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Yakima/Klickitat Fisheries Project

Klickitat Monitoring and Evaluation

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YAKIMA/KLICKITAT FISHERIES PROJECT - KLICKITAT MONITORING AND EVALUATION

2005 Annual Report

Performance Period

May 1, 2005—April 30, 2006

Project No. 199506335

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The Confederated Tribes and Bands of

The Yakama Nation

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YAKIMA/KLICKITAT FISHERIES PROJECT - KLICKITAT MONITORING AND EVALUATION

2005 Annual Report

Introduction

This report describes the results of monitoring and evaluation (M&E) activities for salmonid fish populations and habitat in the Klickitat River subbasin in south-central Washington. The M&E activities described here were conducted as a part of the Bonneville Power Administration (BPA)-funded Yakima/Klickitat Fisheries Project (YKFP) and were designed by consensus of the scientists with the Yakama Nation (YN) Fisheries Program. Overall YKFP goals are to increase natural production of and opportunity to harvest salmon and steelhead in the Yakima and Klickitat subbasins using hatchery supplementation, harvest augmentation and habitat improvements. Klickitat subbasin M&E activities have been subjected to scientific and technical review by members of the 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 – a project aimed at improving the quality, consistency, and focus of fish population and habitat data to answer key M&E questions relevant to major decisions in the Columbia Basin) 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- and post-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.

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restoration specialist Will Conley (under the Klickitat Watershed Enhancement Project, BPA Project # 199705600) provided data management and database report development for many monitoring tasks. YN Fisheries/YKFP biologist Chris Frederiksen provided EDT modeling 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 spring Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*O. mykiss*), and other species of interest (including fall Chinook salmon *O. tshawytscha* and coho salmon *O. kisutch*) in the Klickitat subbasin. Develop methods of detecting trends in natural production for these stocks. Assist Klickitat Data Systems Manager with efforts towards standardizing, consolidating, centralizing, and making accessible all data and information generated by the M&E project within the Klickitat subbasin.

Task 1.a 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, and to evaluate effectiveness of habitat restoration/enhancement projects.

Methods: Snorkel surveys were conducted in selected upper mainstem Klickitat R. reaches above Castile Falls (located at river mile [RM] 64). The surveyed reaches were in the Kesslers Ranch (RM 79) and Caldwell Prairie (RM 81) areas, at four sites where placement of instream large wood complexes or logjams occurred in July 2004. The construction of the logjams was conducted under the Klickitat Watershed Enhancement Project (BPA Project # 199705600) with the objective of providing pool and cover habitat as well as increasing channel complexity. The snorkel surveys used a before/after study design (Roni et al. 2005) and a single-pass direct enumeration method; the survey objective was to determine if the logjams increased the local abundance of fish (especially juvenile spring Chinook and *O. mykiss*) and to determine if they provided suitable cover habitat for larger fish. The surveys were conducted in July 2004 (before logjam construction at three sites and after construction at one site) and in August 2005 (approximately one year after construction at all four sites).

Results: Very low densities of juvenile fish were observed at all four sites before and after logjam construction. In 2004 a total of 9 juvenile spring Chinook and *O. mykiss* were observed at all four sites, compared with 8 fish in 2005 (data is presented in Appendix A). Hatchery spring Chinook adults (surplus broodstock fish from Klickitat Hatchery) were released near some snorkel survey sites in 2004 just prior to the surveys, but none were released in 2005. In 2004 at one Kesslers Ranch site, adult Chinook were observed holding under a log structure that was constructed the previous day. Even though the low densities of juvenile fish at these sites prevented any meaningful before/after comparisons in abundance, the observations of adult salmon utilizing the logjams almost immediately after their construction provides evidence that the structures were providing suitable cover habitat. Future snorkel surveys will attempt to evaluate juvenile abundance and adult use as more wild spring Chinook salmon return to spawn in these river reaches.

Task 1.b Mobile juvenile monitoring sites

Objective: To continue developing methods 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 Klickitat Hatchery (RM 43) were operated on a year-round basis. A rotary trap located above Castile Falls (RM 64.6) was fished seasonally as access and flows allowed.

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 this reporting period. The five-foot trap located above Castile Falls was fished from early May 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. High flows in early January damaged the trap and limited fishing time during much of January and February. The catch of each trap is summarized on a monthly basis and presented in Appendix B.

Developing flow/entrainment relationships and estimating trap efficiency (the percentage captured of the total number of fish moving past the trap site) is a continuing project goal. For the Castile Falls and Lyle Falls trap, results of efficiency testing are presented in Appendix B. For the Castile trap, efficiency estimates ranged from approximately 19% to 45%. For the Lyle trap, efficiency estimates ranged from 1.2% to 20.1%. For both traps, efficiency depends largely on streamflow, but other factors (such as trap position in current and species/size of fish) also play a role. These relationships will continue to be developed in the future.

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 (percent spawned), and presence of CWT tags or external experimental marks. Observations of carcasses with floy tags (inserted into adult salmon and hatchery steelhead at the Lyle Falls adult trap at RM 2.3 in joint operations with WDFW under BPA project 200306500) aided in population estimation. Scale samples were also taken from carcasses.

Spawning ground surveys were conducted as follows: spring Chinook – mid August through early October; fall Chinook – early October through early December; coho – late October through early March; steelhead – early February 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. Figures 1 through 3 show the observed 2005 spawning distribution for spring Chinook, fall Chinook, and steelhead, respectively. A tabular summary of spawning ground survey results by species is presented in Appendix C.

Spring Chinook

Spring Chinook surveys were conducted between August 22 and October 11, 2005, covering nearly 70 river miles. Natural spring Chinook spawning occurs in the Klickitat mainstem between Castile Falls (RM 64) and the Stinson Flats area (RM 29). Additional spawning occurs above Castile Falls which has been seeded in recent years by transporting and releasing surplus adult fish that have returned to the Klickitat Hatchery. No fish were transported above Castile Falls in 2005. Recently completed (summer 2005) improvements at the Castile Falls fish ladders have enhanced fish passage, correcting problems with the original 1960s ladders which had decreased passage from historic levels. Four redds, along with five spring Chinook adults, were observed above Castile Falls in 2005. The remaining 46 redds were located in the 41 river miles between Beeks Canyon and Castile Falls. The total redd count of 50 is one of the lowest on record for YN Fisheries (surveying began in 1989). A total of eight spring Chinook carcasses were counted; none were floy-tagged. See Table C1 in Appendix C for detailed results of 2005 spring Chinook spawner surveys. See Table C2 and Figure C1 for a summary of spring Chinook redd counts from 1989-2005.

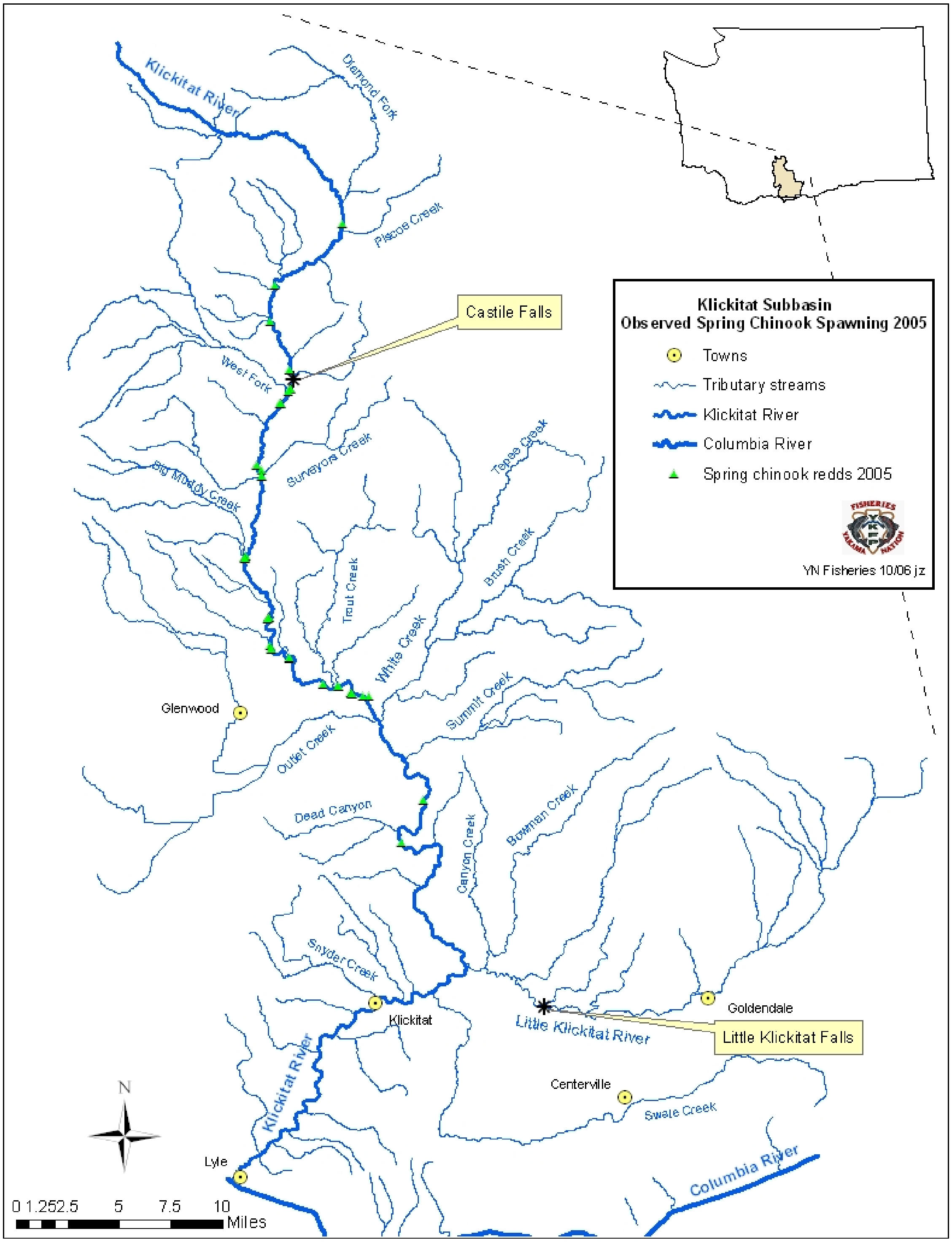

Figure 1. Observed spring Chinook spawning distribution in the Klickitat subbasin in 2005.

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 6 and

December 8. Three passes were completed through most known spawning reaches. The final redd count was 505. The highest redd densities were found in the 8.1 miles from Summit Creek downstream to Stinson Flats. This segment contained 254 redds (50% of the total redd count) with a density of 31 redds per mile. Fall Chinook were found spawning from just above the Klickitat Hatchery downstream nearly to Lyle Falls, a total of about 40 river miles; the average redd density was 10.4 redds per mile. Significant river ice buildup in early to mid-December and subsequent rain, high flows, and turbidity in late December effectively ended fall Chinook spawner surveys approximately 2 weeks early. Total redd counts may be biased slightly low as a result. A total of 243 fall Chinook carcasses were counted; one was floy-tagged (0.4%). See Table C3 in Appendix C for detailed results of 2005 fall Chinook spawner surveys.

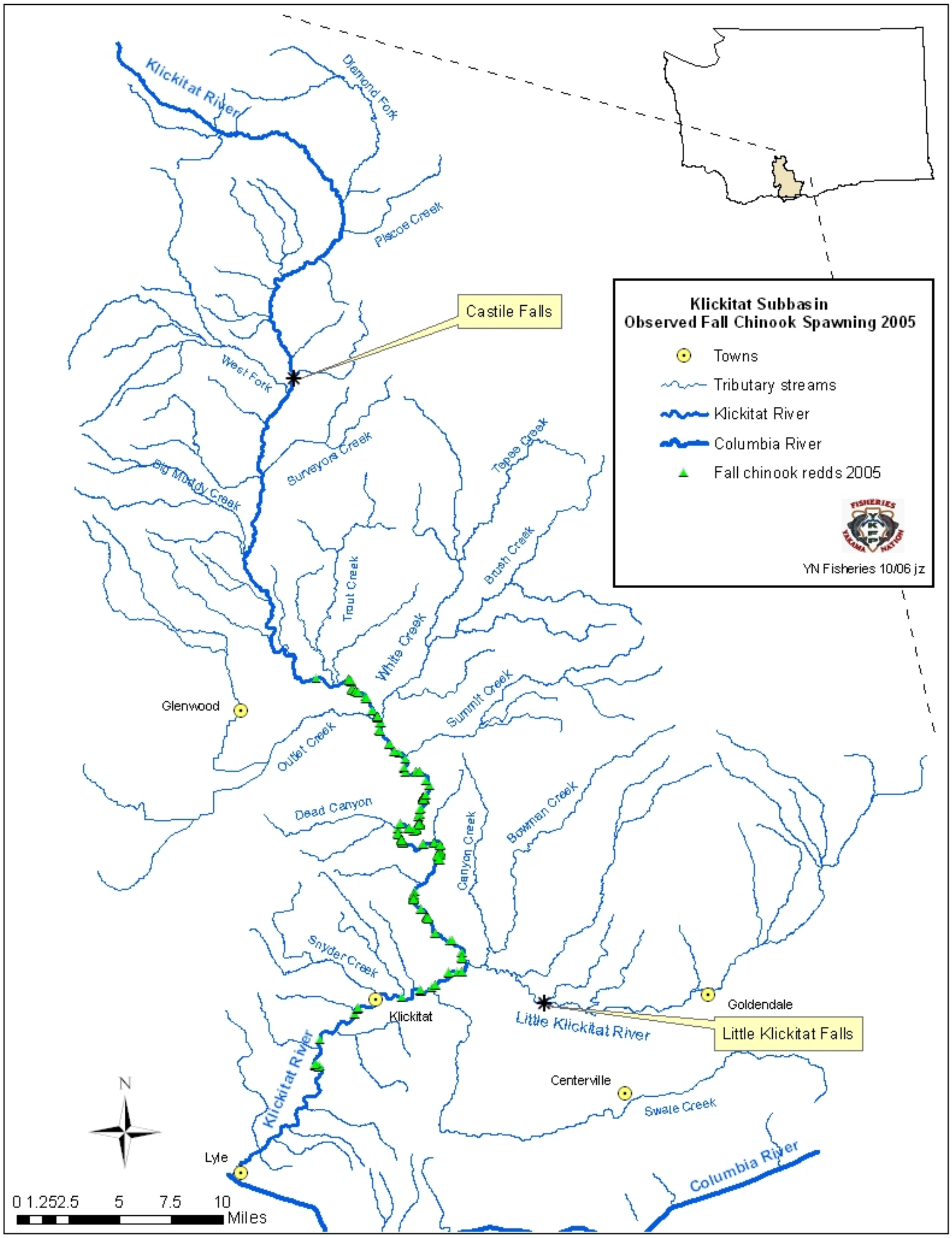

Figure 2. Observed fall chinook spawning distribution in the Klickitat subbasin in 2005.

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 began on October 20, 2005 and ended on March 7, 2006. Significant river ice buildup in December and high flows and turbidity from December through January prevented surveys during much of the spawning period. No redds were observed. No carcasses and no floy-tagged fish were observed. Large numbers of live adult coho were observed in the lowermost reach of Canyon Creek (below Lyle Falls). Coho seem to have more of a problem passing Lyle Falls than Chinook or steelhead. In low water years 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 has much suitable spawning habitat, the fish congregate by the hundreds at these confluences. See Table C4 in Appendix C for detailed results of 2005-6 coho spawner surveys.

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 2005 and a progress report for spring 2006. Surveys in 2005 began in mid February and ended in mid June.

In most years, high spring flows and turbidity limit the effectiveness of the mainstem Klickitat steelhead redd surveys, leading to an unavoidable bias toward undercounting of redds in the mainstem. 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 were higher than normal. The proportion of total observed redds in the mainstem was much higher than in most years (due to better ability to observe redds and probably also due to an actual higher proportion of the spawning activity in the mainstem).

The final steelhead redd count for 2005 was 157, significantly lower than in recent years. This included 126 (80%) in the mainstem Klickitat and 31 (20%) in tributaries. Two redds were observed above Castile Falls (see the spring Chinook spawner survey results section for a description of passage at Castile Falls). The White Creek watershed accounted for 11.5% of the total number of observed redds, making it the highest ranking tributary watershed, as in recent years. The Little Klickitat watershed contributed 5.1% of the total redd count. Dead Canyon Creek and Swale Creek each contributed 1.3% of the total redd count. See Table C5 in Appendix C for detailed results of 2005 steelhead spawner surveys.

Steelhead spawner surveys for 2006 also began during this reporting period. Extremely low redd counts resulted from higher-than-average flows and turbidity. Final results will be presented in the 2006 annual report.

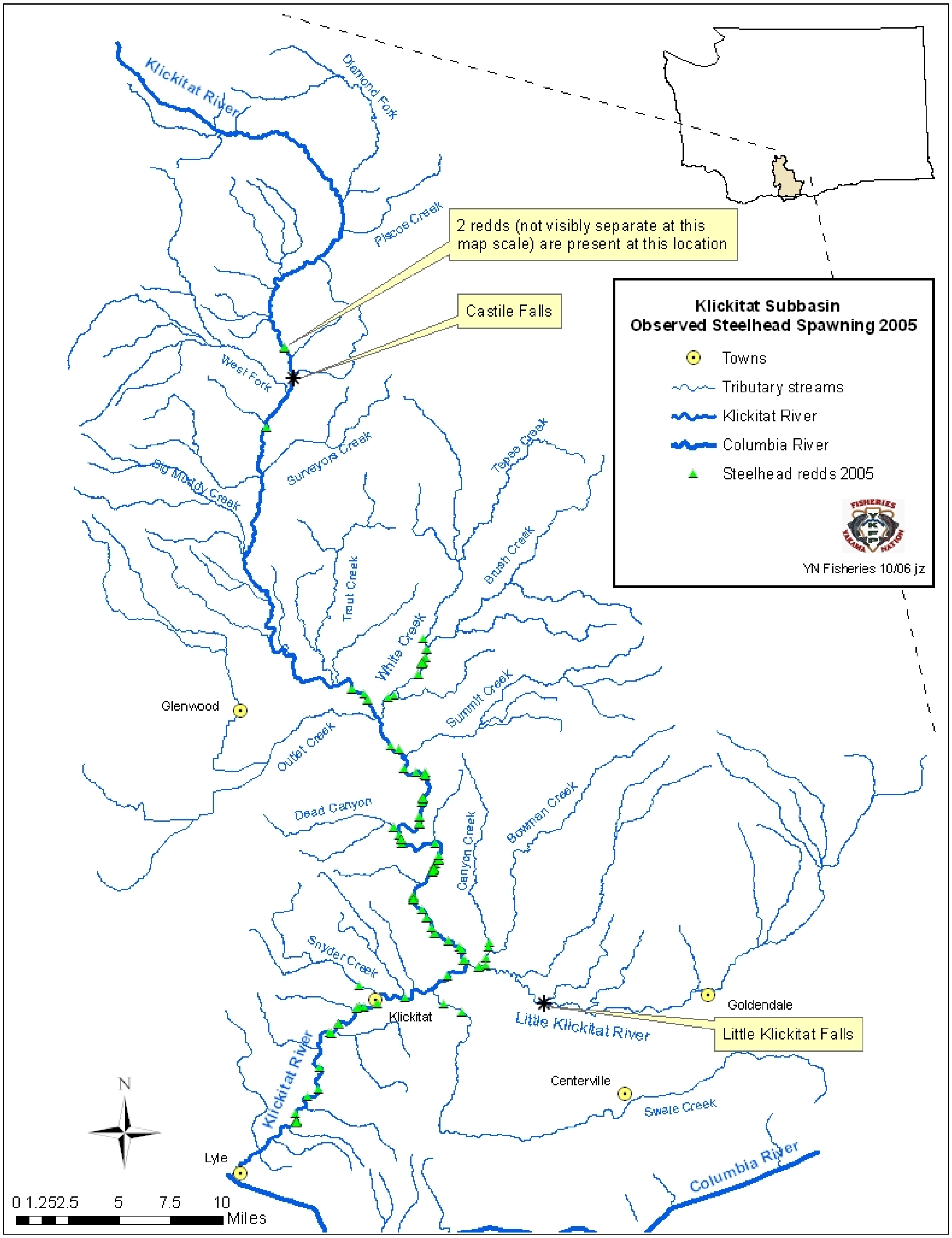

Figure 3. Observed steelhead spawning distribution in the Klickitat subbasin in 2005.

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. 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 122 adult spring and fall Chinook carcasses during 2005 spawner surveys. No coho salmon carcasses were recovered during 2005-2006 spawner surveys. A brief description of the results by species is below. Appendix D presents the age breakdown by sex with accompanying fork and postorbital-hypural length averages and 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.

Only eight spring Chinook carcasses were encountered during spawner surveys, and only three yielded readable scale samples. All three fish were unmarked females (either wild or unmarked hatchery fish). Two of the fish were 4-year-olds; one was a 5-year-old. The average fork length for the 4-year-olds was 80.5 cm, while the 5-year-old was 94.0 cm long.

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 130 samples (119 had readable scales). Of the fish sampled, 30.8% were known hatchery fish and 69.2% were unmarked (either wild or unmarked hatchery fish); 68.2% were females and 31.8% were males. The predominant age class for fall Chinook was 4-year-olds, at 47.9%. Proportions of the remaining age classes were as follows: 15.1% were 5-year-olds, 36.1% were 3-year-olds, and 0.8% 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 84.4 cm and 88.7 cm, respectively. The respective average fork lengths for female and male 5-year-old fall Chinook were 89.6 cm and 100.8 cm. See Appendix D for a more complete breakdown of the results.

Task 1.e Sediment monitoring

Objective: Monitor stream sediment loads associated with anthropogenic factors (e.g., logging, agriculture and road building), affecting streams basin wide. Excessive sediment loads can significantly decrease egg-to-fry survival, and can depress survival and alter habitat for many other life stages of salmonids.

Methods: Twelve sites throughout the basin (8 in the mainstem Klickitat, 3 in Diamond Fork Creek, and 1 in White Creek) were sampled in 2005. See Appendix E (Figure E1) for a map showing locations of sampling sites. Twelve samples were collected from representative spawning gravels at each site (from 3 different riffles at each site, 4 samples from each riffle) using McNeil core gravel samplers. A total of 144 samples were collected and sieved. Each sample was analyzed to estimate the percentage of fine particles present and determine the particle size distribution. 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: Detailed results from sediment monitoring at the 12 sites sampled in 2005, including particle size distributions and percentages of fine sediments (presented as particles < 1.7 mm and particles < 6.75 mm), are presented in Appendix E. Some general trends that are indicated by the data are described below. Monitoring at most of these sites began in 1998, 1999, or 2000, and continued through 2005.

At only one site (Klickitat R. below Swale Cr.) there is a general trend of decreasing fine sediment levels over the monitoring period. Percentage of fine particles (< 1.7 mm) generally went from 33% to 22%. At many of the other sites, percentage of fines appears to be fluctuating over periods of several years, with no long-term directional trend readily apparent. Fines percentages at some of the sites appear to be fluctuating within the range of approximately 10% to 20% (particles < 1.7 mm). These sites include: Diamond Fork Cr. near mouth, Klickitat R. at McCormick Meadows, and Klickitat R. near Leidl Bridge. Fines percentages at other sites range higher, up to 25-30%. At one site (White Cr. meadow below Tepee Cr.), 2005 is the first of data collection; percentage fines at this site were at 26%.

Task 1.f Temperature and water quality monitoring

Objective: Monitor stream temperatures and record water quality measurements on selected tributaries and within selected habitat survey reaches on a seasonal basis.

Methods: Stream temperatures were monitored via continuously-recording Onset thermographs (set to record at 30-min. intervals) at 37 locations on 23 streams within the Klickitat subbasin. Portable field meters were used to measure and record the following parameters on a seasonal basis: temperature, dissolved oxygen, conductivity, pH, and turbidity. 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. Development and quality control of this database is ongoing; these data will be used to monitor trends and differences between selected sites.

Task 1.g Habitat assessment

Objective: Collect baseline data and monitor trends in 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. Habitat data also assists in environmental assessment and planning of land-use activities such as forest management.

Methods: The habitat inventories were 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: No habitat surveys were conducted in 2005. It was the determination of YKFP biologists that most sites had adequately been surveyed in recent years and that other sampling took priority during the 2005 field season (see Section 4. Genetics). Additional development of the relational database continued, and information from past surveys was used in assessment of forest management activities.

Task 1.h Spring Chinook PIT tagging

Objective: 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. This portion of the tagging effort (Phase I) focused on familiarizing technicians and biologists with protocols for tag injection, detection and data input and management.

Methods: Spring Chinook salmon pre-smolts from the Klickitat Hatchery were injected with PIT tags in April 2005 (during the 2004 annual reporting period) and released into the Klickitat River above Castile Falls in May 2005 (during this reporting period). A total of 9943 fish were tagged; 9830 fish were released (post-tagging mortality was estimated at 1.15%). Tagged fish were also marked with a lower caudal fin clip. A survey to determine the tag shedding rate was also conducted approximately 2 weeks post tagging (by scanning 500 marked fish for tag retention). Fish subsequently captured at the 3 screw traps located downstream of the release point were scanned for tags. Tag data has been entered into the regional PIT Tag Information System (PTAGIS) database for further monitoring at mainstem Columbia River sites.

Results: Prior to release, a tag shedding rate of 1.8% was estimated. This estimate, however, may be inflated slightly by unreadable tags or marked fish that were not tagged. Fish were released at Cow Camp above Castile Falls (RM 78) on May 17, 2005; a total of 1359 fish were subsequently recaptured at the three screw traps at Castile Falls (RM 64.6), Klickitat Hatchery (RM 43), and Lyle Falls (RM 2.8). A total of 1226 fish were recaptured at the Castile Falls screw trap starting on May 18 and ending on June 28. Approximately 45% of the Castile recaptures occurred May 18 and 19, and approximately 65% of the Castile recaptures had occurred by May 30. This information coupled with the estimated trapping efficiency at this screw trap during that time period indicates that the majority of the released fish moved out of the upper subbasin quickly and did not rear above Castile Falls. A total of 131 fish were recaptured at the Hatchery screw trap starting on May 19 and ending on July 15. A total of 2 fish were recaptured at the Lyle Falls screw trap (on May 23 and June 14), indicating that most of the fish did stay for additional rearing within the Klickitat River. Given that these were pre-smolts (from brood year 2004) when released, the additional rearing period would be expected.

No additional PIT tagging was conducted in 2005 or early 2006 during this reporting period. Tagging conducted in the 2006 reporting period will be covered in upcoming reports.

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: During the reporting period of May 1, 2005 – April 30, 2006, the EDT model was updated with additional data acquired from the preceding years. Specifically, empirical data related to the demographics of Klickitat summer steelhead were used to define the life history characteristics in the EDT Model. Recent trapping operations have allowed biologists to collect information related to the run timing, age composition, sex ratios and lengths of summer steelhead returning to the Klickitat River. These parameters in the model had been previously populated with information from some work done in the early 1980s (Howell et al. 1985). Age composition, sex ratios and adult holding patterns related to the run timing were all parameters updated in the EDT model. Fecundity estimates for the indigenous summer steelhead stock were also updated by applying a length-fecundity relationship to the lengths of females sampled at the trap during in 2004 and 2005. Given that steelhead have never been collected for broodstock or any other purposes in the Klickitat, no empirically based fecundity estimates currently exist. Because of this, a length-fecundity regression equation developed for Yakima River steelhead in the early 1990s were used as a surrogate and applied to the sampled lengths of Klickitat summer steelhead. The newly updated steelhead EDT model runs and reports can be viewed in the Klickitat Salmon Recovery Plan, when that plan becomes available.

The spring Chinook EDT model was also updated with one minor revision that adjusted the overall exploitation rate experienced by wild Klickitat River spring Chinook. Both mainstem and terminal harvest rates were adjusted to better reflect the recent trends in harvest since the year 2001 and interim management agreements for the indefinite future. The population performance metrics generated by EDT for both steelhead and spring Chinook are currently being utilized in the Klickitat Master planning process. These parameters serve as a working hypothesis related to a population's response to the ascribed habitat potential of the subbasin. The parameters function as inputs into the AHA model which is a tool currently employed to assist the development of future artificial production programs in the Klickitat.

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, a baseline data set will be established 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 to be collected via electrofishing or capture in rotary screw traps from sites throughout the Klickitat subbasin. Laboratory testing was to be performed by the USFWS Lower Columbia River Fish Health Center. Fish are examined using the protocols from the Laboratory Procedures Manual for the National Wild Fish Health Survey.

Results: Due to collection permits not being finalized until near the end of this performance period (April 2006), no pathogen samples were collected during this reporting period. Permits now in place will allow collection of samples for future reporting periods. Previously collected samples have been compiled into existing datasets covering 2002-2005.

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 juvenile and resident *O. mykiss* were collected from streams in the Klickitat subbasin in June through August 2005. A total of 1748 samples were collected from 26 different sites on 17 streams (see Figure 4 for a map of sampling locations). Fish were captured via backpack electrofishing and non-lethal fin clip samples were collected from individual fish (along with lengths and weights). Samples were also collected from the WDFW Goldendale Trout Hatchery in November 2005. The samples and subsequent analysis were intended to augment previous genetic analysis of Klickitat *O. mykiss* reported in Narum et al. (2006).

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 the 2005 reporting period, a total of 791 genetic samples (746 from steelhead, 45 from Chinook) were collected. These samples will be analyzed by CRITFC and information added to existing databases and incorporated into a future report.

Results: A progress update and preliminary results from the *O. mykiss* stream samples (provided by S. Narum, CRITFC) follows: A total of 926 juvenile and/or resident *O. mykiss* representing 21 collections from the Klickitat River sub-basin (Figure 4) have been genotyped at 13 microsatellite loci. Fifteen collections were genotyped by CRITFC geneticists at the Hagerman Fish Culture Experiment Station, and six collections were genotyped by NOAA geneticists at the Northwest Fisheries Science Center. All loci and alleles were standardized among both laboratories prior to combining data. Estimates of genetic diversity are presented in Table G1 in Appendix G.

Estimates of genetic diversity were generally highest in anadromous populations that had no barriers to upstream migration. This included lower White Cr., Bowman Cr., lower Little Klickitat R., lower Summit Cr., lower Trout Cr., and Dead Canyon Cr. Collections from headwater sections had consistently lower genetic diversity than collections from lower sections of the same drainage (Little Klickitat R., Summit Cr., Trout Cr., and White Cr). Collections from areas upstream of the known or presumed anadromous distribution (i.e., upper Brush Cr.) had the lowest levels of genetic diversity observed in this study.

Further statistical analyses of the genetic data are in progress. This includes tests for deviation from Hardy-Weinberg equilibrium, estimates of population differentiation, individual assignment tests, and determination of phylogenetic relationships among collections.

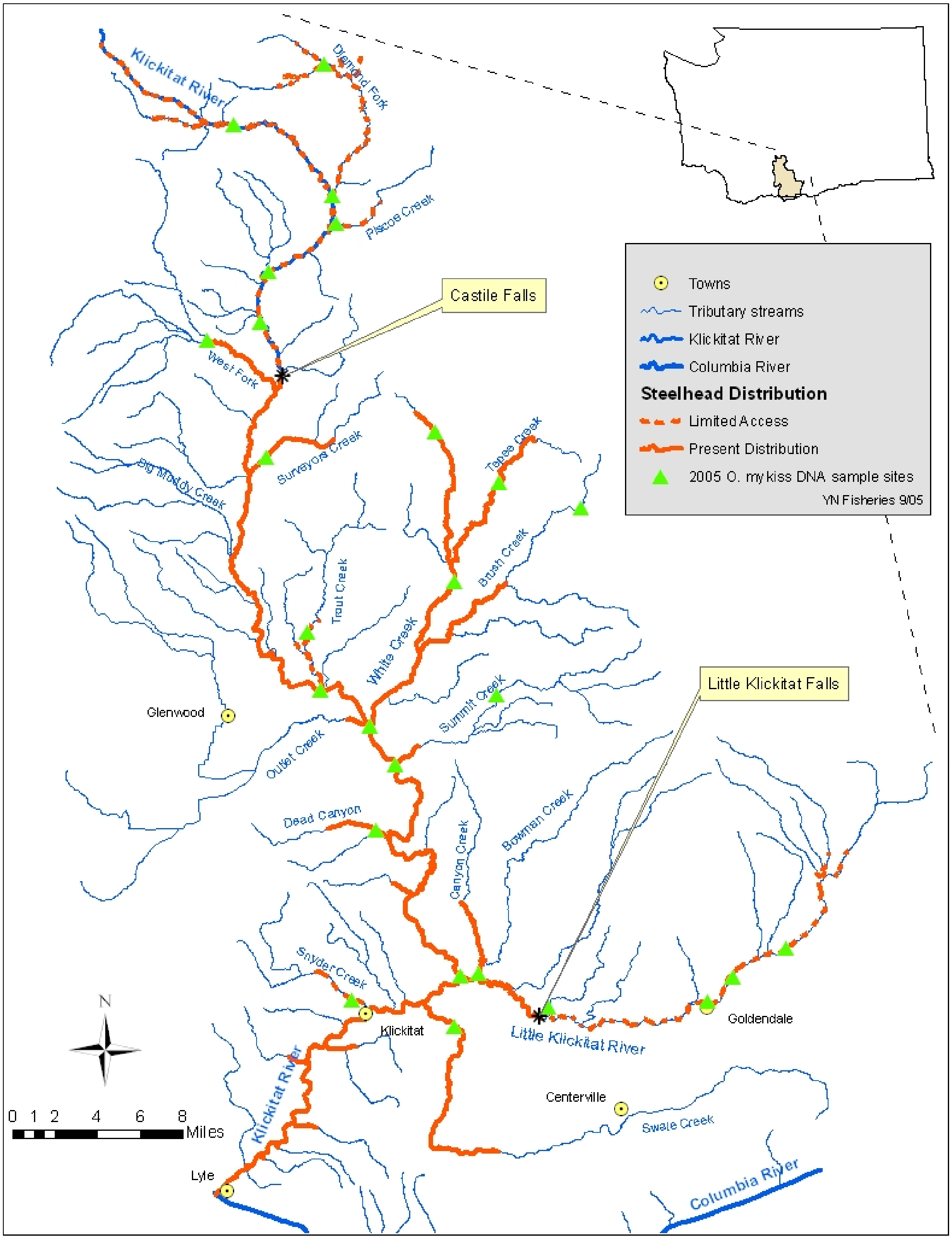

Figure 4. Locations of 2005 Klickitat subbasin *O. mykiss* genetic sampling sites.

5. Appendices

Appendix A. Juvenile & Resident Salmonid Population Surveys.

Table A1. Results of snorkel surveys at sites on the upper Klickitat River before and after instream large woody debris placement.

Reach	Site	Length (ft.)	Survey Date 1	Juvenile Chinook	Adult Chinook*	Juvenile/Resident *O. mykiss*	Unknown	Total Fish (excluding Adult Chinook)	Survey Date 2	Juvenile Chinook	Adult Chinook*	Juvenile/Resident *O. mykiss*	Unknown	Total Fish (excluding Adult Chinook)
Calwell Prairie	C3	770	7/21/2004	1	0	1	1	3	8/23/2005	0	0	0	0	0
	C4	680	7/21/2004	1	1	1	0	3	8/23/2005	1	0	0	2	3
Kessler's Ranch	K3	376	7/21/2004	0	63	0	0	0	8/23/2005	0	0	0	0	0
	K4	356	7/21/2004*	0	2	0	1	3	8/23/2005	1	0	4	0	5

*Note: Hatchery spring chinook adults were released near some snorkel survey locations in 2004 just prior to the surveys, but none were released in 2005. In 2004 at site K4, adult chinook were observed holding under log structure that was constructed 1 day before survey (survey date 1 at site K4 was after logjam construction).

Appendix B. Mobile Juvenile Monitoring Sites (Screw Traps)

Table B1. Catch summary for the Castile Falls screw trap for May 1, 2005 – April 30, 2006.

Month	Days Fished	Wild *O.mykiss*	Wild Chinook	Hatchery Chinook	Brook Trout	*Totals*
May	19	116	485	14570	3	15174
June	19	156	4827	5235	1	10219
July	17	48	4079	525	0	4652
August	13	35	1255	314	0	1604
September	13	61	1188	78	4	1331
October	16	24	1451	18	8	1501
November	3	0	400	0	0	400
Totals	100	440	13685	20740	16	34881

Table B2. Results of efficiency testing at Castile Falls screw trap 2003-2005.

Date	Species	Flow*	No. of fish marked	No. of fish recaptured	Efficiency (%)
8/12/2003	Hatchery spring Chinook	107	55	17	30.9%
8/13/2003	Hatchery spring Chinook	107	110	35	31.8%
9/5/2003	Hatchery spring Chinook	87	68	16	23.5%
7/19/2004	Hatchery spring Chinook	176	52	15	28.8%
7/20/2004	Hatchery spring Chinook	166	40	18	45.0%
5/20/2005	Hatchery spring Chinook	324	500	95	19.0%
5/24/2005	Hatchery spring Chinook	264	286	63	22.0%
7/26/2005	Wild spring Chinook	91	195	51	26.2%
8/1/2005	Wild spring Chinook	83	190	71	37.4%

* Flow values are 2-day averages of mean daily flows starting on test date (USGS gage 14107000 above West Fork near Glenwood [above Castile Falls])

Table B3. Catch summary for the Hatchery screw trap for May 1, 2005 – April 30, 2006.

Month	Days Fished	Hatchery *O.mykiss*	Wild *O.mykiss*	Chinook	Coho	Brook Trout	*Totals*
May	23	66	0	1424	18	0	1508
June	20	76	0	665	6	1	748
July	16	17	0	226	1	0	244
August	19	29	2	129	6	0	166
September	20	19	0	196	8	0	223
October	17	4	0	87	2	1	94
November	17	9	0	377	27	1	414
December	4	0	0	34	1	0	35
January	7	4	0	28	0	0	32
February	13	4	0	13	1	0	18
March	13	4	0	200	6	0	210
April	14	14	0	243	0	0	257
Totals	183	246	2	3622	76	3	3949

Table B4. Catch summary for the Lyle Falls screw trap for May 1, 2005 – April 30, 2006. High flows in early January damaged the trap and limited fishing time in January and February.

Month	Days Fished	Chinook	Coho	Hatchery *O.mykiss*	Wild *O.mykiss*	*Totals*
May	8	823	5281	1286	285	7675
June	8	7953	6455	207	478	15093
July	13	7540	22	5	5	7572
August	13	11836	3	5	19	11863
September	15	4475	16	1	164	4656
October	15	870	50	0	59	979
November	5	683	46	0	19	748
December	5	237	7	0	9	253
January	3	167	91	0	34	292
February	3	18	3	0	0	21
March	10	3759	26	0	6	3791
April	12	67	9703	233	75	10078
Totals	110	38428	21703	1737	1153	63021

Table B5. Results of efficiency testing at the Lyle Falls screw trap 2003-2006.

Date	Species	Flow*	No. of fish marked	No. of fish recaptured	Efficiency (%)	
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	2031	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 coho	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	814	238	25	10.5%	**
2/28/2005	Wild spring Chinook, Wild coho	751	62	12	19.4%	
7/25/2005	Hatchery fall Chinook	576	419	5	1.2%	
8/1/2005	Hatchery fall Chinook	565	196	26	13.3%	
4/25/2006	Hatchery coho	2530	150	7	4.7%	
4/25/2006	Hatchery steelhead	2530	50	1	2.0%	

* Flow values are 2-day averages of mean daily flows starting on test date (USGS gage 14113000 near Pitt)
** 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)

Table C1. Results of 2005 Spring Chinook spawning surveys in the Klickitat subbasin.

KLICKITAT WATERSHED - SPRING CHINOOK SPAWNING SURVEY RESULTS, 2005

									MORTS OBS.			
						LIVE OBS.			Ad-clipped		Unclipped	
STREAM	REACH	MILES	# PASSES	REACH REDD TOTALS	REDDS /MILE	Floy Tag	No Floy	Unk	Floy Tag	No Floy	Floy Tag	No Floy
Klickitat												
MAIN STEM	**Above Castile Falls***											
	Huckleberry Cr. - McCormick Mdws.	3.4	2	0	0.00	0	0	0	0	0	0	0
	McCormick Mdws - Cow Camp	8.0	2	0	0.00	0	0	0	0	0	0	0
	Cow Camp - McCreedy Cr.	7.1	2	1	0.14	0	0	1	0	0	0	1
	McCreedy Cr. - Castile Falls	6.0	2	3	0.50	0	0	3	0	0	0	0
DIAMOND FORK	Butte Meadows Cr. - Cuitin Cr.	2.8	2	0	0.00	0	0	0	0	0	0	0
	Cuitin Cr. to Confluence	8.5	n/s	0	0.00	0	0	0	0	0	0	0
	Subtotal (surveyed reaches)	27.2		4	0.1	0	0	4	0	0	0	1
MAIN STEM	**Below Castile Falls**											
	Castile Falls #11 - Castile Falls #1	0.6	1	0	0.00	0	1	0	0	0	0	0
	Castile Falls #1 - Signal Peak Br.	3.3	2	11	3.33	0	13	0	0	0	0	1
	Signal Peak Br. - Big Muddy Cr.	7.2	2	9	1.25	0	30	0	0	0	0	2
	Big Muddy Cr. - Old USGS gage	3.6	2	0	0.00	0	1	0	0	0	0	2
	Old USGS gage - Hatchery	8.2	2	15	1.83	0	9	0	0	0	0	2
	Hatchery - Summit Cr.	5.5	2	7	1.27	0	35	0	0	0	0	0
	Summit Cr. - Leidl Br.	5.6	2	3	0.54	0	0	0	0	0	0	0
	Leidl Br. - Stinson Flats	2.5	2	1	0.40	0	0	0	0	0	0	0
	Stinson Flats - Beeks Canyon	4.5	2	0	0.00	0	5	0	0	0	0	0
	Subtotal (surveyed reaches)	41		46	1.12	0	94	0	0	0	0	7
	TOTALS	**68.2**		**50**	**0.7**	**0**	**94**	**4**	**0**	**0**	**0**	**8**
	KLICKITAT WATERSHED TOTALS			**50**		**0**	**94**	**4**	**0**	**0**	**0**	**8**
	Above Castile Falls contribution			**8%**		**-**	**0%**	**100%**	**-**	**-**	**-**	**13%**
	Below Castile Falls contribution			**92%**		**-**	**100%**	**0%**	**-**	**-**	**-**	**88%**

n/s = not surveyed

***Note -** No hatchery spring chinook adults were transported above Castile Falls in 2005.

Table C2. Spring Chinook spawning surveys (redd counts) in the Klickitat subbasin, 1989-2005.

KLICKITAT WATERSHED - SPRING CHINOOK SPAWNING SURVEY RESULTS, 1989-2005

REACH	MILES	Redd counts 1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Diamond Fork	8.5	ns	0	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	0	0
McCormick Mdws - Castile Falls	18.0	0	0	0	0	0	1	0	0	0	0	0	64	2	243	165	122	4
Castile Falls #10 - Falls #1	0.8	ns	ns	ns	ns	ns	ns	ns	ns	3	3	2	0	7	0	4	0	0
Castile Falls - Signal Peak Br.	3.3	20	17	28	34	33	18	17	24	87	56	40	39	33	50	41	18	11
Signal Peak Br. - Big Muddy Cr.	6.9	33	42	61	63	84	20	25	51	118	53	38	29	78	75	71	38	9
Big Muddy Cr. - Old USGS gage	3.3	ns	ns	0	5	15	0	0	0	0	0	0	2	0	5	0	0	0
Old USGS gage - WDF Hatchery	8.2	ns	ns	ns	ns	ns	ns	ns	14	2	0	0	27	1	16	34	10	15
WDF Hatchery - Summit Cr.	5.5	ns	ns	2	ns	ns	ns	ns	8	14	1	2	4	1	0	17	3	7
Summit Creek - Leidl	5.6	ns	ns	2	ns	ns	ns	ns	8	3	0	1	2	1	0	0	1	3
Leidl - Stinson Flats	3.2	ns	ns	ns	ns	ns	ns	ns	5	4	ns	ns	ns	ns	ns	ns	0	1
Stinson Flats - Soda Springs	7.5	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	3	0
Soda Springs - Twin Bridges	6.4	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
Twin Bridges - Pitt Bridge	8	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
Pitt - Turkey Farm	5	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
Turkey Farm - Lyle Falls	2	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
Totals	**92.2**	**53**	**59**	**93**	**102**	**132**	**39**	**42**	**110**	**231**	**113**	**83**	**167**	**123**	**389**	**332**	**195**	**50**
Totals (minus releases above Castile)	**65.7**	**53**	**59**	**93**	**102**	**132**	**39**	**42**	**110**	**231**	**113**	**83**	**103**	**123**	**146**	**167**	**73**	**50**

ns = not surveyed

Note: In 2000, 2002, 2003, and 2004 surplus spring chinook adults from Klickitat Hatchery were transported and released above Castile Falls. High redd counts above Castile Falls in those years are largely a result of those releases. For this reason the Totals (minus releases above Castile) row provides for a more consistent across-year comparison of natural spawner escapement.

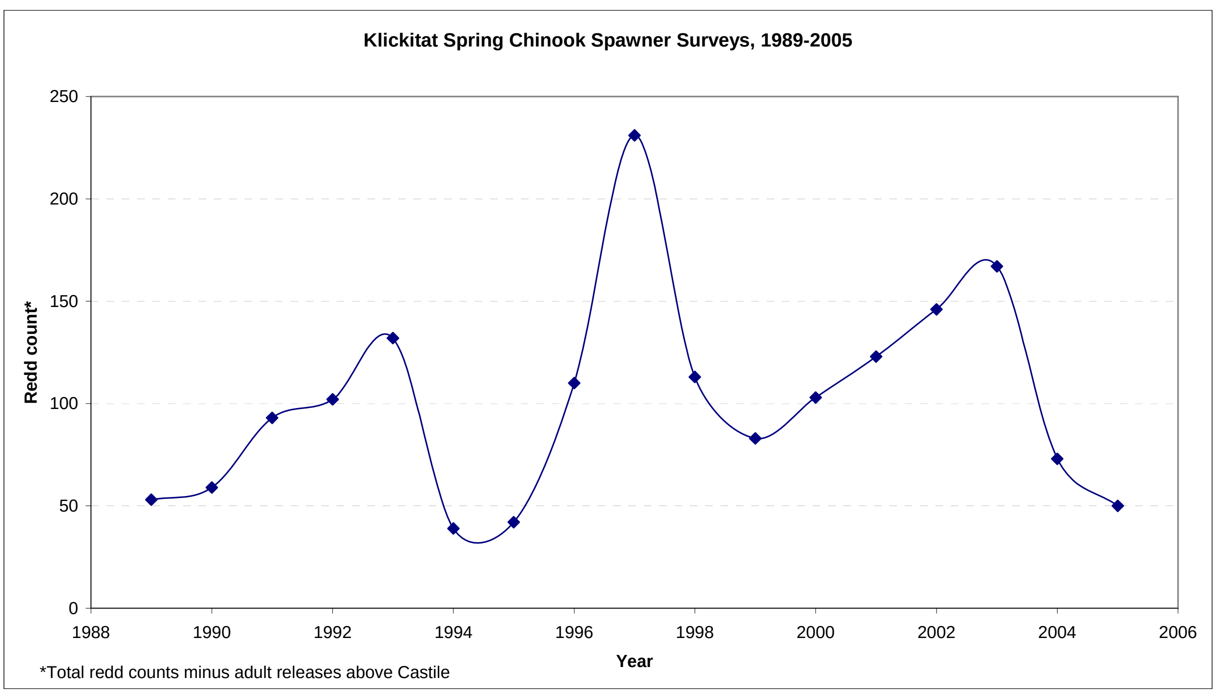

Figure C1. Spring Chinook redd counts in the Klickitat subbasin, 1989-2005.

Table C3. Results of 2005 Fall Chinook spawning surveys in the Klickitat subbasin.

KLICKITAT WATERSHED - FALL CHINOOK SPAWNING SURVEY RESULTS, 2005

STREAM	REACH	MILES	# PASSES	REACH REDD TOTALS	REDDS /MILE	LIVE OBS. Floy Tag	LIVE OBS. No Floy	LIVE OBS. Unk	MORTS OBS. Ad-clipped Floy Tag	MORTS OBS. Ad-clipped No Floy	MORTS OBS. Unclipped Floy Tag	MORTS OBS. Unclipped No Floy	MORTS OBS. Unk Floy Tag	MORTS OBS. Unk No Floy
Klickitat														
MAIN STEM														
	Castile Falls #11 - Castile Falls #1	0.6	0	0	0.00	0	0	0	0	0	0	0	0	0
	Castile Falls #1 - Signal Peak Br.	3.3	0	0	0.00	0	0	0	0	0	0	0	0	0
	Signal Peak Br. - old USGS gage	10.5	0	0	0.00	0	0	0	0	0	0	0	0	0
	Old USGS gage - Hatchery	8.2	2	1	0.12	0	0	0	0	0	0	0	0	0
	Hatchery - Summit Cr.	5.5	3	88	16.00	0	771	0	0	1	0	30	0	0
	Summit Cr. - Leidl Br.	5.6	4	199	35.54	0	257	0	0	2	0	38	0	11
	Leidl Br. - Stinson Flats	2.5	3	55	22.00	0	103	0	0	0	0	56	0	0
	Stinson Flats - Beeks Canyon	4.5	4	68	15.11	0	143	0	0	0	1	20	0	0
	Beeks Canyon - Little Klick	4.8	3	70	14.58	0	83	0	0	1	0	27	0	1
	Little Klick - Twin Bridges	1.5	3	7	4.67	0	35	0	0	1	0	11	0	0
	Twin Bridges - Klick Field Office	1.2	3	5	4.17	0	13	0	0	1	0	7	0	0
	Klick Field Office - Klickitat Town	3.6	3	8	2.22	0	24	0	0	0	0	19	0	0
	Klickitat Town - Pitt Bridge	3.4	2	0	0.00	0	13	0	0	0	0	2	0	0
	Pitt Bridge - Turkey Farm CG	5.4	3	4	0.74	0	20	0	0	0	0	8	0	0
	Turkey Farm CG - Lyle Falls trap	2.5	3	0	0.00	0	4	0	0	0	0	6	0	0
	Below Lyle Falls	0.1	0	0	0.00	0	0	0	0	0	0	0	0	0
	Mainstem Totals (surveyed reaches)	**48.7**		**505**	**10.4**	**0**	**1466**	**0**	**0**	**6**	**1**	**224**	**0**	**12**
	KLICKITAT WATERSHED TOTALS			**505**	**10.4**	**0**	**1466**	**0**	**0**	**6**	**1**	**224**	**0**	**12**

Unk = Unknown

Total Floy-tagged Morts Observed	1
Total Morts Observed	243
Percentage Floy-tagged	0.4%

Note: Significant ice buildup in early-mid Dec. and subsequent rain/high flows/turbidity in late Dec. effectively ended surveys ~2 weeks early. Total redd counts may be biased slightly low as a result.

Table C4. Results of 2005-6 Coho spawning surveys in the Klickitat subbasin.

KLICKITAT WATERSHED - COHO SPAWNING SURVEY RESULTS, 2005/2006

STREAM	REACH	MILES	# PASSES	REACH REDD TOTALS	REDDS /MILE	LIVE OBS. Floy Tag	LIVE OBS. No Floy	LIVE OBS. Unk	MORTS OBS. Ad-clipped Floy Tag	MORTS OBS. Ad-clipped No Floy	MORTS OBS. Unclipped Floy Tag	MORTS OBS. Unclipped No Floy
Klickitat												
MAIN STEM	Castile Falls #10 - Castile Falls #1	0.6	0	0	0.00	0	0	0	0	0	0	0
	Castile Falls - Signal Peak Br.	3.3	0	0	0.00	0	0	0	0	0	0	0
	Signal Peak Br. - Big Muddy Cr.	6.9	0	0	0.00	0	0	0	0	0	0	0
	Big Muddy Cr. - old USGS gage	3.3	0	0	0.00	0	0	0	0	0	0	0
	Old USGS gage - WDFW Hatchery	8.2	0	0	0.00	0	0	0	0	0	0	0
	WDF Hatchery - Summit Cr.	5.4	3	0	0.00	0	14	0	0	0	0	0
	Summit Cr. - Leidl Br.	5.2	1	0	0.00	0	0	0	0	0	0	0
	Leidl Br. - Stinson Flat	2.9	1	0	0.00	0	0	0	0	0	0	0
	Stinson Flat - Beeks Canyon	4.5	1	0	0.00	0	0	0	0	0	0	0
	Beeks Canyon - Little Klickitat	4.8	1	0	0.00	0	0	0	0	0	0	0
	Little Klickitat - Twin br.	1.5	1	0	0.00	0	0	0	0	0	0	0
	Twin Br. - Field Office	1.3	1	0	0.00	0	0	0	0	0	0	0
	Field office - Ice house landing	1.5	1	0	0.00	0	0	0	0	0	0	0
	Ice house landing - Klickitat Town	2.1	1	0	0.00	0	0	0	0	0	0	0
	Klickitat Town - Pitt Bridge	3.4	1	0	0.00	0	0	0	0	0	0	0
	Pitt - bus turn around	2	1	0	0.00	0	0	0	0	0	0	0
	Bus turn around - Turkey Farm	3.3	1	0	0.00	0	0	0	0	0	0	0
	Turkey Farm - Lyle Falls scew trap	2.5	1	0	0.00	0	0	0	0	0	0	0
	County Park riffle	0.1	1	0	0.00	0	0	0	0	0	0	0
	Mainstem Totals (surveyed reaches)	**40.5**		**0**	**0.0**	**0**	**14**	**0**	**0**	**0**	**0**	**0**
TRIBUTARIES												
Trib of trib												
OUTLET CREEK		0.3	0	0	0.00	0	0	0	0	0	0	0
WHITE CREEK	Bottom 1.5 miles	1.5	0	0	0.00	0	0	0	0	0	0	0
SUMMIT CREEK	Falls - mouth	1.3	1	0	0.00	0	0	0	0	0	0	0
DEAD CANYON CR		1.3	2	0	0.00	0	0	0	0	0	0	0
BEEKS CANYON		0.5	0	0	0.00	0	0	0	0	0	0	0
LITTLE KLICKITAT	Bowman Cr. - mouth	1.2	0	0	0.00	0	0	0	0	0	0	0
Bowman Cr.	Falls - mouth	1.0	0	0	0.00	0	0	0	0	0	0	0
Canyon Cr.	Right bank trib #3 - left bank trib #1	1.0	0	0	0.00	0	0	0	0	0	0	0
	Left bank trib #1 - Weeping Wall	1.0	0	0	0.00	0	0	0	0	0	0	0
	Weeping wall - mouth	1.0	0	0	0.00	0	0	0	0	0	0	0
SWALE CREEK	above railroad trestle	1.1	1	0	0.00	0	0	0	0	0	0	0
	Trestle to mouth	1.1	1	0	0.00	0	0	0	0	0	0	0
SNYDER CREEK	lowermost bridge to mouth	0.8	1	0	0.00	0	0	0	0	0	0	0
LOGGING CAMP CR		1.0	1	0	0.00	0	0	0	0	0	0	0
WHEELER CREEK		1.0	0	0	0.00	0	0	0	0	0	0	0
DILLACORTE CR	Falls - mouth	1.5	1	0	0.00	0	0	0	0	0	0	0
SILVA CREEK	Bottom	0.1	0	0	0.00	0	0	0	0	0	0	0
CANYON CREEK	Bottom 100 meters	0.1	2	0	0.00	0	100	0	0	0	0	21
	Tributary Totals (surveyed reaches)	**8.2**		**0**	**0.0**	**0**	**100**	**0**	**0**	**0**	**0**	**21**
	KLICKITAT WATERSHED TOTALS	48.7		**0**		**0**	**114**	**0**	**0**	**0**	**0**	**21**
	Tributary Contribution			**-**		**-**	**88%**	**-**	**-**	**-**	**-**	**100%**
	Mainstem Contribution			**-**		**-**	**12%**	**-**	**-**	**-**	**-**	**0%**

Note - River ice in Dec. and high flows/turbidity in Jan. prevented surveys throughout much of the spawing period

Table C5. Results of 2005 Steelhead spawning surveys in the Klickitat subbasin.

KLICKITAT WATERSHED - STEELHEAD SPAWNING SURVEY RESULTS, 2005

CREEK	REACH	MILES*	REACH TOTALS	REDDS /MILE*	LIVE OBS.	DEAD OBS.
Klickitat						
MAIN STEM	Huckleberry Cr. confl - road washout	3.4	0	0.0	0	0
	Road washout - outhouse	3.2	0	0.0	0	0
	Outhouse - Cow Camp	2.0	0	0.0	0	0
	Cow Camp - main road bridge	2.2	0	0.0	0	0
	Main road bridge - turnout/turnaround	2.3	0	0.0	0	0
	Turnout/turnaround - McCreedy confluence	2.0	0	0.0	0	0
	McCreedy confl. - Chaparral confluence	2.7	0	0.0	0	0
	Chaparral confluence - old upper trap site	1.7	0	0.0	0	0
	Old upper trap site - top of Castile falls complex	1.3	2	1.5	0	0
	Extent of Castile Falls complex	0.7	0	0.0	0	0
	Bottom of Castile complex - West Fork conflu.	0.8	0	0.0	0	0
	West Fork - Signal Peak bridge	2.3	2	0.9	7	0
	Signal Peak bridge - Surveyors Cr. confluence	2.4	0	0.0	6	0
	Surveyors Cr. confluence - Portage	2.0	0	0.0	2	0
	Portage - Big Muddy conflu.	2.8	0	0.0	6	0
	Big Muddy confluence - old USGS gage site	3.6	0	0.0	2	0
	Old USGS gage - Deer Springs	4.1	0	0.0	4	0
	Deer Springs - Hatchery	4.2	0	0.0	4	0
	Hatchery - White Cr. confluence	2.9	5	1.7	9	0
	White Cr. - Summit Cr. confluence	2.5	3	1.2	17	0
	Summit Cr. - Gage cable above Leidl	2.5	6	2.4	7	0
	Gage cable - Leidl bridge	2.6	14	5.4	25	0
	Leidl bridge - Stinson boat landing	2.9	9	3.1	40	0
	Stinson landing - Matt's pond	2.0	2	1.0	4	0
	Matt's pond - Beeks Cr. confluence	2.0	28	13.8	16	0
	Beeks Cr. confluence - Cattle Gate	2.0	14	7.0	14	0
	Cattle Gate - Little Klickitat confluence	3.4	9	2.6	33	0
	Little Klick - Swale Cr. (KFO)	2.7	1	0.4	8	0
	Swale Cr. - Ice house boat landing	1.3	0	0.0	4	0
	Ice house landing - Klickitat village boat landing	2.1	1	0.5	11	0
	Klickitat boat landing - Pitt Bridge boat landing	3.4	15	4.4	23	1
	Pitt bridge - Logging Camp Cr. confluence	1.2	0	0.0	1	0
	Logging Camp Cr. - Bus Turnaround (RM 8)	0.9	0	0.0	4	0
	Bus Turnaround - Dillacorte Cr. confluence	3.1	3	1.0	11	0
	Dillacorte Cr. - Lyle falls screw trap	2.6	12	4.5	11	0
	County Park area below Lyle Falls	0.2	0	0.0	2	0
	MAINSTEM TOTAL	84.2	126	1.5	271	1
TRIBUTARIES						
Trib of trib						
DIAMOND FORK						
McCREEDY CR.	1 mile upstream to confluence	1.0	0	0.0	0	0
CHAPARRAL CR.	Klick road to confluence	0.8				
PISCOE CR.	Bottom 3 miles	3.0	0	0.0	0	0
SURVEYORS CR.	2nd xing to 1st xing	2.2	0	0.0	0	0
	1st xing to mouth	1.7	0	0.0	0	0
BIG MUDDY	End of Rd. to falls	1.4	0	0.0	0	0
TROUT CREEK		4.0	0	0.0	0	0
Bear Cr.		1.0	0	0.0	0	0
OUTLET CREEK		0.3	0	0.0	0	0
WHITE CREEK	Upper Rd. Xing - IXL Rd.	2.8	0	0.0	0	0
	IXL Rd. - 191 Rd. Xing	3.1	0	0.0	0	0
	191 Rd. Xing - Cedar Valley Rd.	2.4	0	0.0	0	0
	Cedar Valley Rd. - Brush Cr.	4.6	15	3.3	0	0
	Brush Cr. - Washed out xing	1.8	1	0.6	0	0
	Washed out Xing. - mouth	3.1	2	0.6	6	1
West Fork White Cr.	Lower LB trib. - mouth	1.9	0	0.0	0	0
Tepee Cr.	RB Trib - IXL Rd.	2.2	0	0.0	0	0
	IXL Rd.- Tepee Cr. Rd.	2.5	0	0.0	0	0
	Tepee Cr. Rd. - mouth	3.4	0	0.0	0	0
East Fork Tepee Cr.						
Brush Creek	Xing 3.8 mi above Coyote Springs Rd.	3.8	0	0.0	0	0
	Coyote Springs Rd. - Cedar Valley Rd.	2.0	0	0.0	0	0
	Cedar Valley Rd. - Blue Creek	2.6	0	0.0	0	0
	Blue Creek - mouth	2.2	0	0.0	0	0
SUMMIT CREEK	Falls - Confluence	1.3	0	0.0	0	0
DEAD CANYON CR	lower 3.5 miles	3.5	2	0.6	0	0
BEEKS CANYON	Falls to mouth	0.5	0	0.0	0	0
LITTLE KLICKITAT	Falls to Mill Cr.	2.6	0	0.0	1	0
	Mill Cr. to Bowman Cr.	2.5	1	0.4	3	0
	Bowman Cr. - Bridge	0.9	3	3.3	0	0
	Bridge to mouth	0.3	1	3.3	0	0
Bowman Cr.	Falls - mouth	1.0	3	3.0	7	0
Canyon Cr.	Right bank trib #3 - left bank trib #1	1.0	0	0.0	0	0
	Left bank trib #1 - Weeping Wall	1.0	0	0.0	0	0
	Weeping wall - mouth	1.0	0	0.0	0	0
Mill Cr.						
East Prong		1.0				
West Prong		1.0				
SWALE CREEK	above railroad trestle	1.1	0	0.0	0	0
	Trestle to mouth	1.1	2	1.8	0	0
SNYDER CREEK	Upper falls - Lower falls	0.7	0	0.0	0	0
	Lower falls - upper culvert	1.0	0	0.0	0	0
	Upper culvert - mouth	0.9	1	1.1	0	0
LOGGING CAMP CR		1.0	0	0.0	0	0
WHEELER CREEK		2.0	0	0.0	0	0
DILLACORTE CR	Falls - mouth	1.5	0	0.0	0	0
SILVA CREEK	Bottom	0.1	0			0
CANYON CREEK	Bottom 1/4 mile	0.3	0			0
	Tributary Totals	62.1	31	0.5	17	1
	KLICKITAT WATERSHED TOTALS	**146.3**	**157**		**288**	**2**
n/s = not surveyed	**Tributary Contribution**		**20%**		**6%**	**50%**
	Mainstem Contribution		**80%**		**94%**	**50%**

Appendix D. Scale analysis

Table D1. Average, minimum, and maximum fork length and postorbital-hypural length by age and sex for naturally-spawning spring Chinook in the Klickitat R. in 2005.

2005 Spring Chinook Natural Spawner Scale Age Data

			Fork Length (cm)			Postorbital-Hypural Length (cm)			%	%
Age	Sex	Count	Avg.	Min.	Max.	Avg.	Min.	Max.	of sex	of total
4	f	2	80.5	79.0	82.0	66.0	66.0	66.0	66.7%	66.7%
5	f	1	94.0	94.0	94.0	76.0	76.0	76.0	33.3%	33.3%
Total males		0								
Total females		3								
Grand total		3								

Table D2. Average, minimum, and maximum fork length and postorbital-hypural length by age and sex for naturally-spawning fall Chinook in the Klickitat R. in 2005.

2005 Fall Chinook Natural Spawner Scale Age Data

			Fork Length (cm)			Postorbital-Hypural Length (cm)			%	%
Age	Sex	Count	Avg.	Min.	Max.	Avg.	Min.	Max.	of sex	of total
2	m	1	40.5	40.5	40.5	32.0	32.0	32.0	2.5%	0.8%
3	f	23	77.6	66.0	85.0	65.0	55.0	73.0	29.1%	19.3%
	m	20	73.7	56.0	85.0	59.9	45.0	69.0	50.0%	16.8%
4	f	47	84.4	74.0	103.0	70.1	60.0	88.0	59.5%	39.5%
	m	10	88.7	81.0	99.0	70.4	62.0	79.0	25.0%	8.4%
5	f	9	89.6	74.0	94.0	73.9	58.0	78.0	11.4%	7.6%
	m	9	100.8	94.5	110.0	81.4	74.0	90.0	22.5%	7.6%
Total males		40								
Total females		79								
Grand total		119								

Appendix E. Sediment data

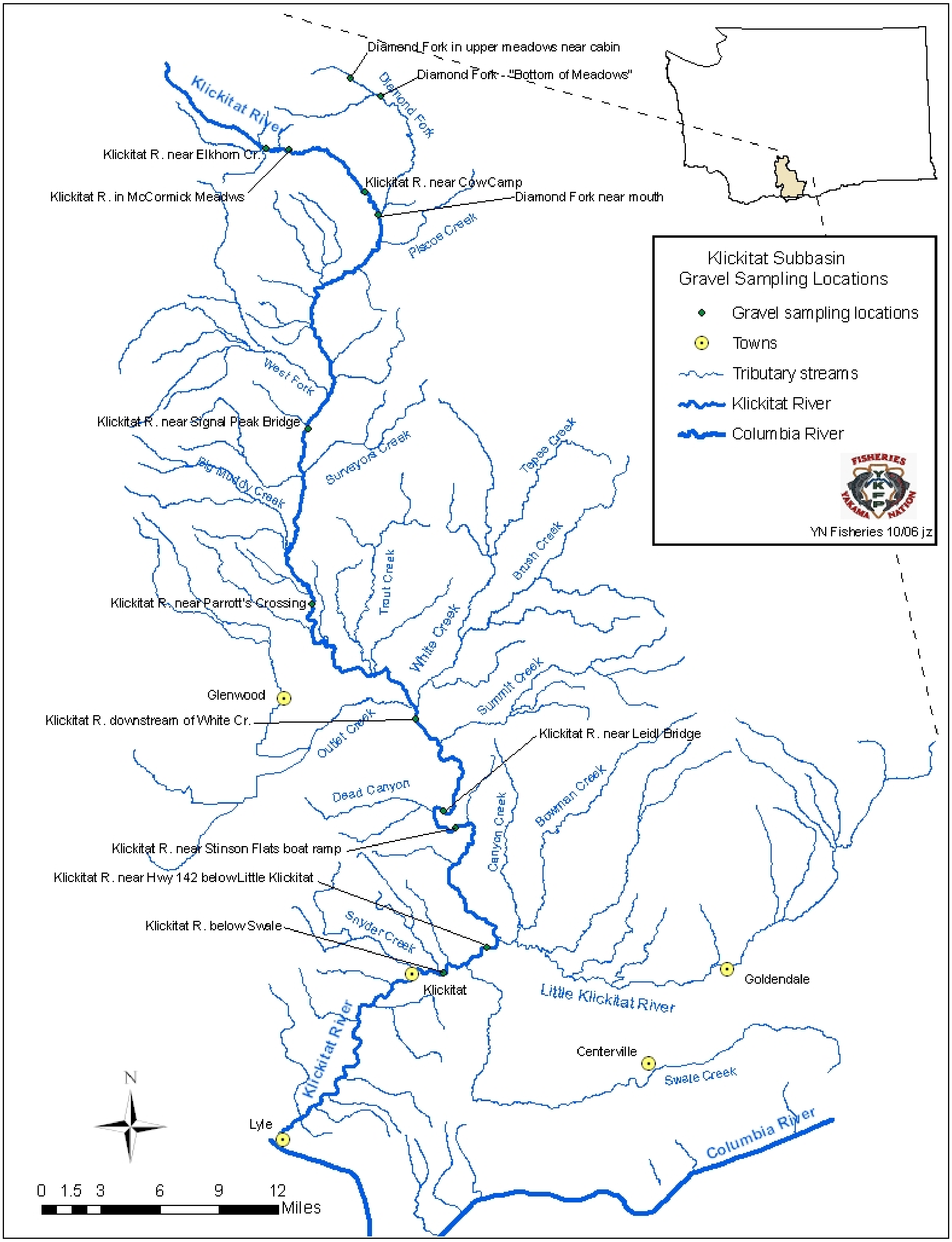

Figure E1. Locations of 2005 Klickitat subbasin sediment sampling sites.

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	100.0	76.6	56.3	48.7	41.3	29.6	20.3	14.3	12.9	8.3	5.0
2003	96.0	61.7	47.2	42.0	37.1	30.1	24.8	20.8	19.3	11.6	6.9
2004	99.0	66.3	47.9	41.6	35.6	26.6	19.1	14.1	12.4	7.7	4.7
2005	98.6	72.1	52.0	45.1	38.3	27.7	19.4	14.7	13.2	8.6	5.5

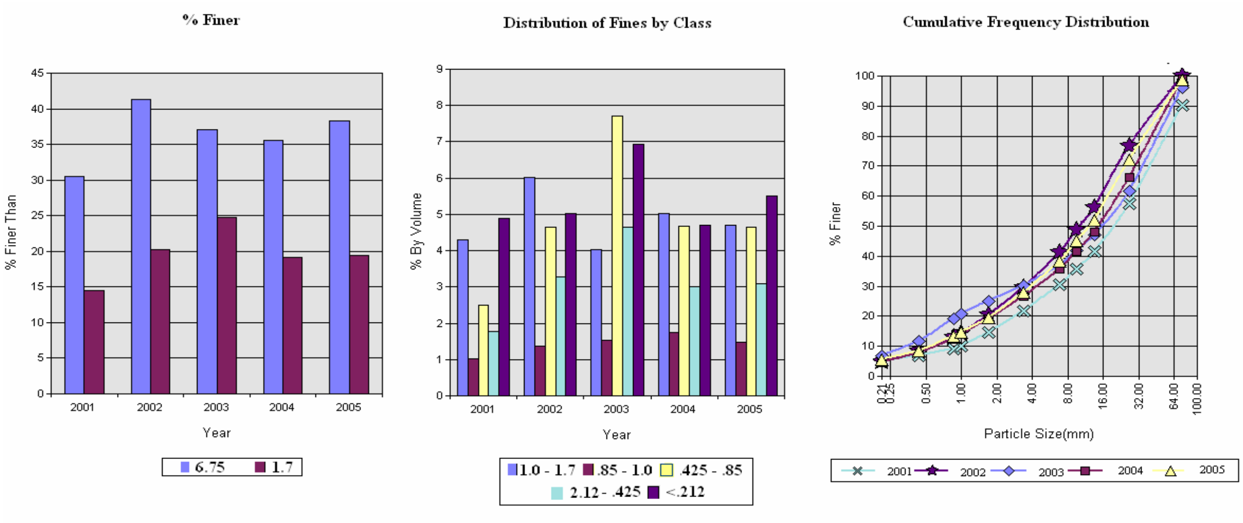

Figure E2. Sediment sampling data from Diamond Fork Bottom of Meadows 2001-2005.

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
1999	97.3	64.9	47.0	40.1	35.0	26.7	19.0	14.3	13.1	9.8	7.8
2000	86.1	44.9	32.8	28.6	25.3	19.7	13.9	8.7	7.3	4.2	3.0
2003	93.8	62.2	43.5	36.3	29.7	19.7	12.5	8.9	8.0	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
2005	89.6	62.4	44.9	38.8	33.0	24.0	17.7	13.3	12.0	8.3	5.8

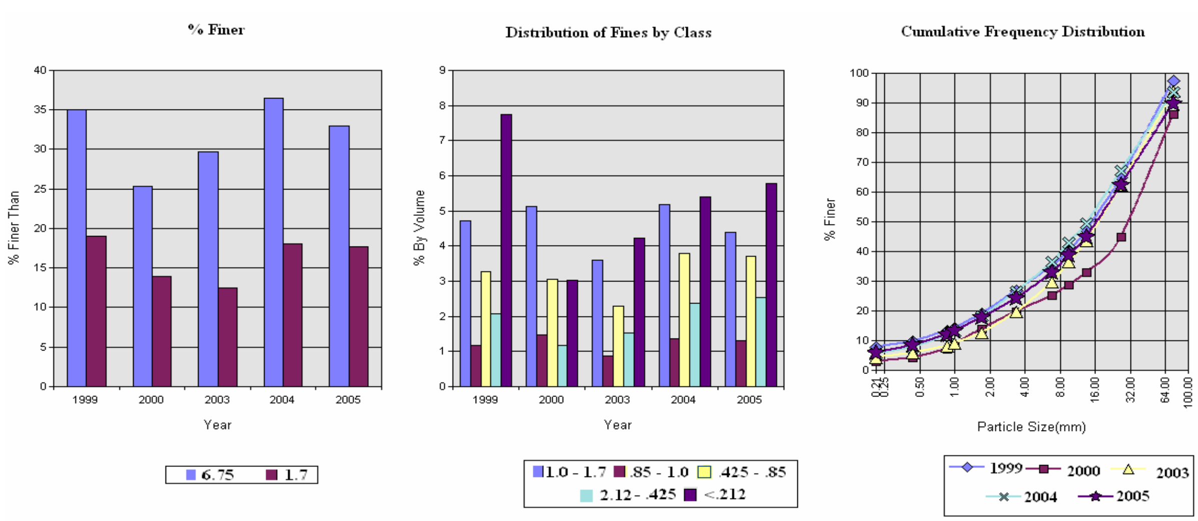

Figure E3. Sediment sampling data from Diamond Fork near mouth 1999-2005.

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
2000	100.0	78.7	60.1	52.9	45.6	35.1	27.2	22.2	20.6	13.8	8.4
2001	98.2	73.1	55.4	48.9	42.5	32.4	24.5	19.9	18.6	13.4	8.7
2002	95.0	52.4	35.6	30.1	25.1	17.7	11.5	8.6	7.8	5.8	4.6
2003	100.0	72.0	46.4	38.3	31.1	21.7	15.2	11.7	10.9	6.5	3.7
2004	100.0	66.4	43.7	37.5	31.4	22.3	15.5	11.3	10.3	6.4	3.9
2005	100.0	72.8	53.8	47.0	40.1	28.8	20.7	15.7	14.5	8.8	5.1

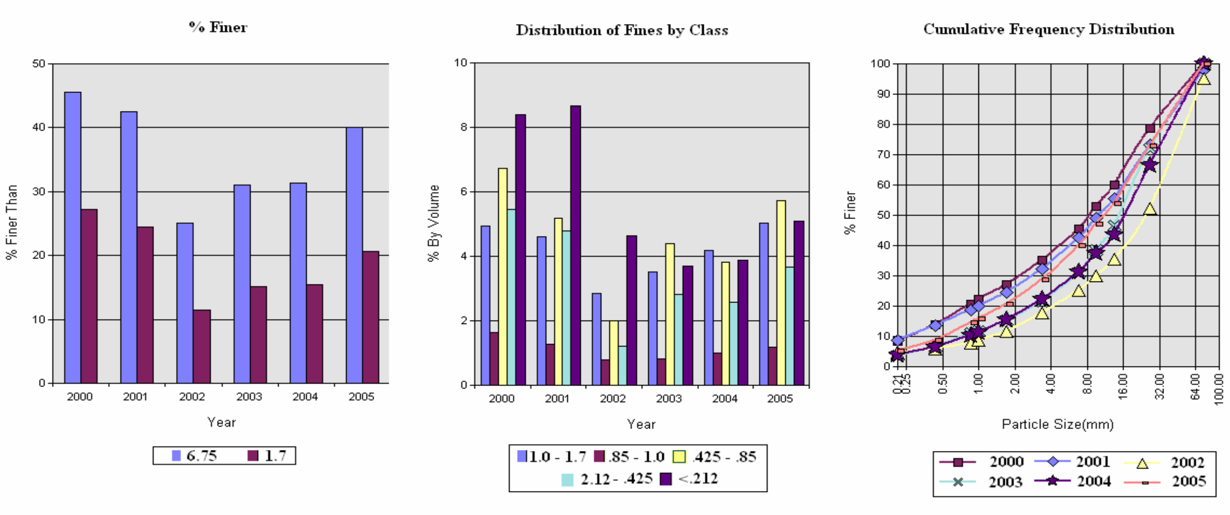

Figure E4. Sediment sampling data from Diamond Fork in upper meadows 2000-2005.

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
1999	100.0	71.6	56.6	51.3	46.8	40.3	33.5	23.9	20.0	8.3	3.4
2000	86.6	46.8	32.5	27.4	24.2	20.6	17.9	13.5	11.8	7.5	5.5
2003	94.9	65.2	46.9	41.9	37.9	32.8	27.8	19.4	15.8	7.4	4.8
2004	94.0	61.8	45.8	41.0	37.1	31.9	26.6	17.0	12.5	4.9	2.6
2005	88.3	54.8	39.7	35.1	31.2	26.3	21.8	13.9	11.4	5.3	3.1

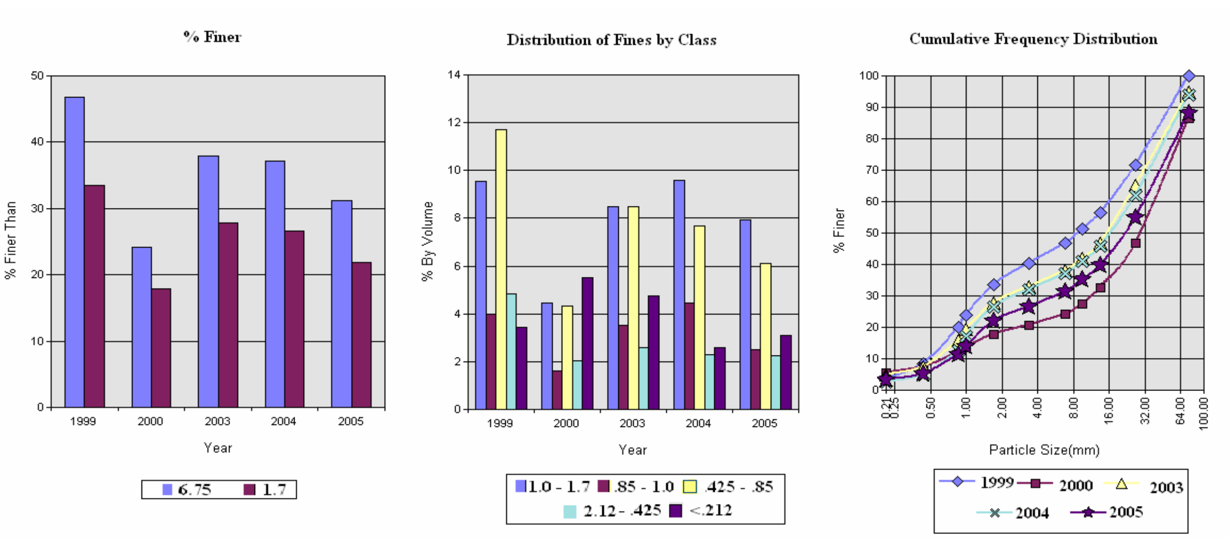

Figure E5. Sediment sampling data from Klickitat R. below Swale Cr. 1999-2005.

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
1999	94.2	53.6	37.9	33.2	29.5	23.8	18.2	13.1	11.5	7.0	4.9
2000	83.8	42.4	29.3	24.4	20.4	15.4	12.3	9.9	9.0	5.5	3.7
2001	92.0	49.1	34.0	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
2005	85.2	55.2	39.9	34.4	29.9	23.4	18.1	13.3	11.7	7.6	4.3

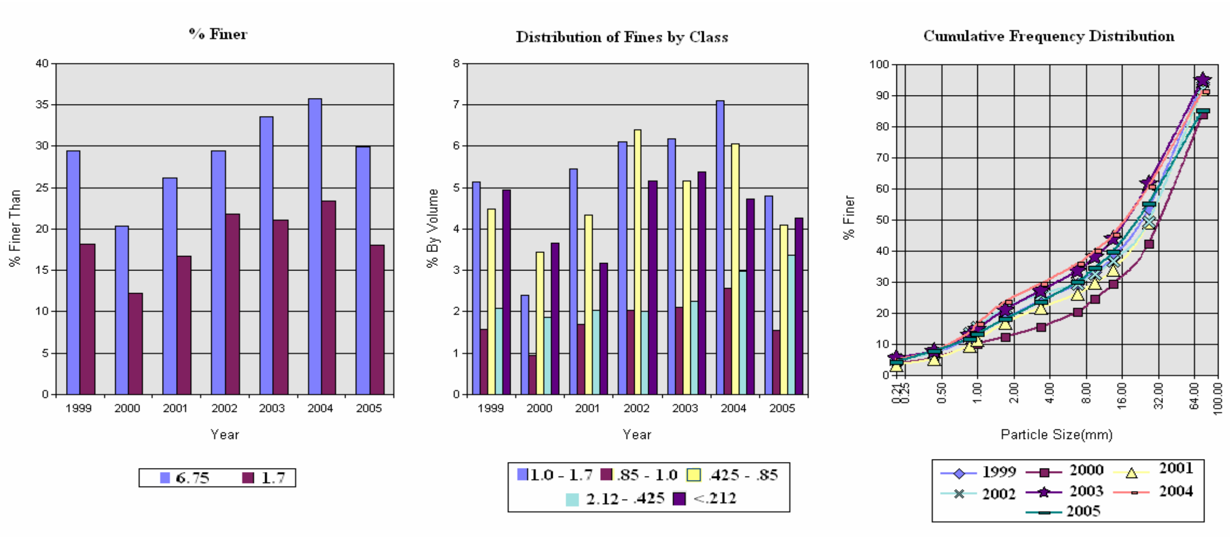

Figure E6. Sediment sampling data from Klickitat R. downstream of White Cr. 1999-2005.

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
1998	91.5	61.4	45.6	39.3	33.1	24.8	18.6	14.6	13.2	8.7	4.7
2003	95.6	49.0	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	27.0	18.8	13.0	9.4	8.2	5.1	3.5
2005	99.0	63.9	42.0	34.4	28.0	19.4	13.5	9.9	8.8	5.8	4.0

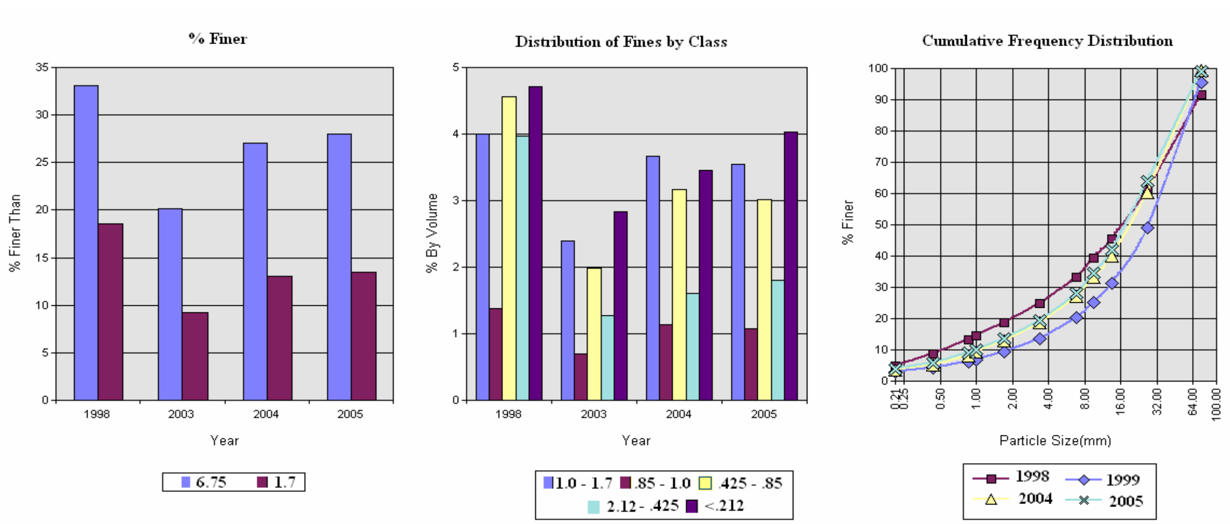

Figure E7. Sediment sampling data from Klickitat R. in McCormick Meadows 1998-2005.

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
1999	88.1	60.1	47.6	42.6	38.3	32.8	28.2	24.3	22.7	15.8	11.6
2000	91.9	42.7	28.4	24.0	21.2	17.6	14.1	10.6	9.6	6.2	4.2
2001	88.7	56.4	40.2	34.5	29.7	23.9	20.0	17.0	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	28.0	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	20.0	16.1	12.1	10.5	5.7	3.4
2005	86.5	54.6	39.8	34.6	29.5	23.4	19.0	15.5	14.1	8.1	4.9

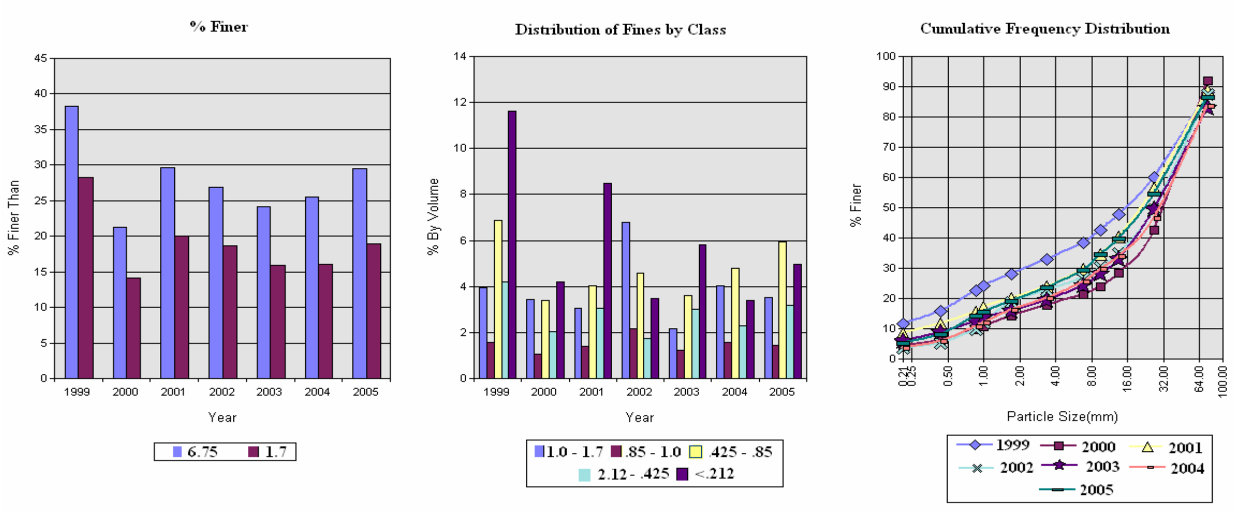

Figure E8. Sediment data from Klickitat R. below Little Klickitat R. 1999-2005.

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	4.0
1999	98.1	57.7	38.8	32.3	27.0	20.5	16.3	13.9	13.1	10.9	8.7
2000	93.1	67.0	49.8	43.7	38.8	30.9	24.8	21.1	20.0	17.1	15.2
2001	97.1	62.6	42.3	35.5	30.0	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	45.0	26.4	20.6	16.2	10.8	7.6	5.9	5.4	4.0	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
2005	87.0	58.3	41.7	35.3	29.4	20.8	14.2	10.3	9.4	6.2	4.3

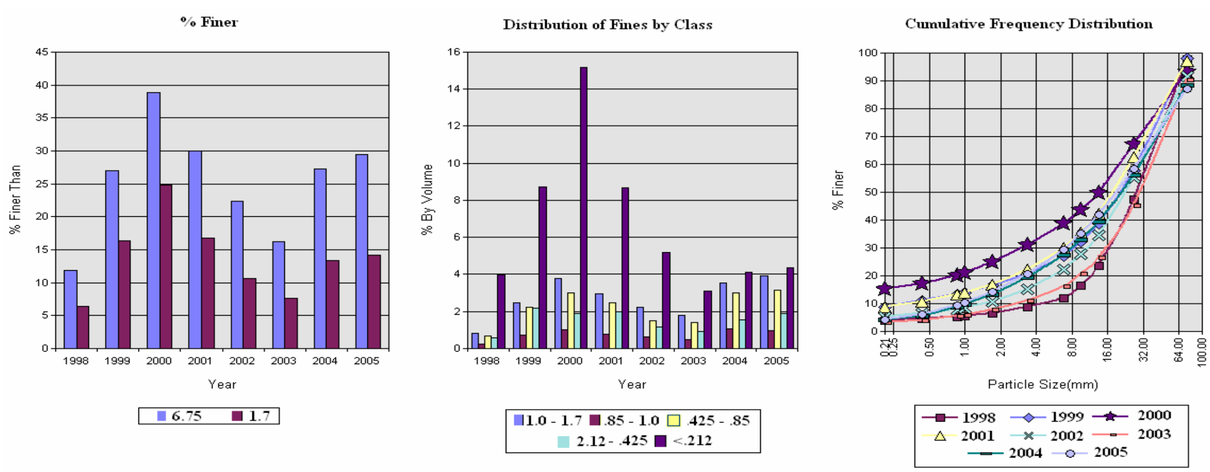

Figure E9. Sediment sampling data from Klickitat R. near Cow Camp 1998-2005.

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
2000	92.2	34.8	23.7	21.2	19.1	16.9	14.2	10.7	9.3	5.0	3.1
2003	95.0	38.3	23.1	22.5	21.9	18.8	14.2	8.0	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
2005	87.6	41.8	29.3	27.0	24.9	21.5	17.8	12.8	10.9	5.7	3.9

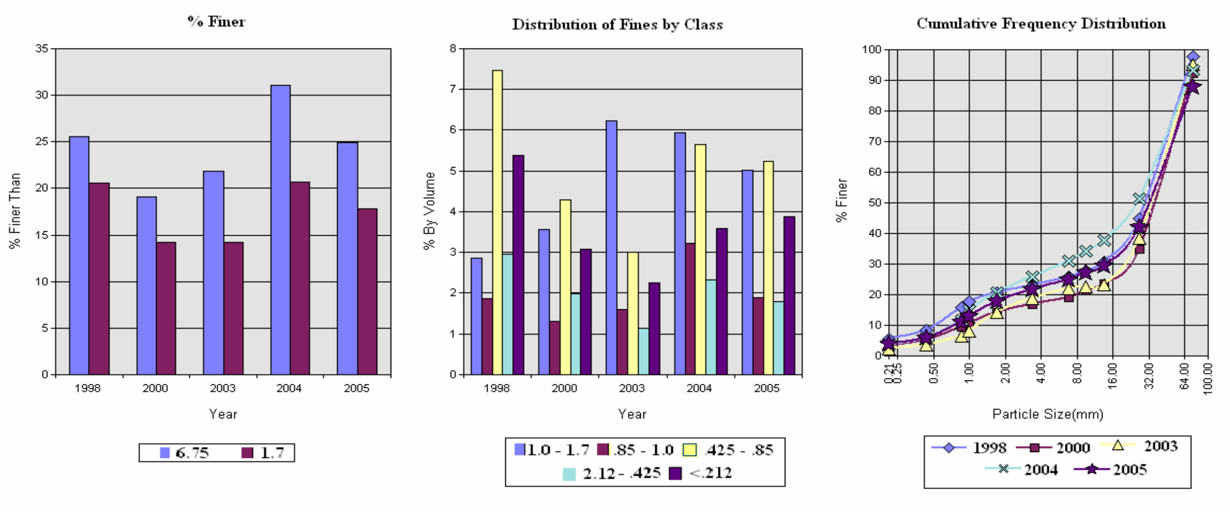

Figure E10. Sediment sampling data from Klickitat R. near Leidl Bridge 1998-2005.

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
1999	91.4	62.4	50.7	46.5	42.4	35.3	28.7	23.3	21.5	14.2	8.4
2000	79.8	43.8	32.2	28.0	24.8	19.2	13.4	8.6	7.2	4.2	3.0
2002	92.6	45.7	30.3	25.6	22.3	18.2	14.8	10.7	9.2	5.1	3.0
2003	81.8	44.2	33.2	29.0	25.6	20.4	16.0	12.3	11.1	6.8	4.4
2004	96.6	56.3	42.0	36.3	30.8	22.5	15.5	11.0	9.7	5.8	4.1
2005	93.1	63.2	48.3	43.0	38.4	31.4	26.1	22.0	20.6	14.2	9.2

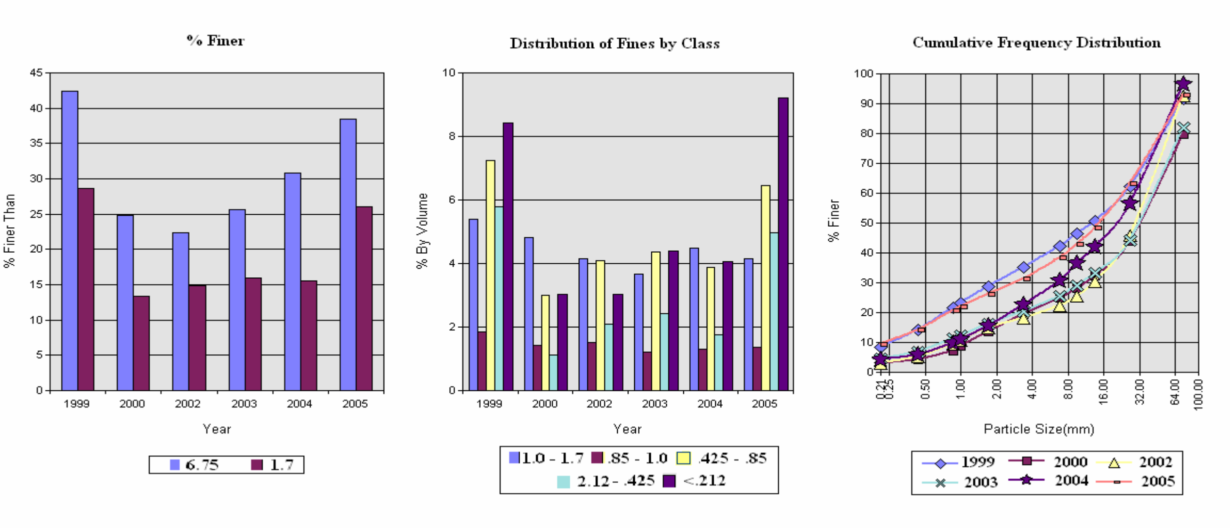

Figure E11. Sediment sampling data from Klickitat R. near Parrott's Crossing 1999-2005.

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
1999	96.3	58.5	42.6	38.3	33.9	28.5	23.8	19.0	17.0	10.4	8.1
2000	90.8	38.3	22.0	17.4	14.9	12.3	9.9	7.0	5.7	3.4	2.4
2002	89.5	51.2	35.6	29.5	24.5	18.2	14.6	11.8	10.9	7.0	5.0
2003	89.4	55.5	40.1	36.4	33.8	30.4	27.2	21.1	18.5	10.7	7.3
2004	84.0	56.5	43.9	40.3	35.8	32.3	28.2	19.0	15.0	6.2	3.8
2005	86.6	44.6	29.0	25.7	23.4	20.9	18.8	14.9	13.1	7.5	4.8

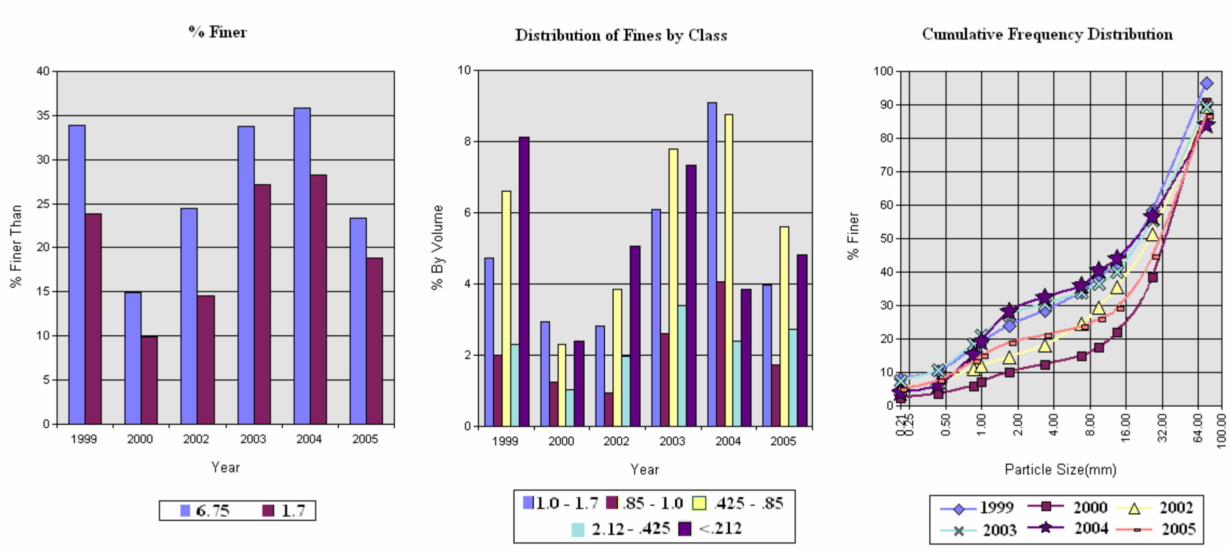

Figure E12. Sediment sampling data from Klickitat R. near Stinson Flats 1999-2005.

Site Name: White Creek meadow below Tepee Creek confluence

Year:	%<75.0m	%<26.5mm	%<13.5m	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425m	%<0.212m
2005	100.0	78.2	55.8	47.7	40.8	31.9	26.4	23.9	22.7	16.6	12.5

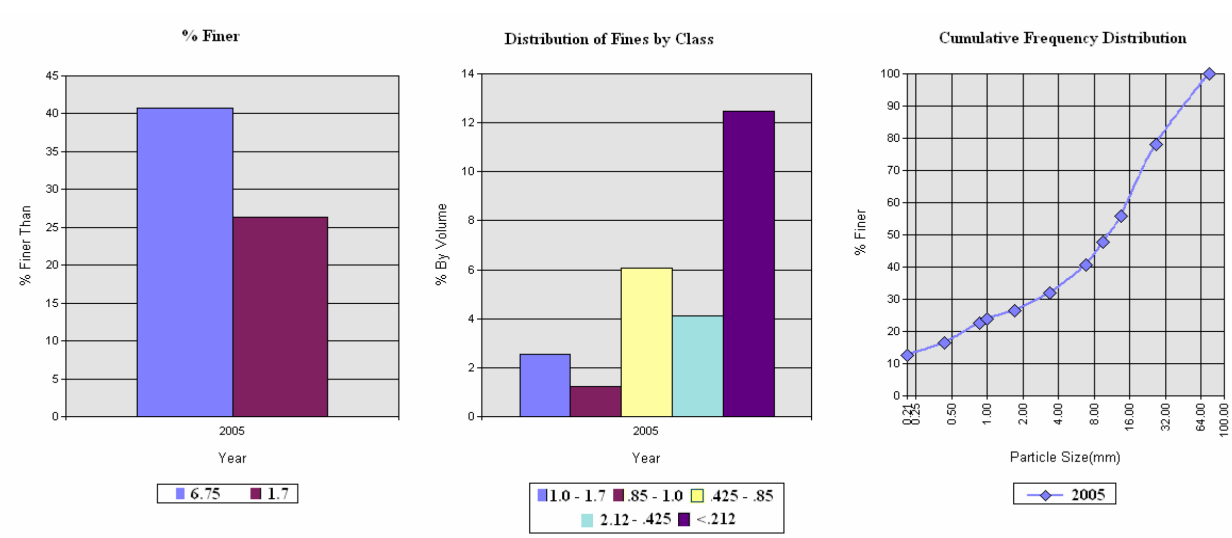

Figure E13. Sediment sampling data from White Cr. below Tepee Cr. 2005.

Appendix F. Temperature and Water Quality Monitoring

Table F1. Site name and stream of Klickitat subbasin temperature and water quality monitoring locations.

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

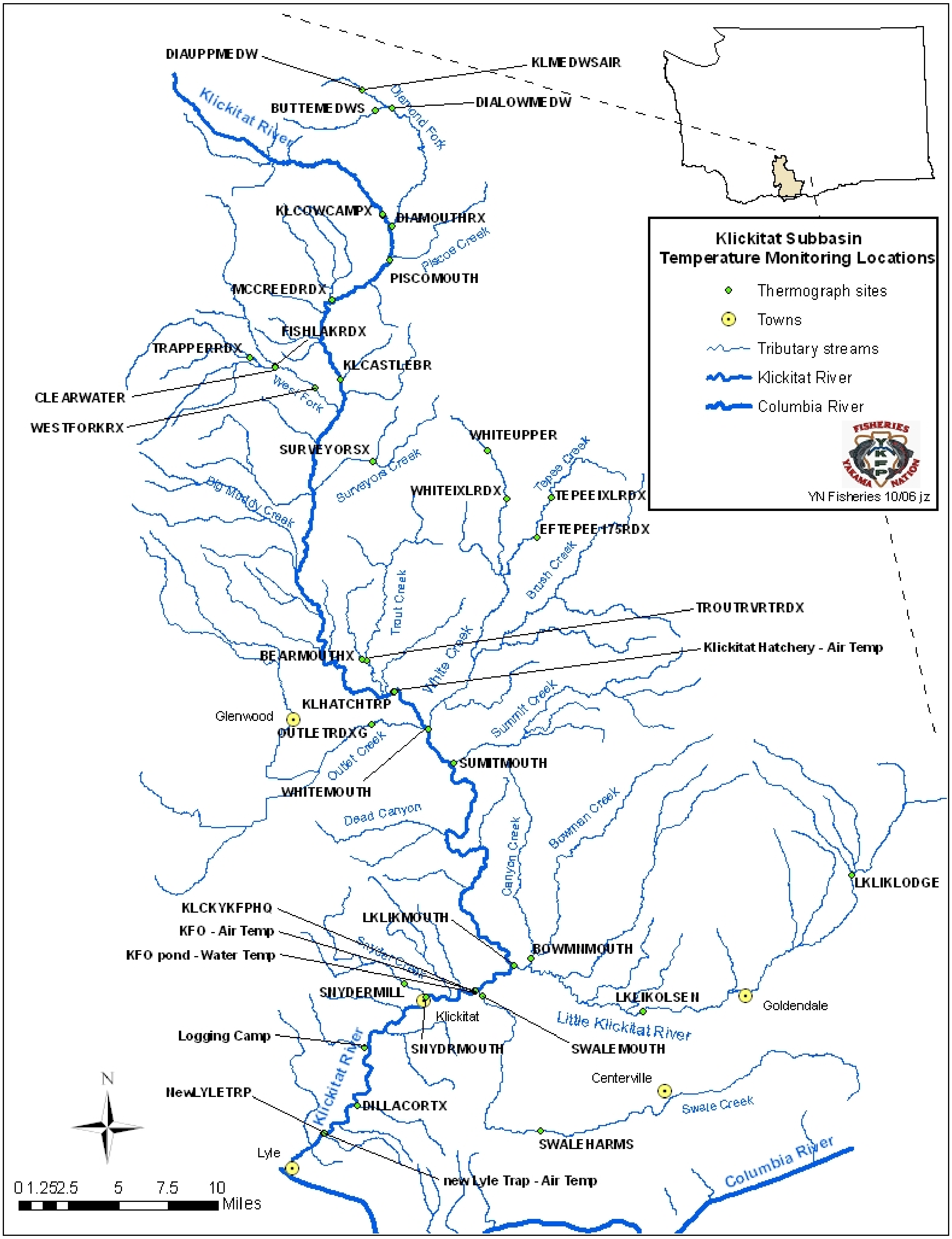

Figure F1. Locations of Klickitat subbasin temperature and water quality monitoring sites.

Table F2. Monthly temperature summaries from 37 sites in the Klickitat subbasin. All temperatures and ranges in degrees Celsius. "--" indicates no data. See description under Task 1.f. in the narrative for an explanation of metrics used.

BEARMOUTHX

2005	# 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	0	0	0	0	0	13	0	0	0	0	15.8	4.9	3.0
June	30	0	0	0	0	0	0	22	0	0	0	0	16.6	6.7	3.3
July	31	0	0	0	0	0	0	31	0	0	0	0	16.1	4.2	3.3
August	31	0	0	0	0	0	0	31	0	0	0	0	15.6	4.2	3.2
September	30	0	0	0	0	0	0	0	0	0	0	0	12.4	3.1	2.4
October	31	0	0	0	0	0	0	0	0	0	0	0	10.2	2.3	1.1
November	30	1	28	1	27	0	0	0	0	0	0	0	7.1	1.7	0.6
December	31	2	31	2	31	0	0	0	0	0	0	0	2.4	1.1	0.2

2006	# 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
January	31	0	31	0	31	0	0	0	0	0	0	0	3.7	2.5	1.0
February	28	4	28	3	28	0	0	0	0	0	0	0	4.0	2.2	1.3
March	31	0	27	0	21	0	0	0	0	0	0	0	8.2	3.4	2.0
April	30	0	6	0	0	0	0	0	0	0	0	0	12.4	5.7	3.6

BOWMNMOUTH

2005	# 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	0	0	0	0	0	31	5	0	0	0	18.1	6.0	3.4
June	17	0	0	0	0	0	0	17	0	0	0	0	16.1	5.3	4.0

BUTTEMEDWS

2005	# 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	24	0	10	0	0	0	0	0	0	0	13.5	7.7	4.1
June	30	0	10	0	0	0	0	10	0	0	0	0	15.4	9.3	5.8
July	31	0	0	0	0	0	0	31	6	0	0	0	17.1	9.6	7.4
August	31	0	0	0	0	0	0	31	4	0	0	0	17.5	9.0	7.0
September	30	0	23	0	8	0	0	0	0	0	0	0	12.3	6.7	4.8
October	31	4	28	0	21	0	0	0	0	0	0	0	7.3	3.9	2.4
November	30	29	30	28	30	0	0	0	0	0	0	0	2.3	1.4	0.3
December	31	31	31	31	31	0	0	0	0	0	0	0	0.1	0.2	0.1

2006	# 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
January	31	31	31	31	31	0	0	0	0	0	0	0	1.1	1.0	0.2
February	28	28	28	28	28	0	0	0	0	0	0	0	0.3	0.2	0.1
March	31	22	31	14	31	0	0	0	0	0	0	0	2.0	1.6	0.6
April	30	9	30	1	30	0	0	0	0	0	0	0	3.3	2.4	1.4

CLEARWATER

2005	# 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	5	0	1	0	0	0	0	0	0	0	0	0	6.8	2.5	1.4
June	17	0	0	0	0	0	0	0	0	0	0	0	9.7	3.4	2.4
July	31	0	0	0	0	0	0	0	0	0	0	0	10.1	3.4	2.6
August	31	0	0	0	0	0	0	0	0	0	0	0	10.2	3.6	2.7
September	30	0	6	0	0	0	0	0	0	0	0	0	8.5	3.1	1.9
October	31	0	11	0	2	0	0	0	0	0	0	0	6.8	1.7	1.2
November	30	0	30	0	29	0	0	0	0	0	0	0	5.1	2.0	1.0
December	31	2	31	0	31	0	0	0	0	0	0	0	4.0	2.1	1.0

CLEARWATER

2006	# 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
January	31	0	31	0	31	0	0	0	0	0	0	0	3.9	1.7	0.8
February	28	3	28	0	28	0	0	0	0	0	0	0	4.2	1.7	1.0
March	31	0	31	0	31	0	0	0	0	0	0	0	5.0	1.9	1.1
April	30	0	30	0	23	0	0	0	0	0	0	0	6.2	2.5	1.6

COWCAMPAIR

2005	# 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
December	16	16	16	12	16	0	0	0	0	0	0	0	4.6	15.2	4.9

2006	# 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
January	31	31	31	30	31	0	0	0	0	0	0	0	2.9	9.0	4.0
February	28	28	28	26	28	0	0	0	0	0	0	0	7.4	25.1	10.8
March	31	31	31	21	31	0	0	0	0	0	0	0	11.8	19.1	11.1
April	30	30	30	4	24	1	1	12	6	0	0	0	25.2	26.2	14.5

DIALOWMEDW

2005	# 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	30	0	6	0	0	0	0	23	4	0	0	0	19.2	11.5	7.8
July	31	0	0	0	0	0	0	31	31	24	22	0	21.7	12.6	10.2
August	31	0	0	0	0	0	0	31	31	25	24	0	22.3	12.4	10.3
September	19	0	6	0	0	0	0	14	0	0	0	0	17.1	11.0	8.3
October	28	3	23	0	12	0	0	0	0	0	0	0	11.0	7.6	4.9
November	30	29	30	28	30	0	0	0	0	0	0	0	3.1	2.9	0.2
December	31	31	31	30	31	0	0	0	0	0	0	0	1.2	0.8	0.1

DIALOWMEDW

2006	# 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
January	31	31	31	31	31	0	0	0	0	0	0	0	0.9	0.8	0.1
February	28	28	28	28	28	0	0	0	0	0	0	0	0.1	0.0	0.0
March	31	31	31	26	31	0	0	0	0	0	0	0	2.3	2.2	0.4
April	30	18	30	1	30	0	0	0	0	0	0	0	5.3	5.2	2.9

DIAMOUTHRX

2005	# 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	8	0	0	0	0	5	0	0	0	0	15.0	6.9	4.0
June	30	0	1	0	0	0	0	15	0	0	0	0	16.9	7.3	5.1
July	31	0	0	0	0	0	0	31	22	4	0	0	18.6	8.0	6.4
August	21	0	0	0	0	0	0	21	18	2	0	0	18.3	7.7	6.3
October	27	0	15	0	5	0	0	0	0	0	0	0	9.4	3.4	2.5
November	30	26	30	13	30	0	0	0	0	0	0	0	4.4	2.2	1.0
December	31	31	31	27	31	0	0	0	0	0	0	0	1.9	1.6	0.2

2006	# 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
January	31	25	31	11	31	0	0	0	0	0	0	0	2.2	1.6	0.8
February	28	26	28	22	28	0	0	0	0	0	0	0	2.5	1.8	0.5
March	31	15	31	5	31	0	0	0	0	0	0	0	4.4	2.7	1.6
April	30	1	30	0	30	0	0	0	0	0	0	0	7.0	5.0	3.0

DIAUPPMEDW

2005	# 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	13	0	1	0	0	8	0	0	0	0	14.7	9.2	5.7
July	22	0	0	0	0	0	0	22	18	5	1	0	18.9	11.6	9.6
August	31	0	0	0	0	0	0	31	23	9	6	0	20.5	11.5	9.6
September	15	0	10	0	1	0	0	7	0	0	0	0	14.9	9.9	7.6
October	28	3	26	0	13	0	0	0	0	0	0	0	9.8	7.0	4.3
November	30	28	30	25	30	0	0	0	0	0	0	0	2.6	2.1	0.5
December	31	29	31	27	31	0	0	0	0	0	0	0	1.8	1.3	0.3

2006	# 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
January	31	16	31	9	31	0	0	0	0	0	0	0	1.7	1.0	0.6
February	28	18	28	10	28	0	0	0	0	0	0	0	1.8	1.1	0.5
March	31	5	31	3	31	0	0	0	0	0	0	0	2.3	1.6	0.7
April	30	2	30	0	30	0	0	0	0	0	0	0	2.9	2.1	1.2

DILLACORTX

2005	# 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	23	0	0	0	0	0	0	23	23	11	10	0	19.6	3.2	1.8
July	31	0	0	0	0	15	6	31	31	31	31	17	24.8	5.0	3.2
August	31	0	0	0	0	28	21	31	31	31	31	31	31.5	15.5	7.3
September	30	0	0	0	0	10	9	30	22	18	17	11	32.1	17.5	6.3
October	31	0	0	0	0	0	0	31	0	0	0	0	16.9	2.6	0.9
November	20	0	0	0	0	0	0	7	0	0	0	0	14.2	0.8	0.5

EFTEPEE175RDX

2005	# 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	0	0	0	0	0	6	0	0	0	0	14.7	4.5	2.9
June	30	0	0	0	0	0	0	9	0	0	0	0	13.0	4.2	2.4
July	31	0	0	0	0	0	0	31	0	0	0	0	14.3	2.8	1.5
August	31	0	0	0	0	0	0	24	0	0	0	0	14.4	2.3	1.1
September	30	0	3	0	0	0	0	0	0	0	0	0	10.6	2.0	0.7
October	31	0	9	0	2	0	0	0	0	0	0	0	8.2	2.5	0.9
November	30	2	29	1	29	0	0	0	0	0	0	0	5.6	1.7	0.3
December	31	31	31	31	31	0	0	0	0	0	0	0	0.4	0.3	0.1

2006	# 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
January	31	16	31	13	31	0	0	0	0	0	0	0	2.0	1.3	0.3
February	28	11	28	7	28	0	0	0	0	0	0	0	1.9	0.8	0.4
March	31	0	31	0	31	0	0	0	0	0	0	0	4.2	1.4	0.7
April	30	0	18	0	16	0	0	0	0	0	0	0	7.6	1.4	0.6

FISHLAKRDX

2005	# 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	29	0	0	0	0	0	0	0	0	0	0	0	12.2	4.7	3.1
July	31	0	0	0	0	0	0	0	0	0	0	0	11.9	4.8	3.8
August	31	0	0	0	0	0	0	0	0	0	0	0	11.3	4.6	3.4
September	24	0	5	0	0	0	0	0	0	0	0	0	8.7	3.3	2.3
October	31	0	18	0	5	0	0	0	0	0	0	0	7.0	2.2	1.4
November	30	2	30	1	29	0	0	0	0	0	0	0	5.1	2.2	1.1
December	31	14	31	8	31	0	0	0	0	0	0	0	2.8	2.2	0.8

FISHLAKRDX

2006	# 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
January	31	0	31	0	31	0	0	0	0	0	0	0	2.8	1.4	0.8
February	28	10	28	4	28	0	0	0	0	0	0	0	3.1	2.4	1.0
March	31	1	31	0	31	0	0	0	0	0	0	0	4.5	2.2	1.5
April	30	0	30	0	30	0	0	0	0	0	0	0	5.7	3.2	2.1

HATCAIRTEM

2005	# 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	31	0	3	0	0	30	29	31	31	31	31	31	35.3	27.4	21.1
September	30	6	19	0	0	12	8	30	30	29	29	9	29.1	23.7	18.5
October	31	6	20	0	3	0	0	26	14	0	0	0	20.2	16.5	11.7
November	30	27	30	14	29	0	0	0	0	0	0	0	9.4	11.3	5.2
December	31	31	31	27	31	0	0	0	0	0	0	0	3.7	12.8	4.9

2006	# 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
January	31	29	31	9	31	0	0	0	0	0	0	0	6.2	6.5	4.0
February	28	27	28	20	28	0	0	0	0	0	0	0	9.0	16.9	8.9
March	31	25	31	2	23	0	0	12	0	0	0	0	16.4	16.5	11.2
April	24	14	21	0	4	0	0	24	4	0	0	0	22.5	22.6	13.7

KLCASTLEBR

2005	# 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	0	0	0	0	0	6	0	0	0	0	14.7	5.9	3.6
June	30	0	0	0	0	0	0	23	3	0	0	0	17.6	8.8	4.9
July	31	0	0	0	0	0	0	31	31	18	17	0	19.7	7.6	6.1
August	31	0	0	0	0	0	0	31	25	17	11	0	19.2	7.2	5.7
September	30	0	0	0	0	0	0	13	0	0	0	0	15.2	5.6	4.1
October	31	0	4	0	2	0	0	0	0	0	0	0	9.9	3.6	2.4
November	30	12	29	4	29	0	0	0	0	0	0	0	5.6	3.5	1.4
December	31	29	31	26	31	0	0	0	0	0	0	0	2.1	1.9	0.4
2006	**# 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**
January	31	7	31	2	31	0	0	0	0	0	0	0	2.9	2.1	1.1
February	28	20	28	11	28	0	0	0	0	0	0	0	3.2	2.4	1.1
March	31	6	31	0	29	0	0	0	0	0	0	0	6.4	3.9	2.4
April	30	0	30	0	17	0	0	0	0	0	0	0	8.4	5.0	3.2

KLCKYKFPHQ

2005	# 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	0	0	0	0	0	29	0	0	0	0	16.5	2.5	1.6
June	30	0	0	0	0	0	0	30	16	13	12	0	22.3	7.7	3.9
July	31	0	0	0	0	0	0	31	31	31	31	2	22.8	8.2	6.1
August	31	0	0	0	0	0	0	31	31	24	21	0	20.0	3.8	3.0
September	30	0	0	0	0	0	0	30	1	0	0	0	16.3	3.6	2.8
October	31	0	0	0	0	0	0	3	0	0	0	0	12.9	2.3	1.2
November	30	0	0	0	0	0	0	0	0	0	0	0	10.9	1.7	0.8
December	31	0	30	0	25	0	0	0	0	0	0	0	6.1	1.1	0.5

KLCKYKFPHQ

2006	# 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
January	31	0	22	0	10	0	0	0	0	0	0	0	6.9	2.7	1.0
February	28	4	23	0	19	0	0	0	0	0	0	0	6.4	2.7	1.7
March	31	0	11	0	0	0	0	0	0	0	0	0	10.1	3.9	2.6
April	30	0	0	0	0	0	0	0	0	0	0	0	12.4	4.7	2.7

KLCOWCAMPX

2005	# 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	7	0	0	0	0	4	0	0	0	0	13.2	6.5	3.9
June	30	0	0	0	0	0	0	17	0	0	0	0	17.3	8.3	5.9
July	31	0	0	0	0	0	0	31	25	18	14	0	19.6	8.4	6.8
August	31	0	0	0	0	0	0	31	30	20	16	0	19.8	8.6	7.5
September	30	0	6	0	0	0	0	25	0	0	0	0	16.5	9.2	6.8
October	31	0	13	0	4	0	0	0	0	0	0	0	10.4	7.2	3.1
November	30	15	30	5	29	0	0	0	0	0	0	0	5.0	2.9	1.5
December	31	26	31	25	31	0	0	0	0	0	0	0	2.9	2.9	0.3

2006	# 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
January	31	0	31	0	31	0	0	0	0	0	0	0	2.8	1.9	0.9
February	28	7	28	6	28	0	0	0	0	0	0	0	3.1	1.6	0.7
March	31	0	31	0	31	0	0	0	0	0	0	0	5.0	2.4	1.6
April	30	0	30	0	28	0	0	0	0	0	0	0	6.1	3.0	1.8

KLHATCHTRP

2005	# 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	17	0	0	0	0	0	0	17	3	0	0	0	17.8	5.3	3.8
July	31	0	0	0	0	0	0	31	26	10	0	0	18.4	6.0	4.8
August	31	0	0	0	0	0	0	31	22	6	1	0	18.6	5.8	5.0
September	30	0	0	0	0	0	0	16	0	0	0	0	14.9	4.7	3.7
October	31	0	1	0	0	0	0	0	0	0	0	0	10.2	2.6	1.8
November	30	3	28	0	27	0	0	0	0	0	0	0	7.0	2.4	1.0
December	31	17	31	15	31	0	0	0	0	0	0	0	3.2	1.6	0.6

2006	# 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
January	31	0	31	0	31	0	0	0	0	0	0	0	4.2	2.1	0.9
February	28	4	28	4	28	0	0	0	0	0	0	0	4.7	2.2	1.2
March	31	0	23	0	18	0	0	0	0	0	0	0	7.3	2.5	1.6
April	30	0	8	0	0	0	0	0	0	0	0	0	9.0	3.4	2.3

KYKFPHQAIR

2005	# 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
July	3	0	0	0	0	3	3	3	3	3	3	3	46.9	35.9	30.6
August	31	0	0	0	0	31	31	31	31	31	31	31	49.0	40.8	30.3
September	30	2	11	0	0	28	28	30	30	30	30	30	44.9	38.5	28.1
October	31	3	15	0	0	17	17	31	30	29	29	27	33.6	31.6	20.7
November	9	3	9	1	5	0	0	2	0	0	0	0	19.4	21.9	10.2
December	5	3	5	0	5	0	0	0	0	0	0	0	5.8	5.2	3.5

KYKFPHQAIR

2006	# 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
January	31	19	30	0	26	0	0	0	0	0	0	0	17.1	18.2	7.3
February	28	22	27	8	21	0	0	18	1	0	0	0	18.3	26.9	16.6
March	31	20	28	0	7	3	2	31	18	13	13	0	26.7	24.5	17.4
April	30	11	23	0	0	15	14	30	30	30	28	13	37.9	32.6	21.1

LKLIKLODGE

2005	# 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	0	0	0	0	0	29	7	5	0	0	19.0	8.8	5.4
June	17	0	0	0	0	0	0	17	17	2	0	0	18.4	8.9	7.5

LKLIKMOUTH

2005	# 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	0	0	0	0	0	31	14	6	6	0	20.6	5.3	3.1
June	17	0	0	0	0	0	0	17	17	8	2	0	18.5	5.2	3.8

LKLIKOLSEN

2005	# 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	0	0	0	2	1	31	30	16	14	1	24.2	8.9	5.5
June	17	0	0	0	0	0	0	17	17	17	17	0	22.2	8.6	6.9

LOGGCAMPCR

2005	# 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	0	0	0	0	0	31	0	0	0	0	16.3	3.4	1.9
June	30	0	0	0	0	0	0	30	11	3	0	0	18.7	3.3	2.3
July	31	0	0	0	0	0	0	31	31	31	17	0	19.0	2.4	0.9
August	31	0	0	0	0	0	0	31	31	31	27	0	19.3	1.0	0.6
September	30	0	0	0	0	0	0	30	10	0	0	0	17.4	0.6	0.5
October	31	0	0	0	0	0	0	24	0	0	0	0	13.9	0.6	0.3
November	30	0	0	0	0	0	0	0	0	0	0	0	11.0	1.2	0.5
December	31	0	17	0	15	0	0	0	0	0	0	0	7.4	2.5	0.7

2006	# 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
January	31	0	2	0	0	0	0	0	0	0	0	0	6.8	1.9	0.9
February	28	0	18	0	11	0	0	0	0	0	0	0	7.1	2.3	1.4
March	31	0	10	0	2	0	0	0	0	0	0	0	9.3	2.3	1.6
April	30	0	0	0	0	0	0	0	0	0	0	0	13.0	4.2	2.4

MCCREEDRDX

2005	# 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	2	0	1	0	0	0	0	0	0	0	0	0	6.6	2.5	1.7
June	18	0	0	0	0	0	0	0	0	0	0	0	10.4	3.1	2.1
July	31	0	0	0	0	0	0	0	0	0	0	0	10.8	3.2	2.3
August	31	0	0	0	0	0	0	0	0	0	0	0	10.5	2.9	2.2
September	24	0	1	0	0	0	0	0	0	0	0	0	9.0	2.5	1.7
October	31	0	4	0	0	0	0	0	0	0	0	0	7.3	1.7	1.2
November	30	0	29	0	29	0	0	0	0	0	0	0	5.3	1.9	0.8
December	31	0	31	0	31	0	0	0	0	0	0	0	3.7	1.6	0.8

MCCREEDRDX

2006	# 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
January	31	0	31	0	31	0	0	0	0	0	0	0	3.9	1.9	0.8
February	28	3	28	1	28	0	0	0	0	0	0	0	3.9	1.7	0.9
March	31	0	31	0	31	0	0	0	0	0	0	0	4.7	1.7	1.0
April	30	0	30	0	30	0	0	0	0	0	0	0	5.3	2.5	1.4

NewLYLETRP

2005	# 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	0	0	0	0	0	31	7	4	3	0	18.7	4.8	3.5

OUTLETRDXG

2005	# 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	18	0	0	0	0	1	0	18	18	18	18	2	23.8	5.0	3.2
July	31	0	0	0	0	21	9	31	31	31	31	26	25.4	4.9	3.6
August	31	0	0	0	0	14	8	31	31	31	31	23	25.4	5.7	3.7
September	30	0	0	0	0	0	0	30	12	9	7	0	20.7	3.7	2.6
October	31	0	6	0	0	0	0	10	0	0	0	0	13.2	8.0	3.8
November	30	0	26	0	25	0	0	0	0	0	0	0	8.8	1.4	0.7
December	31	26	31	22	31	0	0	0	0	0	0	0	2.0	1.4	0.3

2006	# 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
January	31	8	31	5	31	0	0	0	0	0	0	0	3.4	1.8	0.7
February	28	6	28	4	28	0	0	0	0	0	0	0	4.8	2.1	1.1
March	31	0	12	0	6	0	0	0	0	0	0	0	11.9	4.0	2.4
April	30	0	0	0	0	0	0	13	3	0	0	0	18.7	5.7	3.5

PISCOMOUTH

2005	# 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	9	0	2	0	0	0	0	0	0	0	0	0	10.2	3.4	2.7
October	31	0	9	0	3	0	0	0	0	0	0	0	8.7	2.6	1.8
November	30	11	29	5	29	0	0	0	0	0	0	0	5.6	2.9	0.9
December	31	26	31	24	31	0	0	0	0	0	0	0	1.8	1.4	0.3

2006	# 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
January	31	8	31	1	31	0	0	0	0	0	0	0	2.6	1.8	0.8
February	28	15	28	10	28	0	0	0	0	0	0	0	2.4	1.4	0.6
March	31	4	31	1	31	0	0	0	0	0	0	0	3.7	1.6	1.0
April	30	0	30	0	30	0	0	0	0	0	0	0	5.9	3.4	1.9

SNYDERMILL

2005	# 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	0	0	0	0	0	31	3	0	0	0	16.9	4.7	2.8

SNYDRMOUTH

2005	# 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	0	0	0	0	0	31	11	5	4	0	18.9	5.9	3.9
June	30	0	0	0	0	0	0	30	30	24	20	0	20.4	3.9	2.9
July	31	0	0	0	0	0	0	31	31	31	24	0	19.6	4.0	3.1
August	31	0	0	0	0	0	0	31	31	25	20	0	19.4	3.8	2.6
September	30	0	0	0	0	0	0	30	26	0	0	0	17.1	2.1	1.4
October	31	0	0	0	0	0	0	31	20	0	0	0	16.5	1.3	0.8
November	30	0	0	0	0	0	0	6	0	0	0	0	16.2	2.0	0.5
December	31	0	31	0	29	0	0	0	0	0	0	0	4.8	1.7	0.5

SNYDRMOUTH

2006	# 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
January	31	0	16	0	5	0	0	0	0	0	0	0	6.2	2.2	1.0
February	28	4	25	2	19	0	0	0	0	0	0	0	6.2	2.7	1.5
March	31	0	19	0	9	0	0	0	0	0	0	0	9.2	2.7	1.8
April	30	0	0	0	0	0	0	7	0	0	0	0	15.2	5.3	3.1

SUMITMOUTH

2005	# 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	0	0	0	0	0	23	0	0	0	0	17.0	5.6	3.4
June	28	0	0	0	0	0	0	28	8	0	0	0	18.9	6.3	4.1
July	31	0	0	0	0	0	0	31	31	24	20	0	20.2	6.5	5.3
August	31	0	0	0	0	0	0	31	25	20	14	0	20.0	6.4	5.0
September	30	0	0	0	0	0	0	15	0	0	0	0	15.9	4.8	3.6
October	31	0	3	0	0	0	0	0	0	0	0	0	12.0	3.1	2.2
November	30	4	28	2	25	0	0	0	0	0	0	0	7.9	2.9	1.1
December	31	23	31	21	31	0	0	0	0	0	0	0	4.1	1.9	0.5

2006	# 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
January	31	0	29	0	20	0	0	0	0	0	0	0	5.5	1.4	0.8
February	28	6	28	4	25	0	0	0	0	0	0	0	5.3	2.2	1.3
March	31	0	26	0	21	0	0	0	0	0	0	0	7.5	3.1	1.9
April	30	0	5	0	0	0	0	0	0	0	0	0	12.4	4.7	2.9

SURVEYORSX

2005	# 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	15	0	0	0	0	0	0	9	0	0	0	0	13.8	4.6	3.1
July	31	0	0	0	0	0	0	31	0	0	0	0	15.3	4.5	3.6
August	31	0	0	0	0	0	0	31	0	0	0	0	15.2	4.3	3.2
September	24	0	0	0	0	0	0	0	0	0	0	0	12.1	3.1	2.3
October	31	0	3	0	1	0	0	0	0	0	0	0	9.6	2.3	1.5
November	30	4	29	4	28	0	0	0	0	0	0	0	6.5	3.0	0.9
December	31	21	31	16	31	0	0	0	0	0	0	0	3.5	1.9	0.5

2006	# 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
January	31	0	31	0	31	0	0	0	0	0	0	0	4.5	2.2	0.9
February	28	4	28	3	28	0	0	0	0	0	0	0	4.2	1.7	1.0
March	31	0	31	0	31	0	0	0	0	0	0	0	5.1	1.9	1.2
April	30	0	27	0	11	0	0	0	0	0	0	0	7.6	2.8	1.6

SWALEMOUTH

2005	# 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	0	0	0	0	0	31	11	5	0	0	18.4	6.4	3.9

TEPEEIXLRDX

2005	# 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	0	0	0	0	0	11	0	0	0	0	16.4	7.9	4.9
June	30	0	0	0	0	0	0	30	0	0	0	0	16.3	7.8	5.8
July	31	0	0	0	0	0	0	31	0	0	0	0	15.6	4.0	2.5
August	31	0	4	0	0	0	0	31	8	0	0	0	18.2	13.7	6.8
September	30	7	25	0	3	0	0	15	0	0	0	0	16.8	12.6	10.2
October	31	7	26	0	8	0	0	5	0	0	0	0	14.7	10.9	8.0
November	30	0	28	0	28	0	0	0	0	0	0	0	6.0	1.1	0.1
December	31	7	31	7	31	0	0	0	0	0	0	0	3.4	1.1	0.1
2006	**# 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**
January	31	2	31	1	31	0	0	0	0	0	0	0	3.4	2.1	0.9
February	28	7	28	5	28	0	0	0	0	0	0	0	3.2	1.6	0.8
March	31	0	31	0	31	0	0	0	0	0	0	0	5.1	1.9	1.1
April	30	0	23	0	14	0	0	0	0	0	0	0	9.7	4.0	2.2

TRAPPERRDX

2005	# 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	4	0	0	0	0	0	0	0	0	0	9.2	3.1	1.8
June	30	0	0	0	0	0	0	0	0	0	0	0	9.4	3.1	2.0
July	31	0	0	0	0	0	0	0	0	0	0	0	9.5	2.9	2.3
August	31	0	0	0	0	0	0	0	0	0	0	0	9.2	2.9	2.2
September	30	0	5	0	0	0	0	0	0	0	0	0	8.1	2.5	1.8
October	31	0	10	0	3	0	0	0	0	0	0	0	6.9	1.7	1.2
November	30	0	30	0	29	0	0	0	0	0	0	0	5.0	1.9	1.0
December	31	0	31	0	31	0	0	0	0	0	0	0	4.0	1.8	0.9

TRAPPERRDX

2006	# 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
January	31	0	31	0	31	0	0	0	0	0	0	0	3.8	1.7	0.8
February	28	1	28	0	28	0	0	0	0	0	0	0	4.0	1.6	1.0
March	31	0	31	0	31	0	0	0	0	0	0	0	4.7	1.9	1.2
April	30	0	30	0	24	0	0	0	0	0	0	0	6.9	3.3	1.9

TROUTRVRTRDX

2005	# 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	15	0	0	0	0	0	0	15	14	10	6	0	21.3	7.1	5.0
July	31	0	0	0	0	0	0	31	31	31	31	8	23.0	8.2	6.7
August	31	0	0	0	0	0	0	31	31	29	25	0	22.3	8.0	6.2
September	24	0	0	0	0	0	0	15	3	0	0	0	17.2	6.1	4.7
October	31	0	2	0	0	0	0	0	0	0	0	0	11.8	3.9	2.9
November	30	14	29	9	28	0	0	0	0	0	0	0	7.6	2.5	1.2
December	31	31	31	30	31	0	0	0	0	0	0	0	2.6	2.7	0.1

2006	# 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
January	31	0	31	0	29	0	0	0	0	0	0	0	5.6	2.4	0.9
February	28	5	28	4	28	0	0	0	0	0	0	0	4.4	2.2	1.2
March	31	0	28	0	21	0	0	0	0	0	0	0	7.2	2.7	1.8
April	30	0	2	0	0	0	0	0	0	0	0	0	11.5	4.8	2.7

WESTFORKRX

2005	# 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	29	0	0	0	0	0	0	0	0	0	0	0	11.4	4.2	2.8
July	31	0	0	0	0	0	0	0	0	0	0	0	11.4	4.2	3.3
August	31	0	0	0	0	0	0	0	0	0	0	0	11.0	4.0	3.0
September	24	0	5	0	0	0	0	0	0	0	0	0	9.0	3.1	2.2
October	31	0	12	0	4	0	0	0	0	0	0	0	7.1	2.0	1.4
November	30	2	30	1	29	0	0	0	0	0	0	0	5.2	2.4	1.1
December	31	12	31	7	31	0	0	0	0	0	0	0	3.2	1.9	0.9
2006	# 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
January	31	0	31	0	31	0	0	0	0	0	0	0	3.2	1.8	0.8
February	28	5	28	3	28	0	0	0	0	0	0	0	3.5	1.9	1.0
March	31	0	31	0	31	0	0	0	0	0	0	0	4.9	2.2	1.4
April	30	0	30	0	27	0	0	0	0	0	0	0	6.3	3.1	2.0

WHITEIXLRDX

2005	# 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	0	0	0	0	0	7	0	0	0	0	15.1	6.7	4.1
June	16	0	0	0	0	0	0	13	0	0	0	0	14.6	7.1	5.4

WHITEMOUTH

2005	# 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	0	0	0	0	0	31	6	0	0	0	18.9	5.7	3.7
June	30	0	0	0	0	0	0	30	29	12	9	0	21.7	7.9	5.3
July	31	0	0	0	0	14	12	31	31	31	31	18	27.2	14.1	9.5
August	31	0	0	0	0	17	9	31	31	31	31	23	25.9	12.2	9.7
September	30	0	0	0	0	0	0	30	21	11	9	0	20.8	8.2	6.2
October	31	0	0	0	0	0	0	23	0	0	0	0	13.7	4.0	2.9
November	30	0	11	0	6	0	0	0	0	0	0	0	9.3	2.5	1.3
December	31	9	31	2	31	0	0	0	0	0	0	0	4.2	1.8	1.1

2006	# 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
January	31	0	31	0	31	0	0	0	0	0	0	0	4.0	1.6	0.7
February	28	7	28	5	28	0	0	0	0	0	0	0	4.2	1.6	1.0
March	31	0	28	0	23	0	0	0	0	0	0	0	6.7	2.3	1.7
April	30	0	9	0	0	0	0	0	0	0	0	0	12.1	4.5	2.6

WHITEUPPER

2005	# 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	2	0	0	0	0	0	0	2	0	0	0	0	13.2	4.0	2.7
July	31	0	0	0	0	0	0	31	0	0	0	0	15.3	5.1	3.9
August	31	0	0	0	0	0	0	31	0	0	0	0	15.4	5.0	3.7
September	30	0	5	0	0	0	0	0	0	0	0	0	12.3	4.2	3.1
October	31	0	15	0	5	0	0	0	0	0	0	0	8.9	2.9	1.9
November	30	28	30	26	29	0	0	0	0	0	0	0	5.2	3.2	0.4
December	31	31	31	29	31	0	0	0	0	0	0	0	1.4	1.4	0.2
2006	# 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
January	31	6	31	0	31	0	0	0	0	0	0	0	3.2	2.2	1.0
February	28	8	28	3	28	0	0	0	0	0	0	0	3.0	1.8	0.9
March	31	1	31	0	31	0	0	0	0	0	0	0	3.9	1.8	1.2
April	30	0	30	0	26	0	0	0	0	0	0	0	6.9	3.6	1.6

Appendix G. Genetic Sampling

Table G1. Genetic diversity estimates for 21 populations of *O. mykiss* in the Klickitat River from 13 microsatellite loci. n = sample size, He = unbiased heterozygosity, Ho = observed heterozygosity, A = average alleles per locus, SD = standard deviation.

	Population	n	He	He (SD)	Ho	Ho (SD)	A	A (SD)
1	Bowman Cr.	48	0.813	0.024	0.799	0.016	11.8	3.9
2	lower Little Klickitat R.	48	0.804	0.029	0.788	0.017	11.8	4.4
3	mid Little Klickitat R.	47	0.720	0.032	0.685	0.019	9.8	3.9
4	upper Little Klickitat R.	30	0.697	0.035	0.697	0.024	8.1	2.5
5	lower Summit Cr.	48	0.809	0.031	0.800	0.016	11.5	4.6
6	upper Summit Cr.	48	0.649	0.038	0.649	0.019	6.7	1.8
7	Brush Cr.	48	0.460	0.056	0.469	0.020	3.1	1.2
8	lower Trout Cr.	48	0.797	0.033	0.828	0.015	11.0	3.7
9	upper Trout Cr.	47	0.646	0.050	0.651	0.020	6.8	2.0
10	Piscoe Cr.	47	0.707	0.045	0.704	0.019	8.8	3.7
11	Diamond Fork	47	0.644	0.041	0.626	0.020	6.5	2.9
12	upper Klickitat R.	48	0.757	0.035	0.754	0.018	10.2	3.9
13	Surveyors Cr.	38	0.656	0.042	0.650	0.021	7.5	3.0
14	Goldendale Hat.	48	0.669	0.033	0.724	0.018	5.9	2.1
15	Fish Lake Cr.	23	0.800	0.041	0.814	0.025	9.4	3.5
16	Swale Cr.	44	0.784	0.035	0.778	0.017	9.5	3.8
17	Snyder Cr.	47	0.729	0.035	0.756	0.018	7.8	2.9
18	Dead Canyon Cr.	36	0.816	0.028	0.818	0.018	10.7	3.9
19	Tepee Cr.	46	0.753	0.030	0.774	0.017	8.7	3.7
20	lower White Cr.	45	0.810	0.032	0.803	0.017	11.7	3.9
21	upper White Cr.	45	0.707	0.041	0.736	0.018	6.1	2.3
	Average	44.1	0.725	0.037	0.729	0.019	8.7	3.2

Appendix H. References

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