habitat survey reaches on a seasonal basis.

Methods: Portable field meters were used to measure and record the following parameters on a seasonal basis: temperature, dissolved oxygen, conductivity, pH, and turbidity. Stream temperatures were monitored via continuously-recording Onset thermographs (set to record at 30-min. intervals) at 36 locations on 23 streams within the Klickitat subbasin. See Appendix F for a map and tabular description of thermograph locations. Temperature and water quality data are being stored in relational databases.

Results: Summaries of temperature data for each location are presented in Appendix F. These summaries include (for each month during the reporting period): the number of days during which temperature was recorded; the number of times the daily minimum temperature was less than 0.5°C and 4.4°C; the number of times the daily average temperature was less than 0.5°C and 4.4°C; the number of times the daily maximum temperature was greater than 23°C and 24°C; the number of times the 7-day average daily maximum temperature was greater than 12°C, 16°C, 17.5°C, 18°C, and 22°C (the 7-day average daily maximum was calculated by averaging the daily maximum temperatures across the time period that started 3 days prior to and ended 3 days after a given day); the monthly 1-day maximum temperature (the highest instantaneous temperature recorded in a given month); the monthly 1-day maximum range (the largest daily range in temperature recorded during a given month); and the monthly average daily range (the average daily range in temperature recorded during a given month).

Water temperatures are generally higher in the lower basin, from White Creek downstream. High temperatures and associated reductions in dissolved oxygen, along with dewatering, present significant habitat limitations for juvenile salmonids, especially for Mid-Columbia steelhead. Stranding has been observed in a number of tributaries. Considerable mortality likely occurs annually in White, Tepee, Brush, Dead Canyon, Swale, and Dillacort creeks as a result of dewatering and/or warming of refugia pools.

Other basic water quality parameters that have been recorded have been entered into a relational database that is currently under development.

Task 1.i Klickitat habitat assessment

Objective: Collect baseline data on existing habitat conditions throughout the basin. Quantitative habitat data will provide the foundation for decision-making relative to habitat restoration, as well as refining related attributes of the EDT model. Associated with these projects will be ongoing monitoring and evaluation (M&E) of the implemented projects.

Methods: The habitat inventories were be conducted using TFW monitoring methodology (modules include Stream Segment Identification [Pleus and Schuett-Hames 1998a], Reference Point Survey [Pleus and Schuett-Hames 1998b], Habitat Unit Survey [Pleus, Schuett-Hames, and Bullchild 1999], and Large Woody Debris Survey [Schuett-Hames et al. 1999b]). Data collected from these surveys is stored in a relational database.

Results: Habitat surveys were conducted at 6 sites on 4 streams in 2004. Sites surveyed included 2 sites on the upper Klickitat R., 2 sites on Diamond Fork Cr., and 1 site each on Swale Cr. and Bear Cr. Data from these surveys is being entered into the relational database. Summary reports from the database are currently under development.

Task 1.j Spring chinook PIT tagging

Objective: Phase I – Preliminary study to evaluate Passive Integrated Transponder (PIT) tagging as a means of monitoring spring chinook salmon travel and/or holdover time between screw traps located at Castile Falls, the Klickitat Hatchery and Lyle Falls. Upon establishment of screw trap catch efficiencies, PIT tagging will also provide a means for calculating predation or other losses between upper and lower river segments. Additional benefits include monitoring movements through Bonneville Dam on the Columbia River, estimation of smolt-to-adult returns, and screw-trap efficiency testing.

Methods: Spring chinook salmon smolts from the Klickitat Hatchery were injected with PIT tags and released into the Klickitat River above Castile Falls. Fish subsequently captured at the 3 screw traps located downstream of the release point were scanned for tags. A total of 9943 fish were tagged from April 18-21, 2005 at the Klickitat Hatchery. Tagged fish were also marked with a lower caudal fin clip. After tagging, the fish were held for approximately 4 weeks before being released; surveys for mortalities were conducted during this holding period. A survey to determine the tag shedding rate was also conducted approximately 2 weeks post tagging (by scanning 500 marked fish for tag retention). Tag data has been entered into the regional PIT Tag Information System (PTAGIS) database for further monitoring. Phase I focused on familiarizing technicians and biologists with protocols for tag injection, detection and data input and management.

Results: A total of 9943 fish were tagged; pre-release mortality (from April 18 to May 17) was approximately 1.15%. This resulted in 9830 fish being released into the Klickitat River above Castile Falls on May 17, 2005. Fish were subsequently detected at the screw traps downstream; since this monitoring and data collection is ongoing and is occurring after this reporting period, results will be presented in the 2005 annual report. A tag shedding rate of 1.8% was estimated; however this estimate may be inflated slightly by unreadable tags or marked fish that were not tagged.

2. EDT Modeling

Overall Objective: Identify preferred enhancement options with respect to habitat and artificial propagation using the EDT model, applicable TFW protocols, and/or other scientific methods where appropriate.

Task 2.a EDT Modeling

Objective: To estimate potential benefits from habitat restoration and artificial production scenarios using the EDT model.

Methods: Application of the EDT model on habitat improvement strategies and artificial propagation/supplementation options for chinook, coho and steelhead. Incorporate existing data into relational database (Access) and identify additional data needs to refine and bolster output. Generate outputs designed to maximize potential fishery benefits regarding habitat, passage and artificial production options.

Results: The EDT Model was bolstered by newly acquired data and employed for use in the Klickitat Anadromous Fishery Master Plan as well as Klickitat Salmon Recovery Plan. It was also utililized by the Klickitat Watershed Enhancement Program (KWEP). Responses by the Independent Scientific Review Panel (ISRP) and methodologies employed by the Interior Columbia River Technical Recovery Team (ICTRT) demanded that new runs be completed for spring Chinook and steelhead, respectively. Therefore, presumptions about basic life history traits and distributions were altered. A list of activities and accomplishments in bulleted form is presented below.

- Update of existing scientific data in Klickitat basin for level 2 data inputs
- Altered appropriate reach segments and reach breaks for model based on physical geomorphic characteristics for planning processes (Recovery Planning and Master Planning)
- Conducted several field surveys for data acquisition and basin-wide familiarization
- Update of data acquisition and populating of patient attributes
- Update of data inputs for template conditions and design
- Initiated model set up for utilization in scenario building for potential steelhead supplementation program
- Utilized model to answer ISRP questions involved in Phase I of Master Planning
- Designed model parameters and executed runs to assist in Salmon Recovery Planning in order to address ICTRT methodologies

3. Ecological Interactions

Overall Objective: Determine presence of pathogens in wild and naturally produced salmonids in the Klickitat Basin and develop supplementation strategies using this information.

Task 3.a Pathogen sampling

Objective: In order to determine if supplementation increases the incidence of pathogens, we will establish a baseline data set describing existing levels of pathogens in wild populations of steelhead/rainbow trout (*Oncorhynchus mykiss*), chinook salmon (*O. tshawytscha*) and coho salmon (*O. kisutch*).

Methods: Juvenile or resident fish were collected via electrofishing or capture in rotary screw traps from sites throughout the Klickitat subbasin in January and February of 2005. Laboratory testing was performed by the USFWS Lower Columbia River Fish Health Center. Fish were examined using the protocols from the Laboratory Procedures Manual for the National Wild Fish Health Survey.

Results: A total of 204 fish were collected from 15 sites. Results are summarized in Appendix G. Species collected included 137 steelhead/rainbow trout (*O. mykiss*), 10 chinook salmon (*O. tshawytscha*), 34 coho salmon (*O. kisutch*), 21 brook trout (*S. fontinalis*), and 2 Pacific lamprey (*Lampetra tridentata*). One sample of juvenile spring chinook salmon from the upper Klickitat River (above Castile Falls) tested positive for *Renibacterium salmoninarum*, the pathogen that causes bacterial kidney disease (BKD). Samples from numerous other sites yielded a suspected *R. salmoninarum* infection, but could not be confirmed. This may result from a low level infection, or a tissue sample in which the pathogen was no longer present. These sites included Bowman Cr., Diamond Fork Cr., Fish Lake Stream, Klickitat R. above Castile Falls, Klickitat R. Lyle screw trap, Little Klickitat R., McCreedy Cr., Piscoe Cr., Snyder Cr., Summit Cr., Surveyors Cr., Swale Cr., Tepee Cr., and White Cr. All of these suspected infected samples were from *O. mykiss*, with the exception of Fish Lake Stream (brook trout), Klickitat R. Lyle screw trap (coho salmon), and Snyder Cr. (coho salmon). Several *O. mykiss* samples were also collected that exhibited an unknown fungal growth, often related to bodily injuries.

4. Genetics

Overall Objective: Develop YKFP supplementation broodstock collection protocols for the preservation of genetic variability, by refining methods of detecting within-stock genetic variability and between-stock genetic variability.

Task 4.a Genetic data synthesis, collection and analysis

Objective: Gain a thorough understanding of the genetic make-up of target stocks in order to maintain long term genetic variability and minimize the impacts of domestication on supplemented stocks (spring chinook and summer steelhead). As identified in the draft Klickitat Subbasin Anadromous Fishery Master Plan both spring chinook and summer steelhead will be collected for broodstock at Lyle Falls. A thorough knowledge of baseline genetic conditions and dip-in rates by out-of-basin adults is important in order to adhere to the YKFP genetic guidelines.

Methods: Genetic samples from wild *O. mykiss* juveniles collected in 2000-2002 by YKFP Klickitat M&E staff in rotary screw traps and via electrofishing, as well as samples from Skamania-strain juvenile steelhead from Washougal Hatchery, were analyzed by geneticists with CRITFC. The findings of this analysis were incorporated into a manuscript which has been

accepted for publication in the peer-reviewed literature (Narum et al. in press).

Genetic samples have also been collected from wild adult steelhead and chinook salmon at the Lyle adult trap on the lower Klickitat River (RM 2.2). This trap at the Lyle Falls fish ladder is currently operated through a cooperative project with WDFW (under BPA Project #200306500 Determine the Origin, Movements and Relative Abundance of Bull Trout in Bonneville Reservoir). As fish were enumerated, netted and removed from the live trap, small fin clips or opercle punches of all non-adipose-clipped chinook and steelhead are collected. During FY2004 a total of 736 genetic samples (685 from steelhead, 51 from chinook) were collected. These samples will be analyzed by CRITFC and information added to existing databases and incorporated into a future report.

Results: The results that are presented in Narum et al. (in press) are summarized here: Significant genetic structure was detected among *O. mykiss* in various tributaries to the Klickitat River, with the most divergent population located above Castile Falls. Analysis indicated an estimate of six to seven genetically distinct populations of naturally reproducing *O. mykiss* in this river system. The hatchery strain appears to remain genetically distinguishable from native stocks, as only 4.0 % of naturally produced steelhead had most likely assignment to the hatchery strain. These results indicate that genetic integrity and variation of native Klickitat River steelhead have been maintained despite repeated hatchery introductions and potential is high for restoring this threatened population.

5. Appendices

Appendix A. Juvenile & Resident Salmonid Population Surveys.

					O. mykiss Total No. in Pass			*S.fontinalis* Total No. in Pass			All species Total No. in Pass			Program Capture Removal Estimates			
																95% CI	
Stream	Site	Date	Lat	Long	1	2	3	1	2	3	1	2	3	N-hat	SE	U	L
Bear Cr.	Trt 1-4	8/5/04	46.085	-121.234	49	11	7				49	11	7	68	1.8544	68	77
Bear Cr.	Trt 5-8	8/9/04	46.088	-121.233	14	13	6				14	13	6	44	11.3074	36	90
Bear Cr.	Trt 9-12	8/10/04	46.091	-121.234	29	18	1				29	18	1	49	1.902	49	58
Bear Cr.	Cntrl 1-4	8/5/04	46.093	-121.234	28	19	10				28	19	10	71	10.1181	61	106
Bear Cr.	Cntrl 5-8	8/9/04	46.095	-121.235	46	17	9				46	17	9	77	3.6438	74	90
Bear Cr.	Cntrl 9-12	8/11/04	46.098	-121.235	37	19	6				37	19	6	66	3.5791	63	79
Summit Cr.	Trt 1-4	7/29/04	46.032	-121.027	26	11	6	3	2	1	29	13	7	54	4.0677	50	69
Summit Cr.	Trt 5-8	8/2/04	46.036	-121.026	16	18	3	3	5	3	19	23	6	63	12.2938	52	109
Summit Cr.	Trt 9-12	8/4/04	46.038	-121.023	37	12	5	7	3	1	44	15	6	67	2.3123	66	77
Summit Cr.	Cntrl 1-4	7/29/04	46.039	-121.021	20	12	4	9	2	1	29	14	5	51	3.0201	49	63
Summit Cr.	Cntrl 5-8	8/2/04	46.040	-121.018	28	17	5	7	6	4	35	23	9	77	7.1181	70	102
Summit Cr.	Cntrl 9-12	8/3/04	46.041	-121.015	22	12	6	13	11	10	35	23	16	102	18.5226	83	165
Trout Cr.	Trt 1-4	7/26/04	46.072	-121.212	70	24	5				70	24	5	101	1.9844	100	109
Trout Cr.	Trt 5-8	7/27/04	46.075	-121.213	69	45	14				69	45	14	144	8.218	135	169
Trout Cr.	Trt 9-12	7/28/04	46.077	-121.212	82	28	10				82	28	10	124	3.073	122	135
Trout Cr.	Cntrl 1-4	7/26/04	46.078	-121.210	28	3	2				28	3	2	33	0.4684	33	33
Trout Cr.	Cntrl 5-8	7/27/04	46.080	-121.208	10	20	3				10	20	3	47	14.4196	36	107
Trout Cr.	Cntrl 9-12	7/28/04	46.082	-121.208	18	11	6				18	11	6	41	5.9504	37	65

Results of multiple pass electrofishing surveys on Bear, Summit, and Trout creeks with site location, estimated abundance (N-hat), standard error, and upper and lower 95% confidence limits. Population statistics calculated from Removal estimator in Program Capture (White et al. 1982). All sites sampled were 100 meters in length.

Appendix B. Mobile Juvenile Monitoring Sites (Screw Traps)

Castile Falls Smolt Trap - FY2004
Catch by Month

Month	Days Fished	Wild O. Mykiss	Spring Chinook	Brook Trout	Monthly Totals
June '04	2	10	1342	0	1352
July '04	20	111	22944	0	23055
August '04	20	59	6250	0	6309
September '04	17	32	1301	0	1333
October '04	18	22	2322	3	2347
November '04	8	35	3099	4	3138

Hatchery Smolt Trap FY2004
Catch by Month

Month	Days Fished	Chinook	Chinook Fry	Coho	Coho Fry	Wild O. Mykiss	Brook Trout	Montly Totals
May '04	18	1488	396	20	0	19	0	1923
June '04	30	562	259	5	0	1	0	827
July '04	31	499	0	12	0	8	0	519
August '04	31	168	0	153	0	18	0	339
September '04	30	363	0	49	0	24	0	436
October '04	31	141	0	204	0	5	0	350
November '04	26	487	0	202	0	6	1	696
December '04	29	264	0	18	0	1	0	283
January '05	21	22	0	6	0	1	0	29
February '05	28	59	9	8	0	6	0	82
March '05	31	95	95	0	2	6	0	198
April '05	18	107	260	2	3	5	0	377

Lyle Falls Smolt Trap FY2004
Catch by Month

Month	Days Fished	Chinook	Coho	Hatchery O. Mykiss	Wild O. Mykiss	Monthly Totals
May '04	11	2656	2165	2748	1119	8688
June '04	4	843	82	0	74	999
July '04	9	13596	150	0	4	13750
August '04	17	19939	1689	0	11	21639
September '04	19	3049	57	0	162	3268
October '04	17	2217	0	0	211	2428
November '04	8	274	1	0	29	304
December '04	17	561	47	0	54	662
January '05	11	397	417	1	38	853
February '05	16	872	284	1	53	1210
March '05	3	1082	6	0	5	1093
April '05	4	459	5078	2	73	5612

Lyle Falls Smolt Trap 2003-2005
Efficiency Testing Results

Date	Species	Flow* (cfs)	No. fish marked	No. fish recaptured	Catch Rate	
4/10/2003	Hatchery coho	2065	283	16	5.7%	
4/11/2003	Hatchery coho	2100	566	26	4.6%	
4/16/2003	Hatchery coho	2095	377	29	7.7%	
4/17/2003	Hatchery coho	2030	300	5	1.7%	
4/28/2003	Hatchery coho	1970	293	23	7.8%	
4/29/2003	Hatchery coho	2055	94	3	3.2%	
5/5/2003	Hatchery steelhead	2040	300	14	4.7%	
5/6/2003	Hatchery steelhead	1945	300	6	2.0%	
9/4/2003	Chinook	721	244	49	20.1%	
3/9/2004	Hatchery spring chinook	1525	300	43	14.3%	
3/10/2004	Hatchery spring chinook	1570	92	12	13.0%	
3/12/2004	Hatchery spring chinook	1535	300	28	9.3%	
4/20/2004	Hatchery coho	1600	311	38	12.2%	
4/21/2004	Hatchery coho	1550	299	29	9.7%	
5/12/2004	Hatchery steelhead	1620	289	17	5.9%	
5/13/2004	Hatchery steelhead	1570	300	13	4.3%	
8/10/2004	Hatchery fall chinook	634	329	39	11.9%	
2/14/2005	Wild chinook, wild coho	788	238	25	10.5%	**
2/28/2005	Wild spring chinook, wild coho	711	62	12	19.4%	

* Flow values are 2-day averages of USGS mean daily flows starting on test date (in date column)
** This test may slightly underestimate efficiency (by approximately 1-2%) due to a gap in trap operation during test.

Appendix C. Spawning ground surveys (redd counts)

KLICKITAT WATERSHED - SPRING CHINOOK SPAWNING SURVEY RESULTS, 2004

STREAM	REACH	MILES*	# OF PASSES	REACH TOTALS	REDDS /MILE*	LIVE OBS.	MORTS OBS.
Klickitat							
MAIN STEM	**Above Castile Falls****						
	Huckleberry Cr. - McCormick Mdws.	3.4	3	4	1.19	4	2
	McCormick Mdws - Cow Camp	8.0	3	57	7.16	69	18
	Cow Camp - McCreedy Cr.	7.1	3	53	7.46	44	16
	McCreedy Cr. - Castile Falls	6.0	3	8	1.33	4	0
	Diamond Fork, Butte - Cuitin	2.0	1	0	0.00	0	0
	Butte Cr. to Confluence	3.7	1	0	0.00	0	0
	Subtotal	30.1		122	4.1	121	36
	Below Castile Falls						
	Castile Falls #11 - Castile Falls #1	0.6	2	0	0.00	0	0
	Castile Falls #1 - Signal Peak Br.	3.3	3	18	5.45	12	3
	Signal Peak Br. - old USGS gage	10.5	2	38	3.62	73	10
	Old USGS gage - WDFW Hatchery	8.2	1	10	1.22	3	1
	WDF Hatchery - Summit Cr.	5.5	1	3	0.55	1	3
	Summit Cr. - Leidl Br.	5.6	1	1	0.18	6	1
	Leidl Br. - Stinson Flats	2.5	1	0	0.00	2	0
	Stinson Flats - Beeks Canyon	4.5	1	3	0.67	4	3
	Subtotal	40.7		73	1.79	101	21
	MAINSTEM TOTALS	**70.8**		**195**	**2.8**	**222**	**57**
	KLICKITAT WATERSHED TOTALS			**195**		**222**	**57**
	Above Castile Falls contribution			**63%**		**55%**	**63%**
	Below Castile Falls contribution			**37%**		**45%**	**37%**

n/s = not surveyed
*mileages derived from GIS arc lengths (feet/5280)

****Note -** Excess hatchery returns were transported above Castile Falls and released to spawn naturally on 6/22, 7/20, and 8/24/2004. Included in the transport effort were 320 females, 195 adult males and 85 jacks, for a total of 600 fish. Their contribution to the overall redd count was significant, approximately 63%.

KLICKITAT WATERSHED - FALL CHINOOK SPAWNING SURVEY RESULTS, 2004

STREAM	REACH	MILES*	# OF PASSES	REACH TOTALS	REDDS /MILE*	LIVE OBS.	MORTS OBS.
Klickitat							
MAIN STEM	Castile Falls #11 - Castile Falls #1	0.6	n/s				
	Castile Falls #1 - Signal Peak Br.	3.3	n/s				
	Signal Peak Br. - Big Muddy Cr.	6.9	n/s				
	Big Muddy Cr. - old USGS gage	3.3	n/s				
	Old USGS gage - WDFW Hatchery	8.2	2	4	0.5	3	1
	WDF Hatchery - Summit Cr.	5.4	4	65	12.0	425	83
	Summit Cr. - Leidl Br.	5.2	3	94	18.1	306	54
	Leidl Br. - Stinson Flats	2.9	3	52	17.9	184	118
	Stinson Flat - Beeks Canyon	4.5	3	84	18.7	231	112
	Beeks Canyon - Little Klick	4.8	3	335	69.8	122	121
	Little Klick - Twin Bridges	1.5	3	33	22.0	30	57
	Twin Bridges - Klick Field Office	1.2	3	22	18.3	23	32
	Klick Field Office - Klickitat Town	3.6	3	21	5.8	26	71
	Klickitat Town - Pitt Bridge	3.4	3	25	7.4	31	43
	Pitt Bridge - Turkey Farm CG	5.4	3	18	3.3	12	57
	Turkey Farm CG - Lyle Falls trap	2.5	3	10	4.0	2	21
	Below Lyle Falls	0.1	1	14	140.0	9	6
	MAINSTEM TOTALS	**48.7**		**777**	**16.0**	**1404**	**776**

n/s = not surveyed
*mileages derived from GIS arc lengths (feet/5280)

KLICKITAT WATERSHED - COHO SPAWNING SURVEY RESULTS, 2004/2005

STREAM	REACH	MILES*	# OF PASSES	REACH TOTALS	REDDS /MILE*	LIVE OBS.	DEAD OBS.
Klickitat							
MAIN STEM	Castile Falls #10 - Castile Falls #1	0.6	n/s				
	Castile Falls - Signal Peak Br.	3.3	n/s				
	Signal Peak Br. - Big Muddy Cr.	6.9	n/s				
	Big Muddy Cr. - old USGS gage	3.3	n/s				
	Old USGS gage - WDFW Hatchery	8.2	2	0	0.0	0	0
	WDF Hatchery - Summit Cr.	5.4	5	1	0.2	103	2
	Summit Cr. - Leidl Br.	5.2	5	5	1.0	35	3
	Leidl Br. - Stinson Flat	2.9	5	0	0.0	2	0
	Stinson Flat - Beeks Canyon	4.5	5	1	0.2	8	2
	Beeks Canyon - Little Klickitat	4.8	5	1	0.2	23	2
	Little Klickitat - Twin br.	1.5	5	1	0.7	2	0
	Twin Br. - Field Office	1.3	5	0	0.0	3	1
	Field office - Ice house landing	1.5	5	0	0.0	2	4
	Ice house landing - Klickitat Town	2.1	5	0	0.0	11	2
	Klickitat Town - Pitt Bridge	3.4	4	0	0.0	10	2
	Pitt - bus turn around	2	4	0	0.0	1	0
	Bus turn around - Turkey Farm	3.3	3	0	0.0	2	0
	Turkey Farm - Lyle Falls screw trap	2.5	3	0	0.0	2	0
	County Park riffle	0.1	3	46	460.0	192	0
	MAINSTEM TOTAL	40.4		55	1.4	396	18
TRIBUTARIES							
Trib of trib							
OUTLET CREEK		0.3	n/s				
WHITE CREEK	Bottom 1.5 miles	1.5	0	0	0.0	0	0
SUMMIT CREEK	Falls - mouth	1.3	2	0	0.0	0	0
DEAD CANYON CR		1.3	0	0	0.0	0	0
BEEKS CANYON		0.5	0	0	0.0	0	0
LITTLE KLICKITAT	Bowman Cr. - mouth	1.2	2	2	1.7	8	1
Bowman Cr.	Falls - mouth	1.0	1	0	0.0	0	0
Canyon Cr.	Right bank trib #3 - left bank trib #1	1.0	n/s				
	Left bank trib #1 - Weeping Wall	1.0	n/s				
	Weeping wall - mouth	1.0	n/s				
SWALE CREEK	above railroad trestle	1.1	0	0	0.0	0	0
	Trestle to mouth	1.1	0	0	0.0	0	0
SNYDER CREEK	lowermost bridge to mouth	0.8	1	0	0.0	0	0
LOGGING CAMP CR		1.0	0	0	0.0	0	0
WHEELER CREEK		1.0	0	0	0.0	0	0
DILLACORTE CR	Falls - mouth	1.5	0	0	0.0	0	0
SILVA CREEK	Bottom	0.1	0	0	0.0	0	0
CANYON CREEK	Bottom 100 meters	0.1	1	0	0.0	0	0
	Tributary Totals	13.5		2	0.1	8	1
	COMBINED TOTAL	**53.9**		**57**		**404**	**19**
	Tributary Contribution			**4%**		**2%**	**5%**
	Mainstem Contribution			**96%**		**98%**	**95%**

n/s = not surveyed
*mileages from GIS arcs (feet/5280)

KLICKITAT WATERSHED - STEELHEAD SPAWNING SURVEY RESULTS, 2004

STREAM	REACH	MILES*	# OF PASSES	REACH TOTALS	REDDS /MILE*	LIVE OBS.	DEAD OBS.
Klickitat							
MAIN STEM	Huckleberry Cr. - McCormick Mdws.	2	1	0	0.0	0	0
	McCormick Mdws - Cattle guard	5.1	3	0	0.0	0	0
	Cattle guard - Castile Falls	12.9	3	0	0.0	0	0
	Castile Falls #10 - Castile Falls #1	0.8	n/s				
	Castile Falls - Signal Peak Br.	3.3	1	0	0.0	0	0
	Signal Peak Br. - Big Muddy Cr.	6.9	0	0	0.0	0	0
	Big Muddy Cr. - old USGS gage	3.3	0	0	0.0	0	0
	Old USGS gage - WDFW Hatchery	8.2	2	0	0.0	0	0
	WDF Hatchery - Summit Cr.	5.5	2	3	0.5	6	0
	Summit Cr. - Leidl Br.	5.6	3	0	0.0	3	0
	Leidl Br. - Stinson Flat	2.5	4	1	0.4	7	0
	Stinson Flat - Beeks Canyon	4.6	4	13	2.8	14	0
	Beeks Canyon - Little Klickitat	4.7	3	8	1.7	13	1
	Little Klickiat - Twin Bridges	1.5	3	0	0.0	0	0
	Twin Bridges - Field Office	1.2	3	0	0.0	0	0
	Field office - Ice House	1.3	2	0	0.0	0	0
	Ice house - town of Klickitat	2.7	2	2	0.7	2	0
	Town of Klick - Pitt	2.5	2	3	1.2	9	0
	Pitt - Turkey Farm	5	2	2	0.4	5	1
	Turkey Farm - Lyle Falls	2	1	0	0.0	0	0
	MAINSTEM TOTAL	80.8		32	0.4	59	2
TRIBUTARIES							
Trib of trib							
DIAMOND FORK							
McCREEDY CR.							
CHAPARRAL CR.	Klick road to confluence	0.8	1	0	0.0	0	0
PISCOE CR.	Bottom 3 miles	3.0	1	0	0.0	0	0
SURVEYORS CR.	2nd xing to 1st xing	2.2	1	0	0.0	0	0
	1st xing to mouth	1.7	1	0	0.0	0	0
BIG MUDDY	End of Rd. to falls	1.4	n/s				
TROUT CREEK		4.0	n/s				
Bear Cr.		1.0	n/s				
OUTLET CREEK		0.3	n/s				
WHITE CREEK	Upper Rd. Xing - IXL Rd.	2.8	2	1	0.4	3	0
	IXL Rd. - 191 Rd. Xing	3.1	2	40	12.9	0	0
	191 Rd. Xing - Cedar Valley Rd.	2.4	2	22	9.2	6	0
	Cedar Valley Rd. - Brush Cr.	4.6	2	13	2.8	2	0
	Brush Cr. - Washed out xing	1.8	2	13	7.2	6	1
	Washed out Xing. - Schafer Cr.	1.2	2	15	12.5	4	0
	Schafer Cr. - mouth	1.9	2	10	5.3	2	1
West Fork Cr.	Lower LB trib. - mouth	1.9	n/s				
Teepee Cr.	RB Trib - IXL Rd.	2.2	2	1	0.5	3	0
	IXL Rd.- Teepee Cr. Rd.	2.5	2	9	3.6	5	0
	Teepee Cr. Rd. - mouth	3.4	2	2	0.6	1	0
Brush Creek	Xing 3.8 mi above Coyote Springs Rd.	3.8	1	0	0.0	0	0
	Coyote Springs Rd. - Cedar Valley Rd.	2.0	2	1	0.5	0	0
	Cedar Valley Rd. - Blue Creek	2.6	2	2	0.8	6	0
	Blue Creek - mouth	2.2	2	3	1.4	10	0
SUMMIT CREEK	Falls - Confluence	1.3	3	7	5.4	3	0
DEAD CANYON CR	lower 3.5 miles	3.5	2	17	4.9	2	0
BEEKS CANYON	Falls to mouth	0.5	2	0	0.0	0	0
LITTLE KLICKITAT	Bowman Cr. - mouth	1.2	3	8	6.7	8	0
Bowman Cr.	Falls - mouth	1.0	2	6	6.0	1	0
Canyon Cr.	Right bank trib #3 - left bank trib #1	1.0	1	2	2.0	5	1
	Left bank trib #1 - Weeping Wall	1.0	n/s				
	Weeping wall - mouth	1.0	n/s				
Mill Cr.			n/s				
East Prong		1.0	n/s				
West Prong		1.0	n/s				
SWALE CREEK	above railroad trestle	1.1	1	5	4.5	0	0
	Trestle to mouth	1.1	1	0	0.0	0	0
SNYDER CREEK	Upper falls - Lower falls	0.7	1	0	0.0	0	0
	Lower falls - upper culvert	1.0	1	0	0.0	0	0
	Upper culvert - mouth	0.9	3	9	10.0	10	0
LOGGING CAMP CR		1.0	2	0	0.0	1	0
WHEELER CREEK		2.0	3	2	1.0	4	0
DILLACORTE CR	Falls - mouth	1.5	2	0	0.0	0	1
SILVA CREEK	Bottom	0.1	n/s				
CANYON CREEK	Bottom 1/4 mile	0.3	n/s				
	Tributary Totals	62.0		188	3.0	82	4
	COMBINED TOTAL	**142.8**		**220**		**141**	**6**
	Tributary Contribution			**85%**		**58%**	**67%**
	Mainstem Contribution			**15%**		**42%**	**33%**

n/s = not surveyed
*mileages from GIS arcs (feet/5280)

Appendix D. Scale analysis

2004 Spring Chinook Scale-based Age data

Age	Sex	Num. Sampled	Avg. Fk Lgth.	Max. Fk Lgth.	Min. Fk Lgth.	% of sex	% of total
2	Female	0	-	-	-	0.0%	0.0%
3	Female	0	-	-	-	0.0%	0.0%
4	Female	14	78.5	89	67	66.7%	50.0%
5	Female	7	85.6	100	80	33.3%	25.0%
	Total Females:	21				100.0%	75.0%
2	Male	0	-	-	-	0.0%	0.0%
3	Male	0	-	-	-	0.0%	0.0%
4	Male	6	80.9	99	70.5	85.7%	21.4%
5	Male	1	96.0	96	96	14.3%	3.6%
	Total Males:	7				100%	25.0%
	Grand Totals:	28					100.0%

2004 Fall Chinook Scale-based Age data

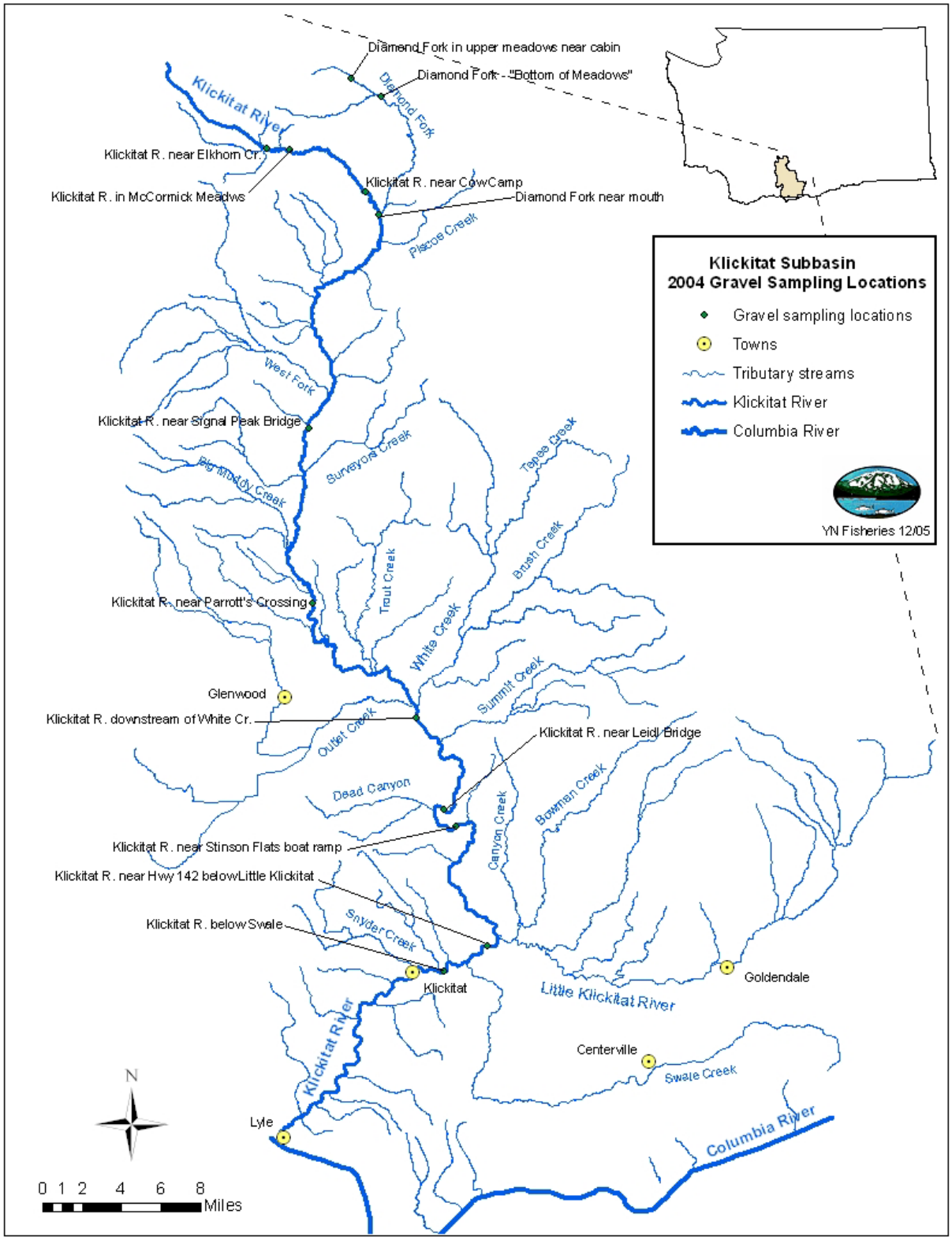
Age	Sex	Num. Sampled	Avg. Fk Lgth.	Max. Fk Lgth.	Min. Fk Lgth.	% of sex	% of total
2	Female	0	-	-	-	0.0%	0.0%
3	Female	2	78.5	79	78	1.9%	1.1%
4	Female	43	87.0	106	79	41.7%	24.7%
5	Female	57	92.0	107	83	55.3%	32.8%
6	Female	1	85.5	85.5	85.5	1.0%	0.6%
	Total Females:	103				100.0%	59.2%
2	Male	1	53.0	53	53	1.4%	0.6%
3	Male	17	69.0	77	55.5	23.9%	9.8%
4	Male	21	83.3	94	68	29.6%	12.1%
5	Male	31	102.4	160	82	43.7%	17.8%
6	Male	1	110.5	110.5	110.5	1.4%	0.6%
	Total Males:	71				100%	40.8%
	Grand Totals:	174					100.0%

2004-5 Coho Scale-based Age data

Age	Sex	Num. Sampled	Avg. Fk Lgth.	Max. Fk Lgth.	Min. Fk Lgth.	% of sex	% of total
3	Female	1	72.0	72	72	100.0%	12.5%
	Total Females:	1				100.0%	12.5%
3	Male	7	74.4	84.5	68	100.0%	87.5%
	Total Males:	7				100%	87.5%
	Grand Totals:	8					100.0%

Note: All fork lengths are in centimeters.

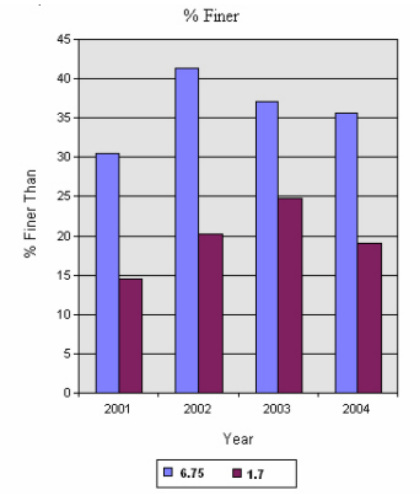
Appendix E. Sediment data

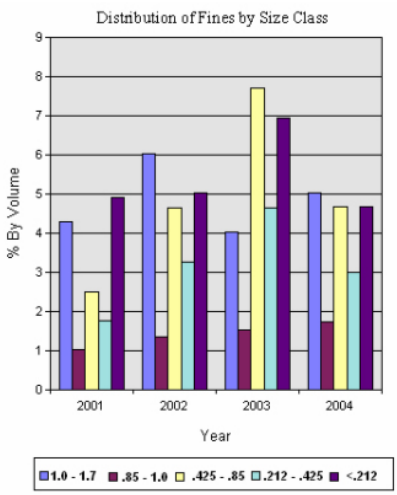


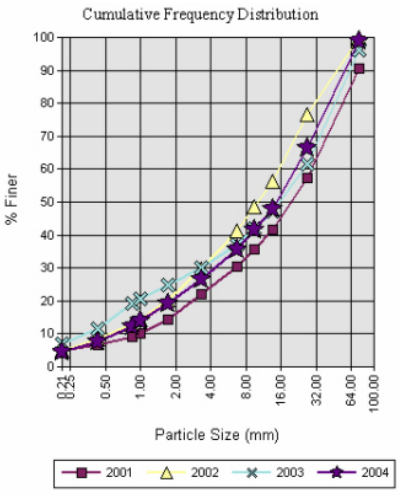
Locations of 2004 Klickitat subbasin sediment sampling sites.

Site Name: Diamond Fork - "Bottom of Meadows"

Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
2001	90.4	57.4	41.5	35.8	30.5	21.9	14.5	10.2	9.2	6.7	4.9
2002	100	76.6	56.3	48.7	41.3	29.6	20.3	14.3	12.9	8.3	5
2003	96	61.7	47.2	42	37.1	30.1	24.8	20.8	19.3	11.6	6.9
2004	99	66.3	47.9	41.6	35.6	26.6	19.1	14.1	12.4	7.7	4.7

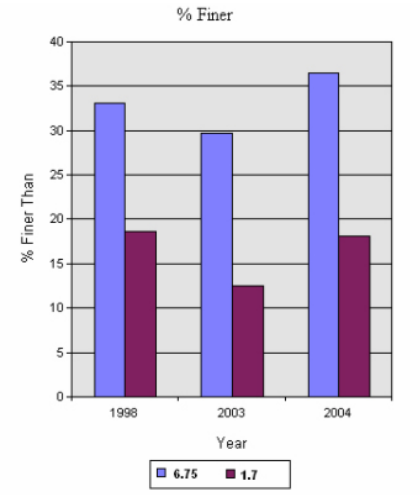


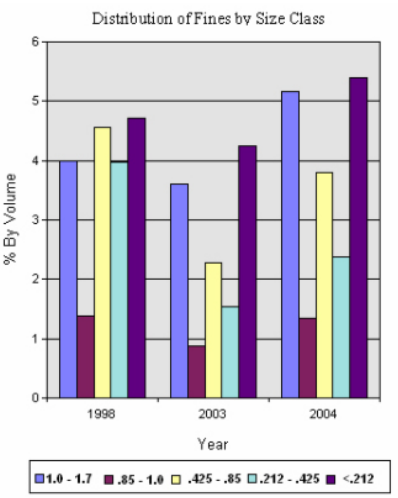


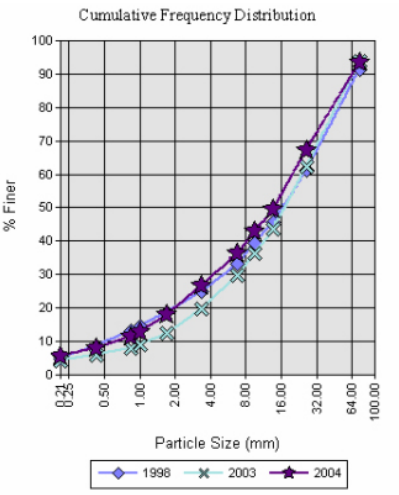


Site Name: Diamond Fork near mouth

Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
1998	91.5	61.4	45.6	39.3	33.1	24.8	18.6	14.6	13.2	8.7	4.7
2003	93.8	62.2	43.5	36.3	29.7	19.7	12.5	8.9	8	5.8	4.2
2004	93.4	67.2	49.5	42.9	36.5	26.5	18.1	12.9	11.5	7.8	5.4

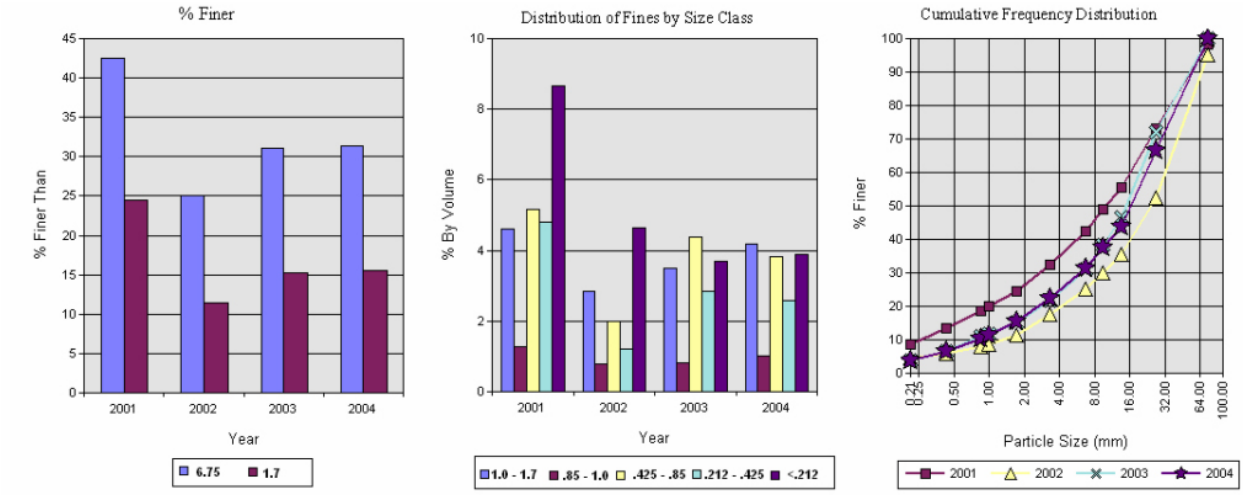






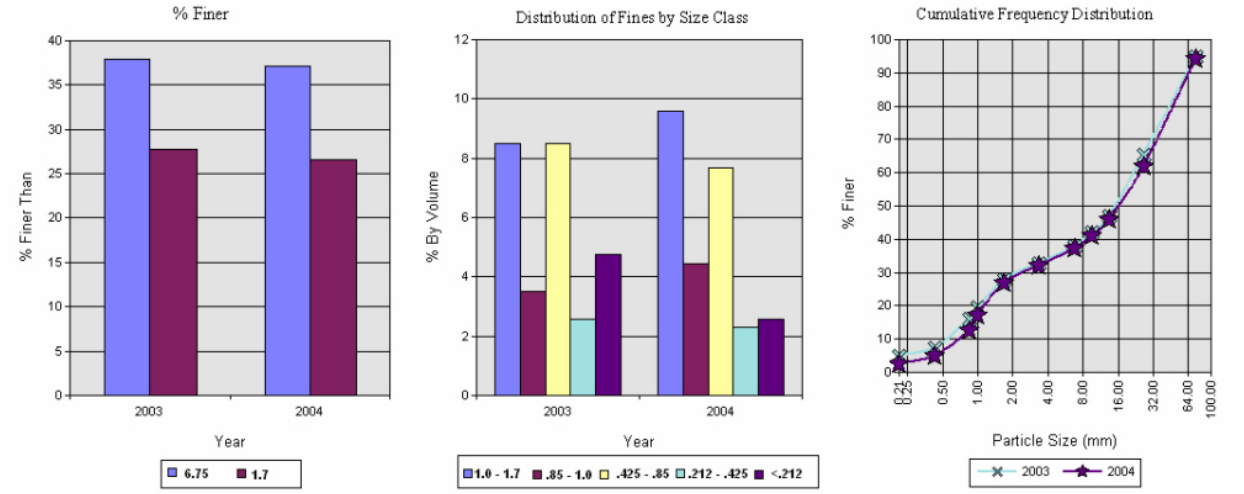
Site Name: Diamond Fork in upper meadows near cabin

Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
2001	98.2	73.1	55.4	48.9	42.5	32.4	24.5	19.9	18.6	13.4	8.7
2002	95	52.4	35.6	30.1	25.1	17.7	11.5	8.6	7.8	5.8	4.6
2003	100	72	46.4	38.3	31.1	21.7	15.2	11.7	10.9	6.5	3.7
2004	100	66.4	43.7	37.5	31.4	22.3	15.5	11.3	10.3	6.4	3.9



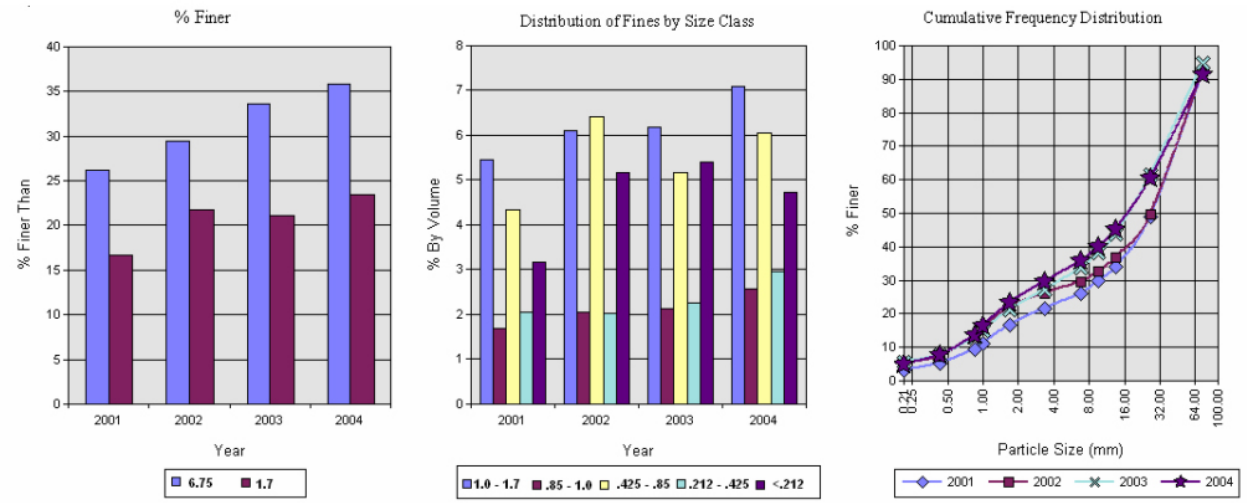
Site Name: Klickitat R. below Swale

Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
2003	94.9	65.2	46.9	41.9	37.9	32.8	27.8	19.4	15.8	7.4	4.8
2004	94	61.8	45.8	41	37.1	31.9	26.6	17	12.5	4.9	2.6



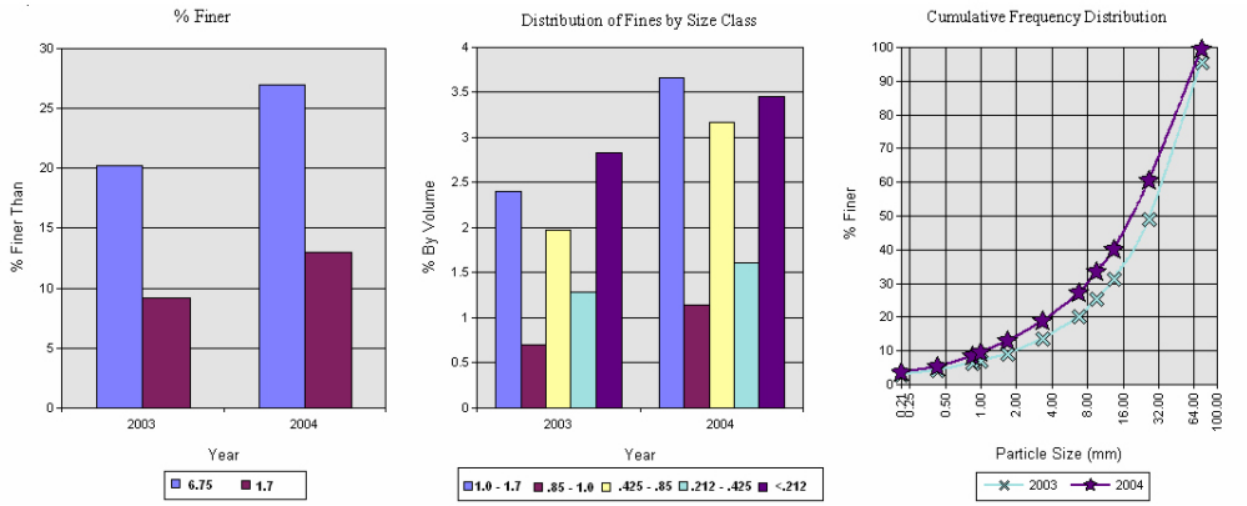
Site Name: Klickitat R. downstream of White Cr.

Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
2001	92	49.1	34	29.8	26.2	21.6	16.7	11.2	9.5	5.2	3.2
2002	92.4	49.5	36.9	32.6	29.5	25.9	21.8	15.6	13.6	7.2	5.2
2003	94.9	61.5	43.8	38.2	33.6	27.2	21.1	14.9	12.8	7.6	5.4
2004	91.2	60.5	45.1	40.1	35.8	29.6	23.4	16.3	13.7	7.7	4.7



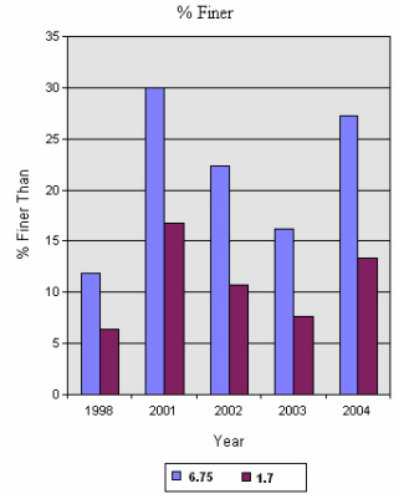
Site Name: Klickitat R. in McCormick Meadws

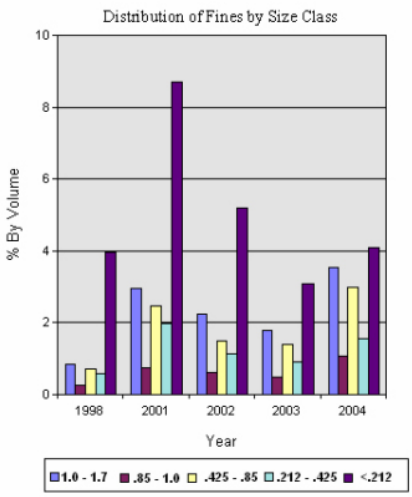
Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
2003	95.6	49	31.2	25.2	20.2	13.6	9.2	6.8	6.1	4.1	2.8
2004	99.2	60.3	39.9	33.2	27	18.8	13	9.4	8.2	5.1	3.5

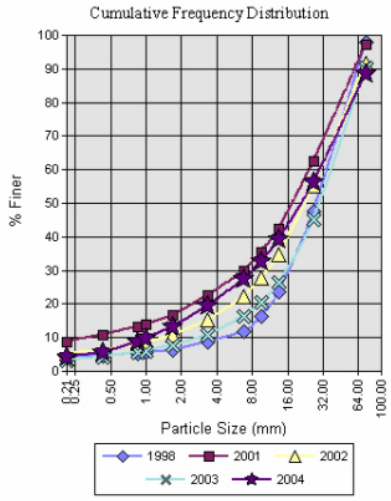


Site Name: Klickitat R. near Cow Camp

Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
1998	97.8	47.4	23.6	16.3	11.8	8.8	6.4	5.5	5.2	4.6	4
2001	97.1	62.6	42.3	35.5	30	22.4	16.8	13.9	13.1	10.7	8.7
2002	91.7	55.2	34.6	27.8	22.3	15.2	10.7	8.5	7.8	6.3	5.2
2003	90.4	45	26.4	20.6	16.2	10.8	7.6	5.9	5.4	4	3.1
2004	88.4	56.2	39.3	32.8	27.3	19.3	13.3	9.7	8.6	5.6	4.1

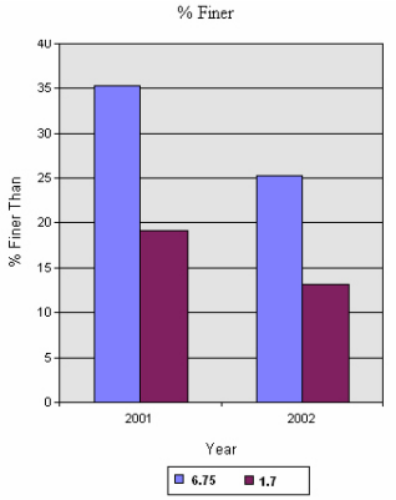


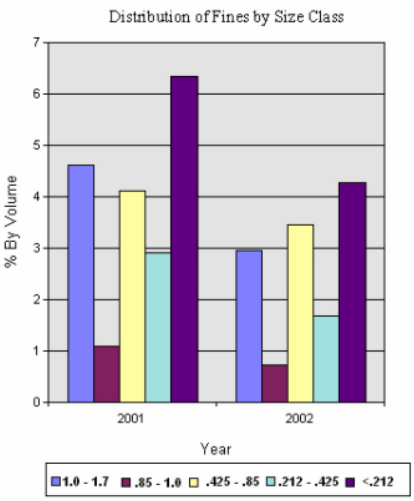


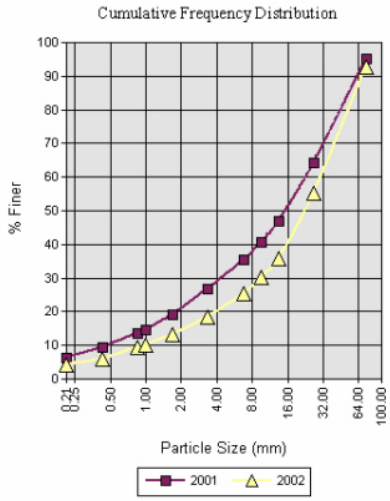


Site Name: Klickitat R. near Elkhorn Cr.

Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
2001	95.2	64.2	46.9	40.7	35.3	26.8	19.1	14.5	13.4	9.3	6.3
2002	92.6	55.1	35.9	30.3	25.3	18.4	13.1	10.1	9.4	6	4.3

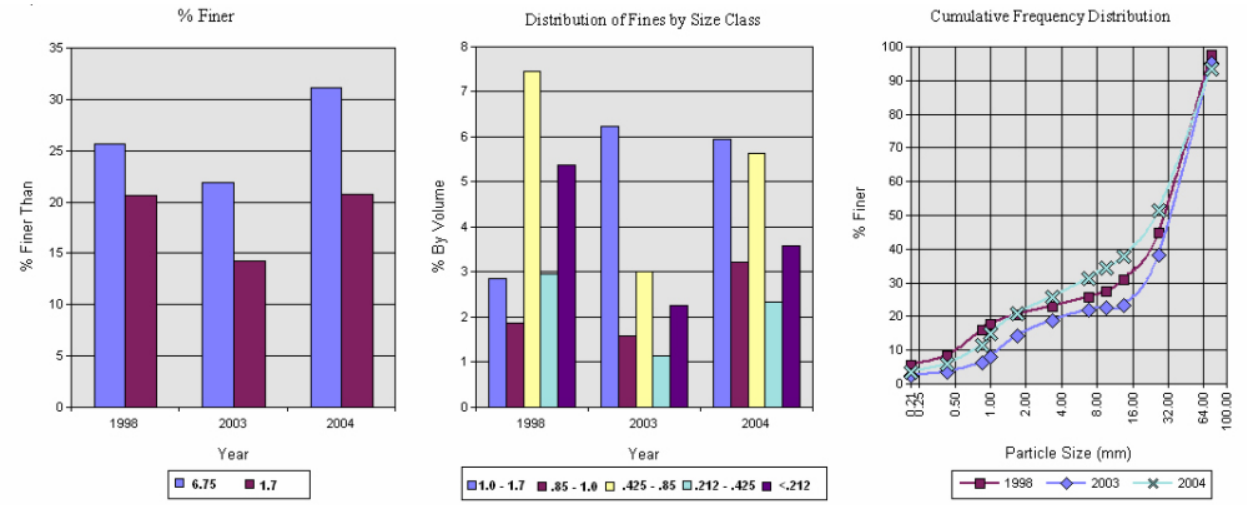






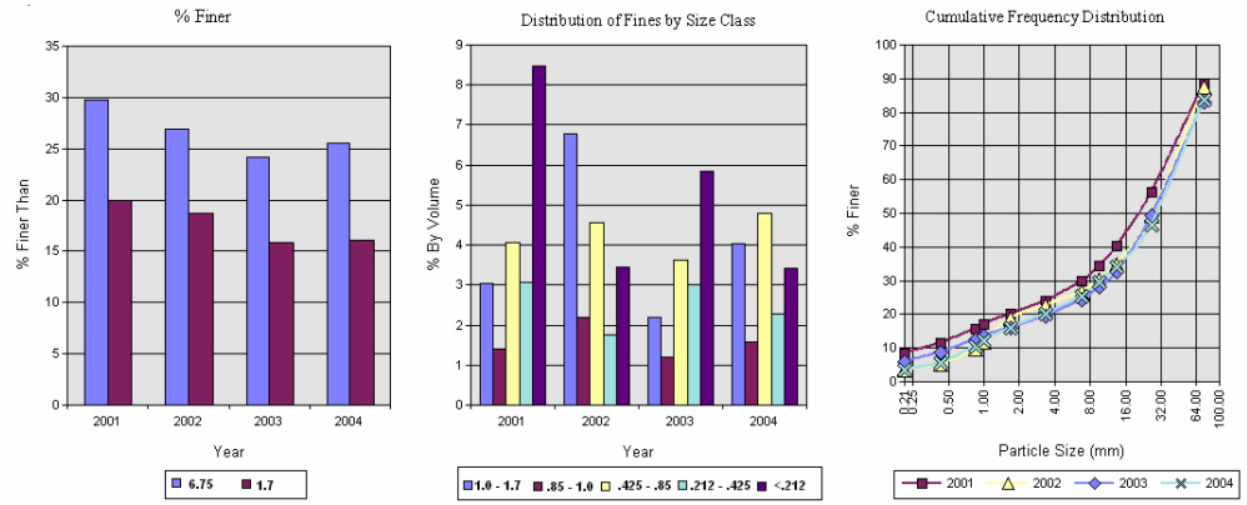
Site Name: Klickitat R. near Leidl Bridge

Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
1998	97.6	44.8	30.8	27.6	25.6	22.9	20.6	17.6	15.8	8.3	5.4
2003	95	38.3	23.1	22.5	21.9	18.8	14.2	8	6.4	3.4	2.3
2004	93.3	51.4	37.8	34.3	31.1	25.7	20.7	14.8	11.5	5.9	3.6



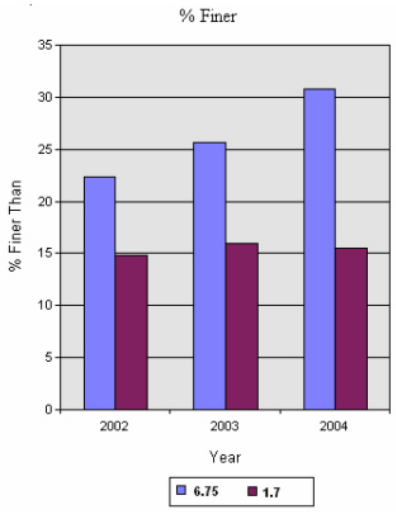
Site Name: Klickitat R. near Hwy 142 below Little Klickitat

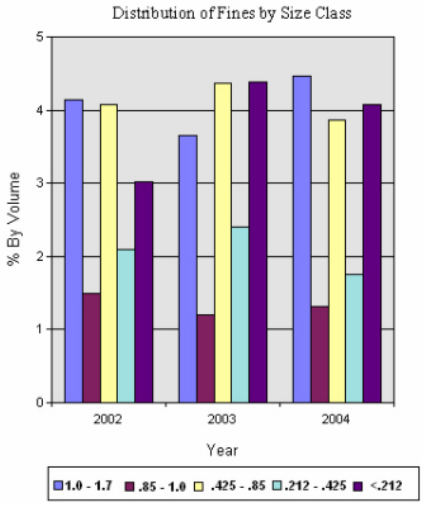
Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
2001	88.7	56.4	40.2	34.5	29.7	23.9	20	17	15.6	11.5	8.5
2002	87.5	49.4	34.7	30.3	26.9	22.7	18.7	11.9	9.8	5.2	3.5
2003	82.9	49.3	32.8	28	24.2	19.3	15.9	13.6	12.4	8.8	5.8
2004	83.7	46.5	33.9	29.6	25.5	20	16.1	12.1	10.5	5.7	3.4

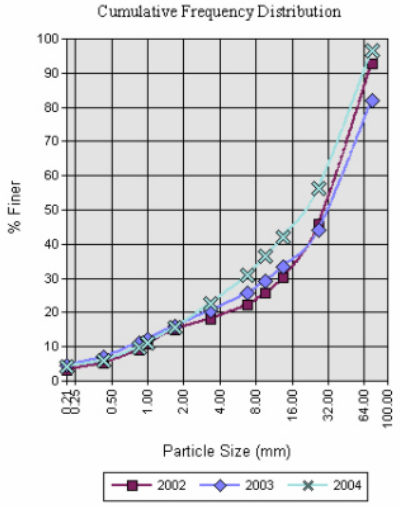


Site Name: Klickitat R. near Parrott's Crossing

Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
2002	92.6	45.7	30.3	25.6	22.3	18.2	14.8	10.7	9.2	5.1	3
2003	81.8	44.2	33.2	29	25.6	20.4	16	12.3	11.1	6.8	4.4
2004	96.6	56.3	42	36.3	30.8	22.5	15.5	11	9.7	5.8	4.1

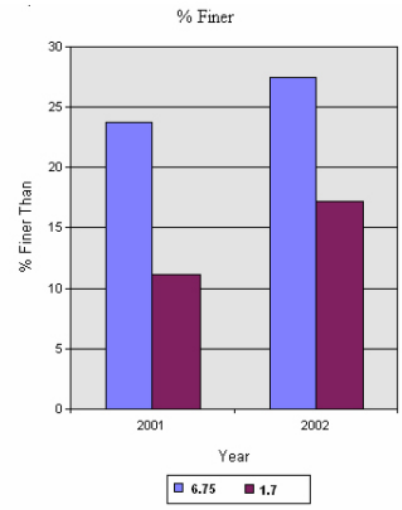


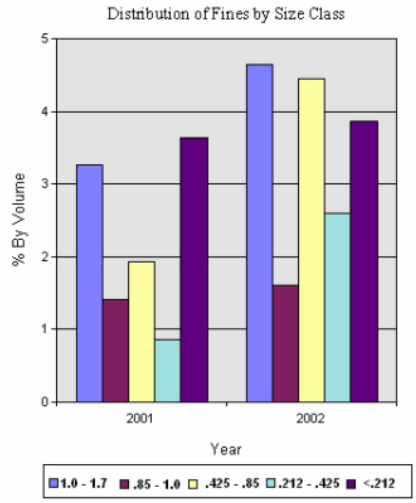


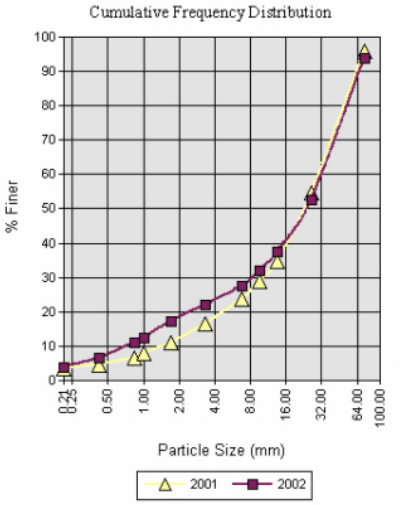


Site Name: Klickitat R. near Signal Peak Bridge

Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
2001	96	54.5	34.7	28.8	23.7	16.4	11.1	7.8	6.4	4.5	3.6
2002	93.9	52.7	37.4	31.9	27.5	22	17.2	12.5	10.9	6.5	3.9

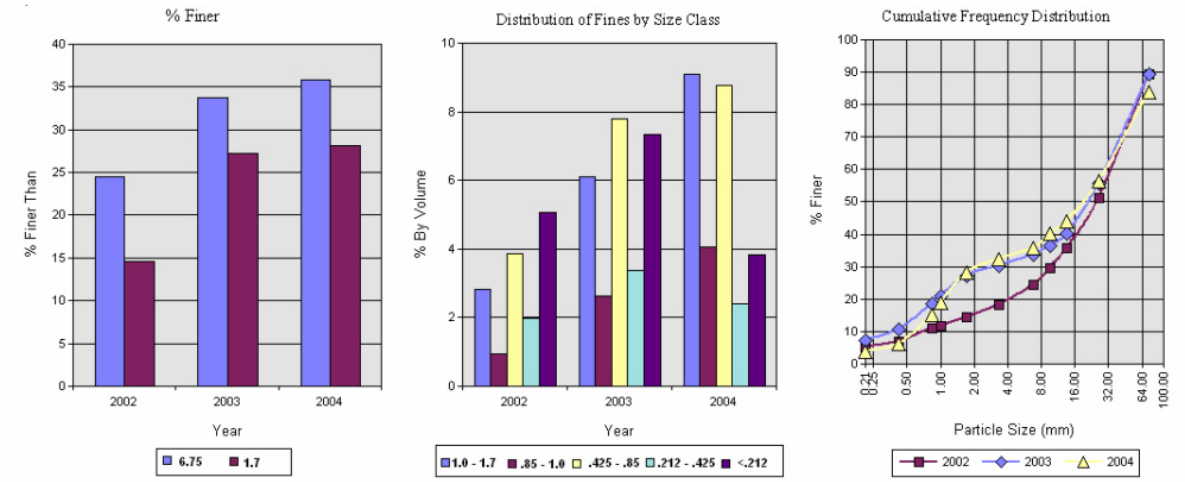






Site Name: Klickitat R. near Stinson Flats boat ramp

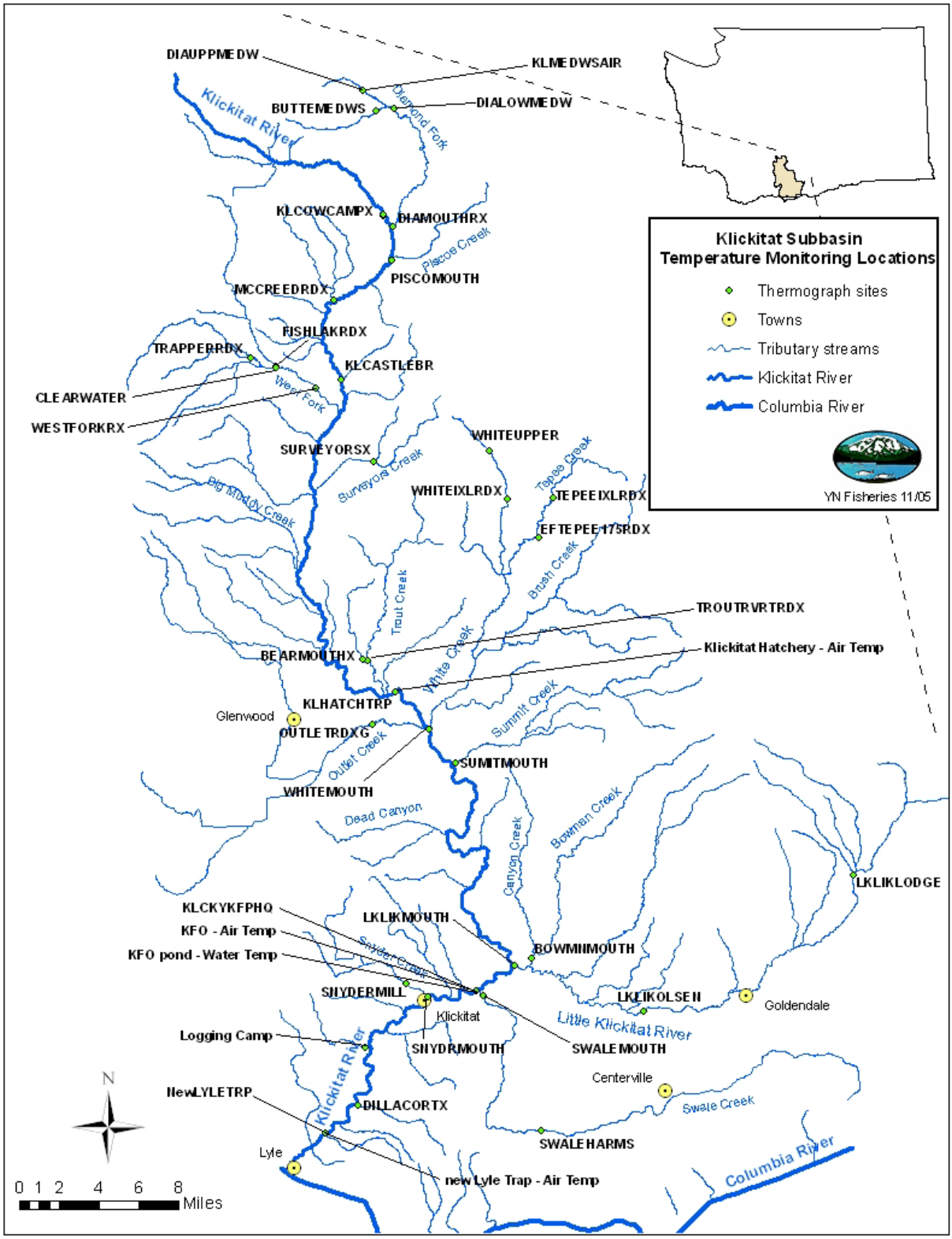
Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
2002	89.5	51.2	35.6	29.5	24.5	18.2	14.6	11.8	10.9	7	5
2003	89.4	55.5	40.1	36.4	33.8	30.4	27.2	21.1	18.5	10.7	7.3
2004	84	56.5	43.9	40.3	35.8	32.3	28.2	19	15	6.2	3.8



Appendix F. Klickitat Water Quality Inventory

Site Name	Stream
BEARMOUTHX	Bear
BOWMNMOUTH	Bowman
BUTTEMEDWS	Butte Meadows
CLEARWATER	Clearwater
DIALOWMEDW	Diamond Fork
DIAMOUTHRX	Diamond Fork
DIAUPPMEDW	Diamond Fork
DILLACORTX	Dillacort
EFTEPEE175RDX	East Fork Tepee
FISHLAKRDX	Fish Lake
KFOWellPond	Small pond at Wahkiacus
KLCASTLEBR	Klickitat
KLCKYKFPHQ	Klickitat
KLCOWCAMPX	Klickitat
KLHATCHTRP	Klickitat
LKLIKLODGE	Little Klickitat
LKLIKMOUTH	Little Klickitat
LKLIKOLSEN	Little Klickitat
LOGGCAMPCR	Logging Camp
MCCREEDRDX	McCreedy
NewLYLETRP	Klickitat
OUTLETRDXG	Outlet
PISCOMOUTH	Piscoe
SNYDERMILL	Snyder
SNYDRMOUTH	Snyder
SUMITMOUTH	Summit
SURVEYORSX	Surveyors
SWALEHARMS	Swale
SWALEMOUTH	Swale
TEPEEIXLRDX	Tepee
TRAPPERRDX	Trappers
TROUTRVRTRDX	Trout
WESTFORKRX	West Fork
WHITEIXLRDX	White
WHITEMOUTH	White
WHITEUPPER	White

Site name and stream of 2004 Klickitat subbasin temperature monitoring locations.



Locations of 2004 Klickitat subbasin temperature monitoring sites.

Monthly Temperature Summaries (degrees C)

BEARMOUTHX

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	18	0	0	0	0	0	0	0	0	0	0	0	11.9	3.3	2.0
June	11	0	0	0	0	0	0	0	0	0	0	0	13.4	2.9	2.1
August	4	0	0	0	0	0	0	4	1	1	0	0	17.5	5.3	3.5
September	7	0	0	0	0	0	0	0	0	0	0	0	10.4	2.0	1.8
October	31	0	0	0	0	0	0	0	0	0	0	0	9.7	2.0	0.9
November	30	2	20	1	16	0	0	0	0	0	0	0	6.6	3.1	1.2
December	31	3	30	0	29	0	0	0	0	0	0	0	6.2	1.9	1.0
2005															
January	31	11	31	10	31	0	0	0	0	0	0	0	4.5	2.4	0.5
February	28	0	28	0	28	0	0	0	0	0	0	0	4.2	1.4	0.8
March	31	0	21	0	13	0	0	0	0	0	0	0	6.8	3.4	1.2
April	30	0	6	0	0	0	0	0	0	0	0	0	13.6	4.3	2.2

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

BOWMNMOUTH

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	20	0	0	0	0	0	0	20	0	0	0	0	15.2	5.1	3.1
June	28	0	0	0	0	0	0	28	12	9	8	0	19.4	6.2	4.1
September	17	0	0	0	0	0	0	17	0	0	0	0	14.4	3.4	2.4
October	31	0	0	0	0	0	0	2	0	0	0	0	13.9	2.8	1.9
November	30	0	11	0	8	0	0	0	0	0	0	0	9.0	2.8	1.8
December	31	0	22	0	18	0	0	0	0	0	0	0	7.8	2.2	1.1
2005															
January	31	5	28	1	24	0	0	0	0	0	0	0	6.4	2.6	1.3
February	28	1	27	0	27	0	0	0	0	0	0	0	6.8	3.0	2.2
March	31	0	9	0	0	0	0	0	0	0	0	0	10.2	4.2	2.6
April	30	0	1	0	0	0	0	9	0	0	0	0	15.3	5.0	3.3

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

BUTTEMEDWS

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	31	0	31	0	27	0	0	0	0	0	0	0	7.8	5.8	3.3
June	30	0	15	0	0	0	0	10	0	0	0	0	14.6	7.4	5.7
July	31	0	0	0	0	0	0	31	0	0	0	0	16.0	7.9	6.5
August	31	0	0	0	0	0	0	22	0	0	0	0	15.9	7.1	4.9
September	30	0	11	0	2	0	0	0	0	0	0	0	10.9	5.6	3.5
October	31	7	29	1	19	0	0	0	0	0	0	0	7.8	3.9	2.2
November	30	23	30	18	30	0	0	0	0	0	0	0	3.1	2.4	0.8
December	31	31	31	28	31	0	0	0	0	0	0	0	1.1	1.0	0.1
2005															
January	31	21	31	19	31	0	0	0	0	0	0	0	2.7	1.6	0.4
February	28	28	28	25	28	0	0	0	0	0	0	0	1.9	1.8	0.2
March	31	22	31	12	31	0	0	0	0	0	0	0	3.1	2.4	1.1
April	30	10	30	1	30	0	0	0	0	0	0	0	6.1	4.6	2.4

CLEARWATER

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	7	0	6	0	0	0	0	0	0	0	0	0	6.8	2.5	2.1

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

DIALOWMEDW

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	31	0	31	0	22	0	0	0	0	0	0	0	9.3	7.0	4.7
June	30	0	13	0	0	0	0	14	7	0	0	0	17.6	9.3	7.1
July	31	0	0	0	0	0	0	31	26	17	15	0	20.3	10.7	8.9
August	31	0	0	0	0	0	0	31	21	12	8	0	20.3	10.3	7.4
September	30	0	6	0	0	0	0	16	0	0	0	0	15.2	9.8	6.5
October	31	7	29	1	15	0	0	0	0	0	0	0	11.6	8.3	4.7
November	30	27	30	16	30	0	0	0	0	0	0	0	4.3	4.0	1.4
December	31	31	31	31	31	0	0	0	0	0	0	0	0.1	0.0	0.0
2005															
January	31	21	31	19	31	0	0	0	0	0	0	0	2.9	2.4	0.6
February	28	28	28	25	28	0	0	0	0	0	0	0	2.1	2.1	0.3
March	22	19	22	5	22	0	0	0	0	0	0	0	5.9	5.5	3.1

DIAMOUTHRX

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	15	0	10	0	1	0	0	0	0	0	0	0	9.5	5.8	3.7
June	30	0	1	0	0	0	0	14	2	0	0	0	17.0	7.0	5.2
July	19	0	0	0	0	0	0	19	6	0	0	0	17.2	7.0	5.5
December	27	20	27	15	27	0	0	0	0	0	0	0	3.1	2.2	0.7
2005															
January	31	18	31	18	31	0	0	0	0	0	0	0	3.8	1.7	0.5
February	28	26	28	21	28	0	0	0	0	0	0	0	2.7	1.8	0.7
March	31	9	31	0	31	0	0	0	0	0	0	0	5.3	3.8	2.6
April	30	1	30	0	20	0	0	0	0	0	0	0	8.9	5.5	3.3

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

DIAUPPMEDW

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	31	0	31	0	27	0	0	0	0	0	0	0	7.3	5.0	3.5
June	30	0	14	0	1	0	0	10	0	0	0	0	15.1	7.0	5.1
July	31	0	0	0	0	0	0	31	15	0	0	0	18.3	8.9	7.3
August	31	0	0	0	0	0	0	31	10	0	0	0	18.4	8.9	6.3
September	4	0	0	0	0	0	0	3	0	0	0	0	12.5	7.0	5.4
October	24	6	21	1	15	0	0	0	0	0	0	0	9.3	5.8	2.9
November	30	20	30	13	30	0	0	0	0	0	0	0	3.7	2.7	1.3
December	31	29	31	26	31	0	0	0	0	0	0	0	1.8	1.8	0.4
2005															
January	31	20	31	18	31	0	0	0	0	0	0	0	2.6	1.8	0.4
February	28	27	28	21	28	0	0	0	0	0	0	0	2.3	1.9	0.7
March	23	14	23	4	23	0	0	0	0	0	0	0	4.0	3.0	2.1

DILLACORTX

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	1	0	0	0	0	0	0	1	1	0	0	0	18.6	9.6	9.6
June	29	0	0	0	0	0	0	29	15	11	10	0	21.3	5.0	2.4
September	17	0	0	0	0	0	0	17	17	3	0	0	18.3	3.2	2.0
October	31	0	0	0	0	0	0	31	8	0	0	0	17.0	2.2	1.3
November	30	0	0	0	0	0	0	3	0	0	0	0	13.1	1.6	0.9
December	31	0	0	0	0	0	0	0	0	0	0	0	9.7	1.1	0.4
2005															
January	31	0	0	0	0	0	0	0	0	0	0	0	7.2	0.9	0.4
February	27	0	11	0	6	0	0	0	0	0	0	0	6.1	1.1	0.7

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

EFTEPEE175RDX

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	19	0	0	0	0	0	0	0	0	0	0	0	11.6	4.3	2.8
June	30	0	0	0	0	0	0	20	9	0	0	0	18.1	5.3	3.8
July	31	0	0	0	0	0	0	31	9	0	0	0	17.1	4.2	2.9
August	31	0	0	0	0	0	0	30	6	0	0	0	17.6	2.8	1.5
September	23	0	0	0	0	0	0	0	0	0	0	0	12.7	2.6	1.4

FISHLAKRDX

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	15	0	1	0	0	0	0	0	0	0	0	0	10.4	3.6	1.9
June	30	0	0	0	0	0	0	11	0	0	0	0	14.3	4.3	2.9
July	31	0	0	0	0	0	0	8	0	0	0	0	12.9	4.5	3.6
August	31	0	0	0	0	0	0	0	0	0	0	0	11.8	4.0	2.9
September	30	0	0	0	0	0	0	0	0	0	0	0	9.1	2.9	1.9
October	31	0	14	0	8	0	0	0	0	0	0	0	8.1	2.3	1.4
November	3	0	3	0	3	0	0	0	0	0	0	0	4.3	1.1	0.6

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

KFOWellPond

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
August	22	0	0	0	0	0	0	22	0	0	0	0	15.2	0.4	0.1
September	30	0	0	0	0	0	0	30	0	0	0	0	15.2	0.4	0.3
October	31	0	0	0	0	0	0	31	0	0	0	0	14.5	0.8	0.3
November	30	0	0	0	0	0	0	30	0	0	0	0	13.3	0.8	0.4
December	31	0	0	0	0	0	0	25	0	0	0	0	13.3	0.8	0.3
2005															
January	22	0	0	0	0	0	0	5	0	0	0	0	12.9	0.8	0.4

KLCASTLEBR

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	15	0	1	0	0	0	0	0	0	0	0	0	10.2	5.0	3.4
June	30	0	0	0	0	0	0	14	0	0	0	0	15.5	5.9	4.4
July	31	0	0	0	0	0	0	31	19	11	9	0	18.9	6.2	5.2
August	31	0	0	0	0	0	0	31	21	12	9	0	19.2	6.2	4.5
September	30	0	0	0	0	0	0	13	0	0	0	0	14.7	4.8	3.3
October	31	0	9	0	6	0	0	0	0	0	0	0	11.3	3.6	2.1
November	30	5	30	2	26	0	0	0	0	0	0	0	5.3	2.0	1.4
December	31	9	31	2	31	0	0	0	0	0	0	0	3.6	1.9	1.1
2005															
January	31	19	31	16	31	0	0	0	0	0	0	0	3.9	2.7	0.7
February	28	19	28	8	28	0	0	0	0	0	0	0	4.3	3.0	1.7
March	31	0	31	0	25	0	0	0	0	0	0	0	6.8	3.6	2.6
April	30	0	19	0	11	0	0	0	0	0	0	0	9.6	5.1	3.0

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

KLCKYKFPHQ

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	8	0	0	0	0	0	0	8	0	0	0	0	13.7	4.3	2.8
June	30	0	0	0	0	0	0	30	14	9	2	0	18.2	5.4	3.7
September	17	0	0	0	0	0	0	17	0	0	0	0	14.8	3.3	2.0
October	31	0	0	0	0	0	0	7	0	0	0	0	12.9	1.9	1.2
November	30	0	3	0	2	0	0	0	0	0	0	0	8.9	1.9	0.9
December	31	0	2	0	1	0	0	0	0	0	0	0	7.0	1.1	0.6
2005															
January	31	0	18	0	16	0	0	0	0	0	0	0	6.2	1.4	0.5
February	28	0	10	0	7	0	0	0	0	0	0	0	7.0	1.1	0.6
March	31	0	0	0	0	0	0	0	0	0	0	0	9.8	1.9	1.1
April	30	0	0	0	0	0	0	0	0	0	0	0	12.4	2.0	1.2

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

KLCOWCAMPX

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	15	0	11	0	1	0	0	0	0	0	0	0	9.0	4.8	3.3
June	30	0	5	0	0	0	0	8	0	0	0	0	13.2	6.6	4.9
July	31	0	0	0	0	0	0	31	17	9	0	0	18.5	7.7	6.5
August	31	0	0	0	0	0	0	31	16	8	0	0	18.6	8.2	5.2
September	30	0	0	0	0	0	0	11	0	0	0	0	13.7	5.6	3.9
October	31	0	11	0	8	0	0	0	0	0	0	0	9.7	4.2	2.4
November	30	4	30	2	29	0	0	0	0	0	0	0	5.5	2.2	1.6
December	31	7	31	1	31	0	0	0	0	0	0	0	3.4	1.9	1.0
2005															
January	31	17	31	16	31	0	0	0	0	0	0	0	3.9	1.7	0.6
February	28	19	28	5	28	0	0	0	0	0	0	0	4.0	3.4	1.6
March	31	1	31	0	25	0	0	0	0	0	0	0	7.2	4.4	3.1
April	30	0	29	0	15	0	0	0	0	0	0	0	8.4	6.0	3.4

KLHATCHTRP

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	21	0	0	0	0	0	0	0	0	0	0	0	10.6	3.2	2.3
June	30	0	0	0	0	0	0	16	0	0	0	0	16.3	4.3	3.1

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

LKLIKLODGE

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	21	0	4	0	0	0	0	2	0	0	0	0	13.3	6.9	4.6
June	30	0	0	0	0	0	0	28	14	12	11	0	20.9	8.9	6.6
September	17	0	0	0	0	0	0	17	0	0	0	0	16.6	7.0	5.5
October	31	0	4	0	0	0	0	14	0	0	0	0	15.4	7.1	4.0
November	30	3	26	1	16	0	0	0	0	0	0	0	8.2	3.8	2.4
December	31	7	31	0	31	0	0	0	0	0	0	0	4.7	1.9	1.3
2005															
January	31	16	31	13	30	0	0	0	0	0	0	0	5.6	2.5	0.9
February	28	16	28	0	27	0	0	0	0	0	0	0	6.1	4.4	2.5
March	31	0	28	0	13	0	0	0	0	0	0	0	9.8	6.1	4.0
April	30	0	15	0	0	0	0	2	0	0	0	0	14.7	7.9	4.4

LKLIKMOUTH

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	20	0	0	0	0	0	0	20	1	0	0	0	17.1	4.2	2.8
June	28	0	0	0	0	0	0	28	21	16	12	0	22.4	5.4	3.7
September	17	0	0	0	0	0	0	17	0	0	0	0	15.3	2.9	2.2
October	31	0	0	0	0	0	0	9	0	0	0	0	13.8	2.6	1.6
November	30	1	13	1	11	0	0	0	0	0	0	0	8.4	3.3	1.4
December	31	0	24	0	21	0	0	0	0	0	0	0	8.4	2.6	1.0
2005															
January	31	10	24	7	20	0	0	0	0	0	0	0	6.5	2.2	0.9
February	28	3	27	0	26	0	0	0	0	0	0	0	7.4	3.0	1.9
March	31	0	0	0	0	0	0	0	0	0	0	0	11.6	3.6	2.4
April	30	0	0	0	0	0	0	11	0	0	0	0	16.6	4.4	2.5

LKLIKOLSEN

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	20	0	0	0	0	0	0	20	13	1	1	0	18.6	6.9	4.7
June	30	0	0	0	0	12	9	30	28	24	22	12	26.7	9.2	6.6
September	18	0	0	0	0	0	0	18	12	4	2	0	18.7	6.0	4.7
October	31	0	0	0	0	0	0	18	1	0	0	0	16.6	5.6	3.3
November	30	1	15	0	10	0	0	0	0	0	0	0	8.8	3.4	2.3
December	31	1	27	0	25	0	0	0	0	0	0	0	8.1	2.2	1.3
2005															
January	31	11	29	7	23	0	0	0	0	0	0	0	6.5	3.6	1.2
February	28	6	27	0	26	0	0	0	0	0	0	0	8.8	5.2	3.4
March	31	0	7	0	0	0	0	6	0	0	0	0	14.1	6.4	4.3
April	30	0	0	0	0	0	0	12	0	0	0	0	18.6	6.6	4.2

LOGGCAMPCR

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	19	0	0	0	0	0	0	19	0	0	0	0	14.4	3.8	2.6
June	30	0	0	0	0	0	0	30	13	10	8	0	19.4	3.9	2.9

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

MCCREEDRDX

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	15	0	9	0	1	0	0	0	0	0	0	0	7.9	3.9	2.1
June	30	0	1	0	0	0	0	0	0	0	0	0	11.4	4.1	2.7
July	31	0	0	0	0	0	0	0	0	0	0	0	11.1	2.9	2.4
August	31	0	0	0	0	0	0	0	0	0	0	0	11.6	2.6	1.9
September	30	0	0	0	0	0	0	0	0	0	0	0	9.0	2.3	1.6
October	31	0	9	0	5	0	0	0	0	0	0	0	8.0	2.2	1.3
November	18	0	17	0	16	0	0	0	0	0	0	0	5.1	1.4	1.0
December	31	0	31	0	31	0	0	0	0	0	0	0	4.3	2.1	0.7
2005															
January	31	0	31	0	31	0	0	0	0	0	0	0	4.1	1.6	0.7
February	28	0	28	0	28	0	0	0	0	0	0	0	4.0	1.4	1.1
March	31	0	31	0	26	0	0	0	0	0	0	0	5.7	2.0	1.2
April	30	0	24	0	17	0	0	0	0	0	0	0	7.9	3.6	1.7

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

NewLYLETRP

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	7	0	0	0	0	0	0	7	0	0	0	0	14.4	3.5	2.7
June	30	0	0	0	0	0	0	30	15	12	11	0	19.8	5.0	3.7
July	2	0	0	0	0	0	0	2	2	2	2	0	20.2	4.3	2.3
September	18	0	0	0	0	0	0	18	0	0	0	0	15.4	3.3	2.3
October	31	0	0	0	0	0	0	9	0	0	0	0	13.8	2.5	1.7
November	30	0	11	0	8	0	0	0	0	0	0	0	8.7	2.7	1.4
December	31	0	21	0	14	0	0	0	0	0	0	0	7.4	1.7	0.9
2005															
January	31	5	20	2	20	0	0	0	0	0	0	0	6.7	2.6	1.0
February	28	0	27	0	19	0	0	0	0	0	0	0	7.8	2.5	1.8
March	31	0	0	0	0	0	0	0	0	0	0	0	11.2	3.4	2.2
April	30	0	0	0	0	0	0	10	0	0	0	0	15.4	4.5	2.8

OUTLETRDXG

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
September	17	0	0	0	0	0	0	17	0	0	0	0	16.8	3.6	2.4
October	31	0	0	0	0	0	0	13	0	0	0	0	14.9	3.4	1.4
November	30	1	22	0	16	0	0	0	0	0	0	0	6.7	2.5	1.0
December	31	10	30	2	30	0	0	0	0	0	0	0	5.7	2.8	1.1
2005															
January	31	21	31	20	28	0	0	0	0	0	0	0	5.9	2.1	0.6
February	28	7	28	0	27	0	0	0	0	0	0	0	7.3	4.5	2.6
March	31	0	6	0	0	0	0	4	0	0	0	0	13.3	5.7	4.0
April	1	0	0	0	0	0	0	0	0	0	0	0	8.1	1.7	1.7

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

PISCOMOUTH

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	15	0	2	0	0	0	0	0	0	0	0	0	9.6	4.0	2.6
June	30	0	0	0	0	0	0	13	0	0	0	0	16.0	5.0	3.8
July	31	0	0	0	0	0	0	31	11	0	0	0	17.0	5.5	4.6
August	31	0	0	0	0	0	0	31	3	0	0	0	16.7	5.0	3.6
September	30	0	0	0	0	0	0	3	0	0	0	0	12.9	3.7	2.5
October	31	0	9	0	8	0	0	0	0	0	0	0	9.9	2.8	1.6
November	3	0	3	0	3	0	0	0	0	0	0	0	4.4	1.6	0.9

SNYDERMILL

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	18	0	0	0	0	0	0	18	0	0	0	0	14.8	4.6	3.0
June	30	0	0	0	0	0	0	30	15	13	12	0	20.9	5.4	3.9
July	2	0	0	0	0	0	0	2	2	2	2	0	20.9	3.8	1.9
September	17	0	0	0	0	0	0	17	0	0	0	0	15.7	1.2	0.8
October	31	0	0	0	0	0	0	9	0	0	0	0	13.0	1.2	0.8
November	30	0	10	0	9	0	0	0	0	0	0	0	8.4	2.3	0.9
December	31	0	19	0	18	0	0	0	0	0	0	0	8.4	1.7	0.7
2005															
January	31	0	30	0	25	0	0	0	0	0	0	0	5.6	1.9	0.7
February	28	2	28	0	27	0	0	0	0	0	0	0	6.1	2.3	1.4
March	31	0	9	0	2	0	0	0	0	0	0	0	8.5	3.3	2.1
April	30	0	0	0	0	0	0	8	0	0	0	0	14.3	5.3	2.9

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

SNYDRMOUTH

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
June	28	0	0	0	0	12	10	28	28	24	23	13	29.1	12.4	7.9
July	2	0	0	0	0	1	1	2	2	2	2	2	28.7	12.4	6.4
September	16	0	0	0	0	0	0	16	16	0	0	0	17.6	2.2	1.6
October	31	0	0	0	0	0	0	31	15	0	0	0	17.0	2.1	1.2
November	30	0	0	0	0	0	0	12	0	0	0	0	14.3	1.1	0.7
December	31	0	0	0	0	0	0	5	0	0	0	0	12.6	3.1	0.5
2005															
January	31	0	21	0	15	0	0	0	0	0	0	0	6.4	1.7	0.7
February	28	0	28	0	25	0	0	0	0	0	0	0	6.7	2.9	2.1
March	31	0	3	0	0	0	0	0	0	0	0	0	10.4	3.3	2.4
April	30	0	0	0	0	0	0	11	0	0	0	0	15.6	5.4	3.3

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

SUMITMOUTH

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	18	0	0	0	0	0	0	2	0	0	0	0	12.9	4.7	2.8
June	30	0	0	0	0	0	0	26	11	9	4	0	19.1	6.0	4.2
July	31	0	0	0	0	0	0	31	31	23	18	0	20.7	6.3	5.0
August	31	0	0	0	0	0	0	31	24	18	15	0	20.7	5.7	4.0
September	30	0	0	0	0	0	0	19	0	0	0	0	15.9	4.3	2.9
October	31	0	4	0	2	0	0	0	0	0	0	0	12.5	3.2	2.1
November	30	6	24	4	18	0	0	0	0	0	0	0	8.1	3.6	1.6
December	31	10	29	2	29	0	0	0	0	0	0	0	8.1	3.3	1.3
2005															
January	31	18	31	17	29	0	0	0	0	0	0	0	5.3	3.0	0.7
February	28	18	28	11	28	0	0	0	0	0	0	0	5.2	2.7	1.3
March	31	0	22	0	13	0	0	0	0	0	0	0	8.4	3.8	2.5
April	30	0	10	0	0	0	0	0	0	0	0	0	13.7	5.1	2.9

SURVEYORSX

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	19	0	0	0	0	0	0	0	0	0	0	0	10.1	3.3	2.3
June	30	0	0	0	0	0	0	13	0	0	0	0	15.3	5.0	3.5
July	31	0	0	0	0	0	0	31	0	0	0	0	15.7	4.3	3.5
August	31	0	0	0	0	0	0	31	0	0	0	0	16.1	3.7	2.7
September	30	0	0	0	0	0	0	1	0	0	0	0	12.2	2.8	2.0
October	31	0	6	0	2	0	0	0	0	0	0	0	10.2	2.3	1.5
November	5	0	5	0	4	0	0	0	0	0	0	0	6.2	2.2	1.5

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

SWALEHARMS

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	20	0	0	0	0	0	0	20	15	0	0	0	19.0	4.5	2.4
June	30	0	0	0	0	4	3	30	30	25	23	7	24.8	6.2	2.9

SWALEMOUTH

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	20	0	0	0	0	0	0	20	5	0	0	0	17.8	5.7	3.3
June	30	0	0	0	0	4	0	30	24	14	13	7	24.0	8.4	4.3
September	17	0	0	0	0	0	0	17	2	0	0	0	16.8	2.5	1.4
October	31	0	0	0	0	0	0	21	0	0	0	0	14.1	1.9	1.0
November	30	0	0	0	0	0	0	0	0	0	0	0	10.2	1.1	0.7
December	31	0	5	0	3	0	0	0	0	0	0	0	7.5	1.6	0.4
2005															
January	31	0	22	0	20	0	0	0	0	0	0	0	7.2	2.0	1.1
February	28	0	28	0	22	0	0	0	0	0	0	0	7.3	4.1	2.9
March	31	0	6	0	0	0	0	0	0	0	0	0	11.3	5.1	3.4
April	30	0	0	0	0	0	0	23	0	0	0	0	17.3	7.3	4.2

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

TEPEEIXLRDX

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	19	0	0	0	0	0	0	6	0	0	0	0	13.9	6.8	4.5
June	26	0	0	0	0	0	0	23	9	7	7	0	21.3	9.5	7.1
August	5	0	0	0	0	1	1	5	5	1	1	1	25.3	12.5	7.7
September	8	0	0	0	0	0	0	0	0	0	0	0	8.7	1.1	0.5
October	31	0	9	0	8	0	0	0	0	0	0	0	7.7	1.7	0.8
November	30	0	30	0	30	0	0	0	0	0	0	0	5.6	2.8	0.5
December	31	22	31	19	31	0	0	0	0	0	0	0	2.1	2.1	0.4
2005															
January	31	18	31	17	31	0	0	0	0	0	0	0	4.1	2.4	0.5
February	28	26	28	21	28	0	0	0	0	0	0	0	3.7	2.4	0.7
March	31	7	31	0	27	0	0	0	0	0	0	0	7.7	5.6	3.6
April	30	0	18	0	10	0	0	0	0	0	0	0	13.8	6.9	4.0

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

TRAPPERRDX

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	15	0	8	0	0	0	0	0	0	0	0	0	8.0	3.1	2.2
June	30	0	0	0	0	0	0	0	0	0	0	0	9.5	3.1	2.3
July	31	0	0	0	0	0	0	0	0	0	0	0	9.4	2.9	2.3
August	31	0	0	0	0	0	0	0	0	0	0	0	9.2	2.5	1.8
September	30	0	0	0	0	0	0	0	0	0	0	0	7.7	2.2	1.4
October	31	0	13	0	8	0	0	0	0	0	0	0	7.4	1.9	1.2
November	30	0	28	0	22	0	0	0	0	0	0	0	5.2	1.4	1.0
December	31	1	31	0	31	0	0	0	0	0	0	0	4.1	2.5	0.8
2005															
January	31	0	31	0	31	0	0	0	0	0	0	0	4.4	1.6	0.8
February	28	0	28	0	28	0	0	0	0	0	0	0	4.4	1.9	1.3
March	31	0	31	0	25	0	0	0	0	0	0	0	6.0	2.2	1.5
April	30	0	20	0	15	0	0	0	0	0	0	0	7.8	3.3	1.8

TROUTRVRTRDX

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	17	0	0	0	0	0	0	16	0	0	0	0	15.3	5.0	3.9
June	30	0	0	0	0	0	0	30	18	14	13	7	23.0	7.4	5.5
July	31	0	0	0	0	13	3	31	31	31	31	19	24.3	8.0	7.0
August	31	0	0	0	0	8	0	31	31	31	31	13	23.8	7.7	5.7
September	30	0	0	0	0	0	0	30	10	1	0	0	17.7	6.1	4.5
October	31	0	8	0	5	0	0	2	0	0	0	0	13.3	4.8	3.0
November	5	1	5	0	4	0	0	0	0	0	0	0	5.6	2.5	2.0

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

WESTFORKRX

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	15	0	1	0	0	0	0	0	0	0	0	0	9.6	3.4	2.0
June	30	0	0	0	0	0	0	0	0	0	0	0	12.7	4.2	2.9
July	31	0	0	0	0	0	0	0	0	0	0	0	11.6	4.0	3.2
August	31	0	0	0	0	0	0	0	0	0	0	0	11.4	3.6	2.6
September	30	0	0	0	0	0	0	0	0	0	0	0	8.8	2.8	1.8
October	31	0	10	0	7	0	0	0	0	0	0	0	8.0	2.0	1.3
November	5	0	5	0	5	0	0	0	0	0	0	0	4.8	1.4	1.0

WHITEIXLRDX

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	19	0	0	0	0	0	0	1	0	0	0	0	12.2	5.7	4.1
June	30	0	0	0	0	0	0	25	14	11	11	0	21.2	10.6	7.5
July	11	0	0	0	0	0	0	11	11	11	11	0	21.5	10.3	7.7
August	5	0	0	0	0	1	0	5	5	1	1	1	23.5	10.9	6.7
September	1	0	0	0	0	0	0	1	0	0	0	0	13.1	5.9	5.9
October	5	0	3	0	0	0	0	2	0	0	0	0	13.4	10.6	6.2
December	7	7	7	7	7	0	0	0	0	0	0	0	0.1	1.0	0.3
2005															
January	28	20	28	19	28	0	0	0	0	0	0	0	3.6	1.9	0.5
February	22	21	22	16	22	0	0	0	0	0	0	0	3.8	3.0	1.0
March	9	1	9	1	9	0	0	0	0	0	0	0	4.7	2.5	1.5
April	29	0	18	0	10	0	0	0	0	0	0	0	12.7	5.9	3.2

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

WHITEMOUTH

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	17	0	0	0	0	0	0	17	0	0	0	0	15.5	4.8	3.5
June	30	0	0	0	0	0	0	30	22	14	13	0	21.8	7.4	5.4
July	31	0	0	0	0	13	2	31	31	31	31	19	24.2	9.0	7.7
August	31	0	0	0	0	9	0	31	31	31	31	12	23.9	8.5	6.2
September	30	0	0	0	0	0	0	30	20	11	9	0	19.1	6.7	4.7
October	31	0	0	0	0	0	0	18	0	0	0	0	15.4	5.3	3.1
November	30	0	8	0	3	0	0	0	0	0	0	0	9.2	2.8	1.8
December	31	0	29	0	25	0	0	0	0	0	0	0	5.6	1.7	1.1
2005															
January	31	2	31	0	31	0	0	0	0	0	0	0	5.1	1.9	1.1
February	28	1	28	0	28	0	0	0	0	0	0	0	5.4	4.1	2.7
March	31	0	18	0	5	0	0	0	0	0	0	0	9.6	5.1	3.3
April	30	0	2	0	0	0	0	7	0	0	0	0	14.7	5.4	2.9

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

WHITEUPPER

2004	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	19	0	0	0	0	0	0	0	0	0	0	0	11.0	4.5	3.1
June	30	0	0	0	0	0	0	13	0	0	0	0	15.7	5.6	3.9
July	31	0	0	0	0	0	0	31	0	0	0	0	16.5	5.0	3.9
August	31	0	0	0	0	0	0	31	6	0	0	0	17.4	4.5	3.1
September	30	0	0	0	0	0	0	2	0	0	0	0	13.0	3.7	2.5
October	31	0	11	0	9	0	0	0	0	0	0	0	10.4	3.7	2.0
November	30	9	30	7	30	0	0	0	0	0	0	0	5.1	2.8	1.3
December	31	29	31	27	31	0	0	0	0	0	0	0	1.0	0.8	0.2
2005															
January	31	21	31	21	31	0	0	0	0	0	0	0	2.5	1.0	0.2
February	28	25	28	23	28	0	0	0	0	0	0	0	2.3	1.4	0.2
March	8	3	8	3	8	0	0	0	0	0	0	0	3.2	1.3	0.8

NOTE: All Temperatures and Ranges in degrees C, -- Indicates No Available Data.

Appendix G. Pathogen Sampling

Stream/Location	Date Sampled	Species	Sample Size	Tested Positive For	Comments
Bowman Cr.	1/25/05	O. mykiss	10	RS (suspect)	+2/4 pools detected by ELISA, not confirmed by PCR 0/2 *Epistylis* and *Gyrodactylus* on the skin (low). *Nanophyetus* in the gills (low).
Bowman Cr.	1/25/05	O. kisutch	11		All test results negative
Bowman Cr.	1/25/05	Pac. Lamprey	1		All test results negative; *Aeromonas* bacterial growth on BHIA medium.
Diamond Fork Cr.	1/28/05	O. mykiss	10	RS (suspect)	+6/7 detected by ELISA, not confirmed by PCR 0/3 Copepods on the fins. One fish with eroded pectoral fin.
Fish Lake Stream	1/27/05	O. mykiss	1		All test results negative; *Epistylis* on the skin (high).
Fish Lake Stream	1/27/05	S. fontinalis	4	RS (suspect)	+3/3 detected by ELISA, not confirmed by PCR 0/3
Klickitat R. above Castile (MP27)	1/28/05	O. mykiss	10	RS (suspect)	+5/7 detected by ELISA, not confirmed by PCR 0/3
Klickitat R. above Castile (MP27)	1/28/05	O. tshawytscha	4	RS	+1/2 detected by ELISA, confirmed by PCR +1/2
Klickitat R. above Castile (Twin Bridges)	1/28/05	O. mykiss	10		All test results negative
Klickitat R. above Castile (Twin Bridges)	1/28/05	O. tshawytscha	2		All test results negative
Klickitat R. (Lyle screw trap)	1/25/05	O. kisutch	9	RS (suspect)	+3/4 pools detected by ELISA, not confirmed by PCR 0/3
Klickitat R. (Lyle screw trap)	2/2-10/2005	O. mykiss	4		Various injuries with fungus growth covering injury
Little Klickitat R.	1/25/05	O. mykiss	16	RS (suspect)	+2/6 pools detected by ELISA, not confirmed by PCR 0/2 *Epistylis* on the skin (moderate); *Neascus* (Black spot) on the skin (high); *Nanophyetus* in the gills (low).
Little Klickitat R.	1/25/05	Pac. Lamprey	1		All test results negative; *Aeromonas* bacterial growth on BHIA medium.
McCreedy Cr.	1/27/05	O. mykiss	10	RS (suspect)	+3/6 pools detected by ELISA, not confirmed by PCR 0/3
McCreedy Cr.	1/27/05	S. fontinalis	5		All test results negative
Piscoe Cr.	1/27/05	O. mykiss	10	RS (suspect)	+1/5 pools detected by ELISA, not confirmed by PCR 0/1 *Epistylis* on the skin (high).
Piscoe Cr.	1/27/05	S. fontinalis	10		All test results negative
Piscoe Cr.	1/27/05	O. tshawytscha	4		All test results negative
Snyder Cr.	1/25/05	O. mykiss	10	RS (suspect)	+3/5 pools detected by ELISA, not confirmed by PCR 0/3
Snyder Cr.	1/25/05	O. kisutch	9	RS (suspect)	+1/4 pools detected by ELISA, not confirmed by PCR 0/1
Summit Cr.	1/26/05	O. mykiss	10	RS (suspect)	+2/2 detected by ELISA, not confirmed by PCR 0/2 *Epistylis* and *Gyrodactylus* on the skin (low).
Summit Cr.	1/26/05	O. kisutch	4		All test results negative
Surveyors Cr.	1/27/05	O. mykiss	10	RS (suspect)	+1/6 detected by ELISA, not confirmed by PCR 0/1
Surveyors Cr.	1/27/05	S. fontinalis	2		All test results negative
Swale Cr.	1/25/05	O. mykiss	4	RS (suspect)	+1/2 pools detected by ELISA, not confirmed by PCR 0/1
Swale Cr.	1/25/05	O. kisutch	1		All test results negative
Tepee Cr.	1/26/05	O. mykiss	11	RS (suspect)	+2/2 pools detected by ELISA, not confirmed by PCR 0/2
White Cr.	1/26/05	O. mykiss	11	RS (suspect)	+4/4 pools detected by ELISA, not confirmed by PCR 0/3 *Epistylis* on the skin (low).

Summary of fish pathogen testing results. Laboratory analysis performed by U.S. Fish and Wildlife Service, Lower Columbia River Fish Heath Center, and included tests for: **IPNV** Infectious Pancreatic Necrosis Virus, **IHNV** Infectious Hematopoietic Necrosis Virus, **VHS** Viral Hemorrhagic Septicemia Virus, **AS** Furunculosis (*Aeromonas salmonicida)* , **YR** Enteric Redmouth (*Yersinia ruckeri),* **RS** Bacterial Kidney Disease (*Renibacterium salmoninarum*), **BCD** Coldwater Disease (*Flavobacterium psychrophilum)*, **CD** Columnaris (*Flavobacterium columnare)*, **ESC** Emphysematous Putrefactive Disease *(Edwardsiella ictaluri),* **WD** Whirling Disease (*Myxobolus cerebralis*)

Appendix H. References

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