YAKIMA/KLICKITAT FISHERIES PROJECT - KLICKITAT MONITORING AND EVALUATION

2006 Annual Report

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YAKIMA/KLICKITAT FISHERIES PROJECT - KLICKITAT MONITORING AND EVALUATION

2006 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.

Additional and updated information for this project is also available at the YKFP web site (www.ykfp.org/klickitat/).

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Fisheries/YKFP Klickitat subbasin coordinator Bill Sharp (under Klickitat Management, Data, & Habitat Project, BPA Project # 198812035) provided oversight and management, and habitat restoration specialist Will Conley (under the Klickitat Watershed Enhancement Project, BPA Project # 199705600) provided data management and database report development for many monitoring tasks. 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: Electrofishing surveys were conducted to estimate juvenile steelhead abundance at four sites in lower White Creek in 2006. These sites have been identified as potential locations for installation of large woody debris under the Klickitat Watershed Enhancement Project (BPA Project # 199705600) with the objectives of restoring or enhancing pool quality, increasing pool depth, and providing channel roughness. All of these sites are located in a fairly remote reach of White Creek within 2 miles downstream of the Brush Creek confluence. Multiple-pass depletion electrofishing techniques were used at four sites ranging from 111 m to 147 m long; population estimates from this sampling were generated using methods from White et al. (1982). Large wood installation is planned for 2008 or 2009; the 2006 sampling represents population abundance at these sites before the habitat action occurs. Additional population sampling will be conducted at these sites after habitat work is completed; if time allows, additional pre-project sampling may also be conducted. Numerous sites have been identified as potential installation sites for large woody debris in this general area of White Creek; depending on which sites are actually selected for habitat work (which depends on available funds and materials, equipment limitations, and timelines), this evaluation will use either a before-after or before-after control-impact (Roni et al. 2005) study design to monitor changes in local abundance post-project.

Results: Results from the population surveys at the four sites, including population estimates and site locations, are presented in Appendix A (Table A1). Data from any additional pre-project and post-project sampling will be presented in future reports.

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 all three 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: All three rotary screw-traps were fished during this reporting period. The five-foot trap located above Castile Falls was fished from July 10 through October 31, 2006. The fishing period for this trap normally starts in May or June, but high spring and early summer flows delayed the start in 2006. The five-foot trap located at the Klickitat Hatchery was fished throughout most of the year. The eight-foot Lyle Falls trap was fished throughout much of the year, except during periods of very high flows and debris loads, and during large releases of hatchery fish. High flows in November (including a glacial outburst flood), December, January, and March caused trap damage and limited fishing times. This resulted in severely limited fishing times for spring of 2007 and greatly reduced the ability to estimate smolt outmigration for that period. 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, with the overall goal of producing valid juvenile production estimates.

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 as well as spawner distribution.

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 – mid October through mid December; coho – late October through late February; steelhead – late 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 at least 2-3 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 16 and October 6, 2006, covering nearly 70 river miles. Natural spring Chinook spawning typically occurs in the Klickitat mainstem upstream of the Little Klickitat River confluence (RM 20), with most of the spawning occurring upstream of the Big Muddy Creek confluence (RM 54) up to Castile Falls (RM 64). Additional spawning occurs above Castile Falls which historically had some natural passage and had also been seeded in recent years (2000 and 2002-4) by transporting and releasing surplus adult fish that returned to the Klickitat Hatchery. No fish were transported above Castile Falls in 2005 or 2006. Recently completed (summer 2005) improvements at the Castile Falls fish ladders have enhanced fish passage, correcting problems with the original 1960s ladders which had actually impaired natural passage and probably decreased fish numbers above the falls from historic levels. Six redds, along with 22 live spring Chinook adults and 3 carcasses, were observed above Castile Falls in 2006 (an increase from 2005). The remaining 76 redds were located in the 41 river miles between Beeks Canyon and Castile Falls. Most of the redds (65% of the total) were located between Big Muddy Creek and Castile Falls. The total redd count of 82 is a slight increase from the 2005 total of 50, which was one of the lowest on record for YN Fisheries (surveying began in 1989). A total of 11 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 (as well as estimated total run size in the Klickitat River) from 1989-2006.

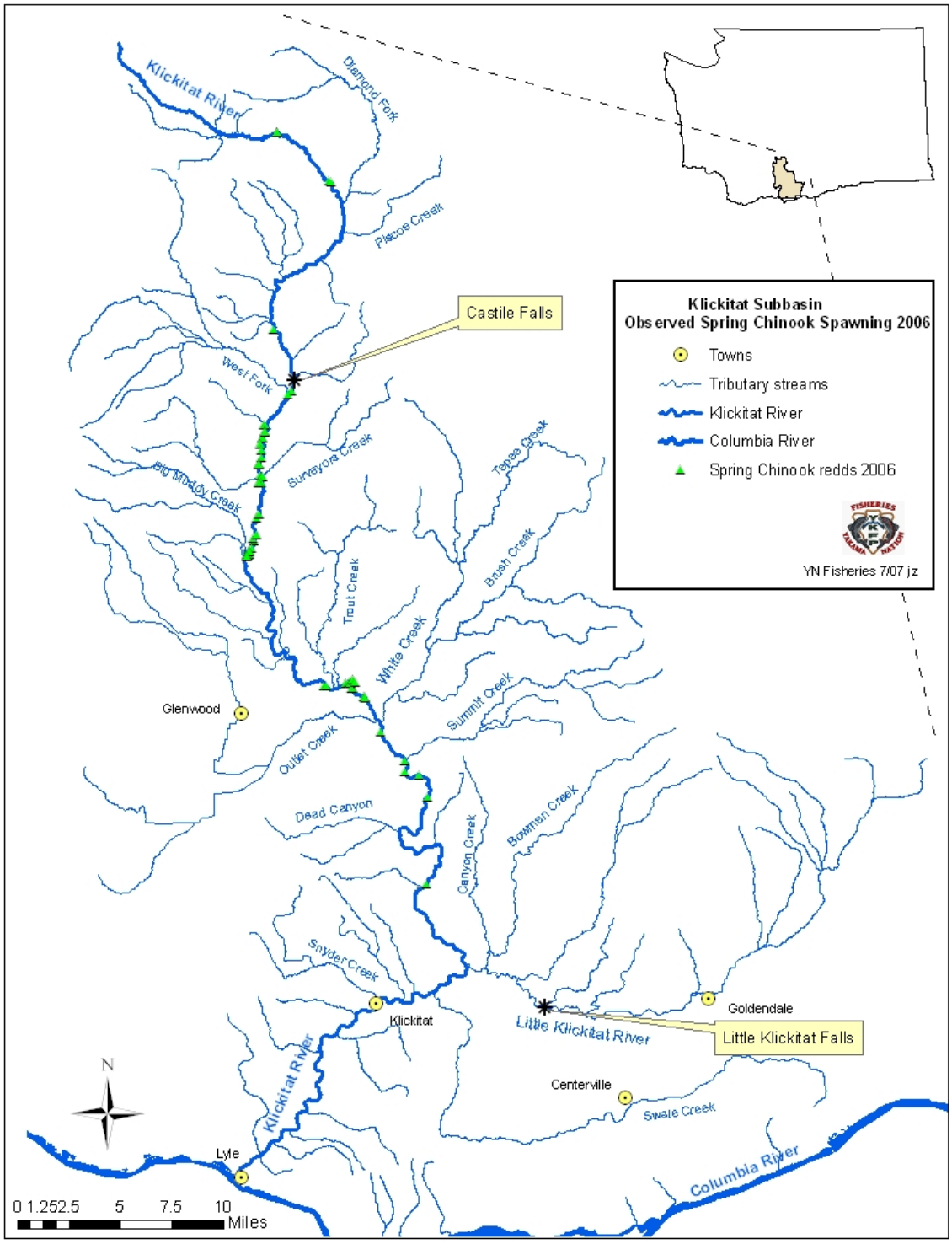

Figure 1. Observed spring Chinook spawning distribution in the Klickitat subbasin in 2006.

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 20 and

December 12. High flows and turbidity throughout much of November (including a glacial outburst flood in early November) and again in mid December limited survey ability and probably biased redd counts low for 2006. The November flows and sediment also caused significant pre-spawn mortality of fall Chinook. The final redd count was 119, significantly lower than redd counts of recent years. The highest redd densities were found in the 5.5 miles from Klickitat Hatchery downstream to Summit Creek. This segment contained 72 redds (over 60% of the total redd count) with a density of 13 redds per mile. This segment also contained the largest number of observed live fall Chinook adults. Fall Chinook were found spawning from the Klickitat Hatchery downstream to Twin Bridges (above the town of Klickitat), but survey passes on the lower river reaches were interrupted by the high flows and turbidity. Average redd densities observed in 2006 were 3.2 redds per mile (also lower than in previous years). A total of 286 fall Chinook carcasses were counted; none were floy-tagged. See Table C3 in Appendix C for detailed results of 2006 fall Chinook spawner surveys.

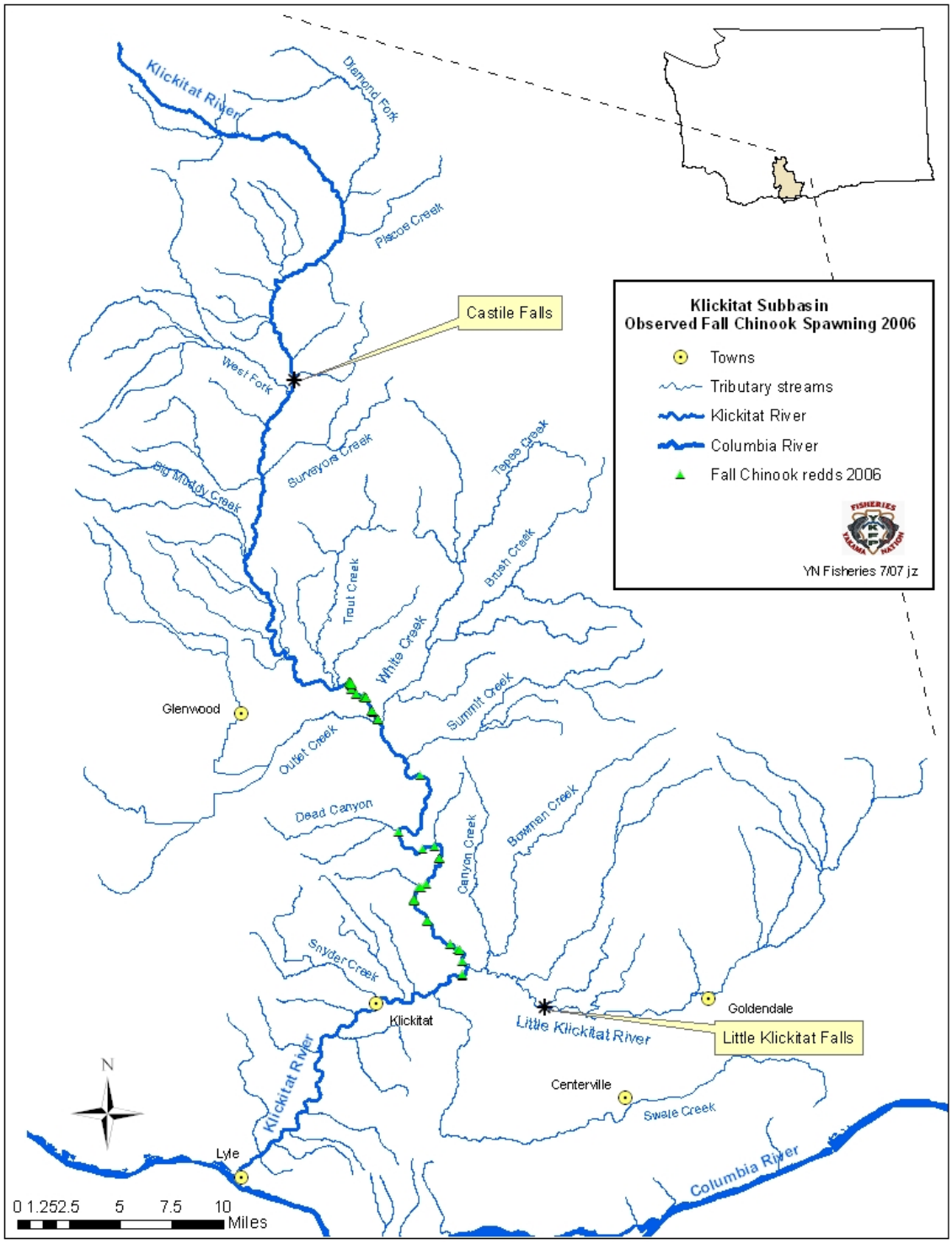

Figure 2. Observed fall chinook spawning distribution in the Klickitat subbasin in 2006.

Coho

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 in conjunction

with fall Chinook spawner surveys in late October 2006 and extended until February 28, 2007. The high flows and turbidity in November and December (see fall Chinook section above) also limited survey ability for coho, probably biasing redd counts low. One redd was observed in Snyder Creek, but no live fish or carcasses were observed above Lyle Falls (RM 2.3). No floy-tagged fish were observed. Large numbers of live adult coho were observed in the lower ¼ mile of Canyon Creek and at the mouth of Silva Creek (both below Lyle Falls), and fish appeared to be attempting to spawn in lower Canyon Creek although individual redds were not identifiable and could not be counted. Coho seem to have more of a problem passing Lyle Falls than Chinook or steelhead in many years. In recent years extremely high densities of fish have been observed at the confluences of Silva and Canyon Creeks, even though neither of these tributaries has much suitable spawning habitat. See Table C4 in Appendix C for detailed results of 2006-7 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 2006 and a progress report for spring 2007. Surveys in 2006 began in late February and ended in late May.

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. In 2006, higher-than-average flows and turbidity in the mainstem and in some tributaries (especially the White Creek watershed), along with a relatively high snowpack that limited survey access to some areas, resulted in limited survey coverage and effectiveness and an extremely low total redd count of 10.

The total redd count included 5 in the mainstem Klickitat and 5 in tributaries. No redds were observed above Castile Falls (see the spring Chinook spawner survey results section for a description of passage at Castile Falls); however, field crews were not able to complete a survey pass in the upper Klickitat due to the conditions described above. The White Creek watershed and Snyder Creek each had 2 redds, with the other tributary redd observed in Dead Canyon Creek. See Table C5 in Appendix C for detailed results of 2005 steelhead spawner surveys.

Steelhead spawner surveys for 2007 also began during this reporting period. High flows and turbidity also impacted survey ability in 2007, although not to the extent as in 2006 and redd counts were considerably higher. Final results will be presented in the 2007 annual report.

One noteworthy result from the 2007 surveys came from a possible steelhead redd observed in the upper Little Klickitat River in late April. The redd was located at about RM 25 on the Little Klickitat, above a 12- to 14-foot falls at RM 6. The size of the redd was typical for steelhead (significantly larger than resident trout redds). Genetic (nonlethal fin-clip) samples were subsequently collected from *O. mykiss* fry via electrofishing in the immediate vicinity of the redd (in June 2007). These samples were analyzed by geneticists at CRITFC and compared to a genetic baseline of previously collected samples from *O. mykiss* populations at various locations in the Klickitat and Little Klickitat watersheds (described in Zendt 2006 and in the Genetic data synthesis, collection, and analysis section of this report). The genotype of at least one of the individuals collected near the upper Little Klickitat redd assigned most closely to one of several primarily anadromous populations in the lower Little Klickitat and other Klickitat tributaries. These results indicate a high probability that at least one anadromous fish (or a fish from a

population other than the upper Little Klickitat resident population) spawned at this location. Steelhead passage frequency at the RM 6 falls is uncertain; it is believed that steelhead can pass this falls at high flow levels. The last documented observation of adult steelhead and redds in the upper Little Klickitat watershed was by YN Fisheries staff in 1996 and 1997 following high flow events.

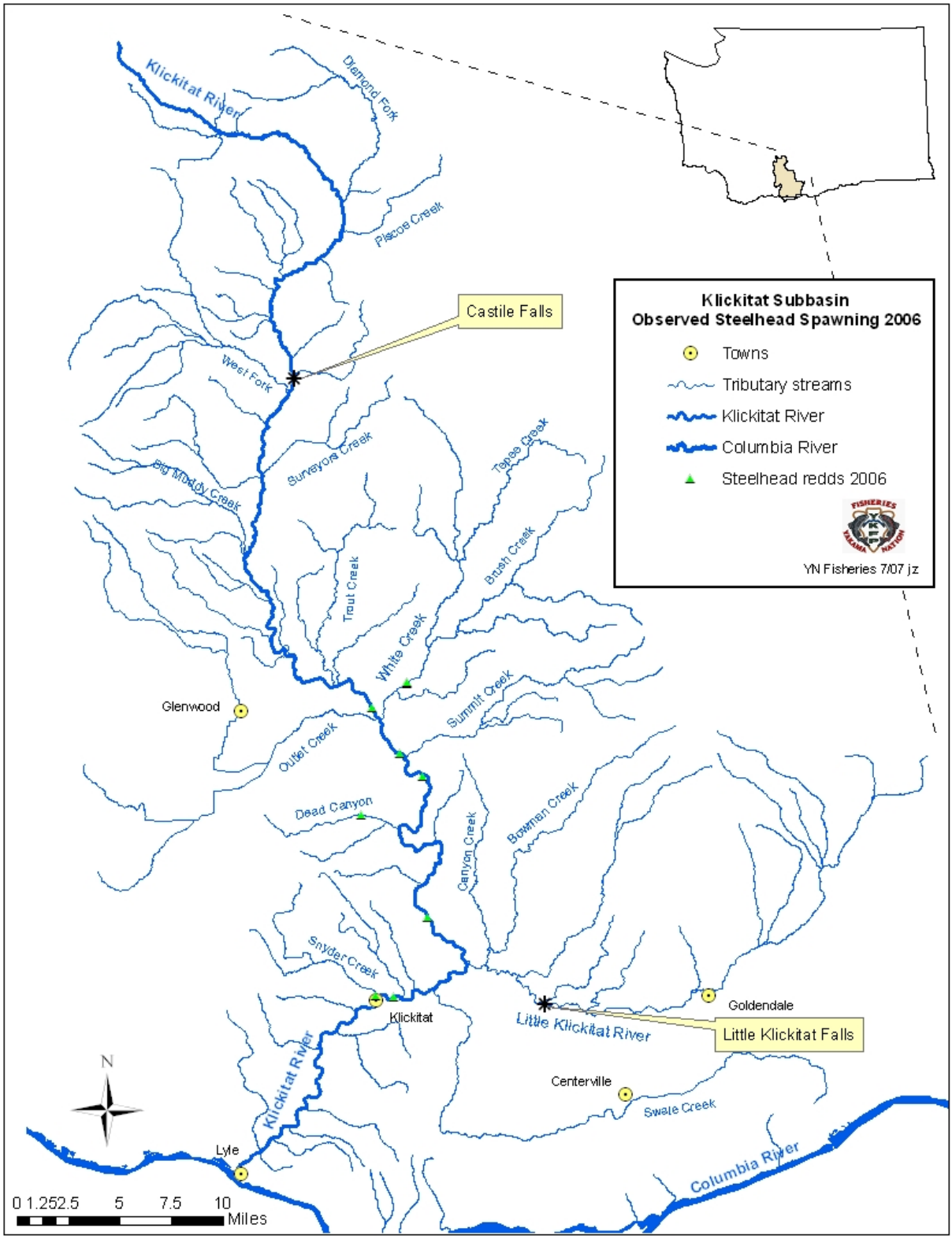

Figure 3. Observed steelhead spawning distribution in the Klickitat subbasin in 2006. High flows and turbidity limited survey visibility and effectiveness.

Task 1.d Scale analysis

Objective: Determine age and stock composition of 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 164 adult spring Chinook, fall Chinook, and coho salmon carcasses during 2006-2007 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% marking of hatchery stocks, origin (hatchery or wild) of fish sampled could not always be reliably determined (beginning in 2007 all returning adult Klickitat hatchery spring Chinook salmon will be 100% adipose-clip marked).

Only two readable scale samples were obtained from spring Chinook carcasses during 2006 spawner surveys. No adipose-clipped carcasses were encountered. Both of the fish were 4-year-olds; one was male and one female. The average fork length was 79 cm.

Due to the large number of fall Chinook carcasses encountered during spawner surveys, subsampling was used while collecting fall Chinook scales. This resulted in a total of 144 readable scale samples. Of the fish sampled, 8% were known hatchery fish and 92% were unmarked (either wild or unmarked hatchery fish); 59% were females and 41% were males. The predominant age class for fall Chinook was 4-year-olds, at 50.7%. Proportions of the remaining age classes were as follows: 40.3% were 5-year-olds and 9.0% were 3-year-olds. The average fork lengths for 4-year-old females and 4-year-old males were 88.5 cm and 86.7 cm, respectively. The respective average fork lengths for female and male 5-year-old fall Chinook were 92.7 cm and 100.1 cm.

No coho carcasses were found above Lyle Falls in 2006-7 surveys, however a large number of coho were found spawning in lower Canyon Creek (below Lyle Falls). Twenty scale samples were collected from this location. Adipose-clipped fish comprised 65% of the sample. All sampled fish were 3-year-olds; 55.6% were females and 44.4% were males. Average fork lengths for 3-year-old females and males were 72.8 and 71.1 cm, respectively. 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: Thirteen sites throughout the basin (8 in the mainstem Klickitat, 3 in Diamond Fork Creek, 1 in White Creek, and 1 in Tepee Creek) were sampled in 2006. 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 156 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 13 sites sampled in 2006, 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 2006.

At two sites some general trends are evident in the data: at Diamond Fork Bottom of Meadows a slight increase in percent fines (particles < 1.7 mm) is evident (from approximately 15% to 20%); and at Diamond Fork Mouth a slight decrease is evident (from approximately 18% to 12%). 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: Klickitat R. at McCormick Meadows, Klickitat below Little Klickitat, and Klickitat R. near Leidl Bridge. Fines percentages at most other sites range higher, up to 25-30%. At one site (Tepee Creek below IXL Road), 2006 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 36 locations on 22 streams within the Klickitat subbasin. Air temperatures were also monitored at four locations in lower-, mid-, and upper-elevation areas within the 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 are 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 2006. 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 2006 field season (see Task 1.a. Juvenile and Resident Salmonid Population Surveys and Task 4.a. Genetic Data Collection). 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: Use Passive Integrated Transponder (PIT) tagging as a means of monitoring spring Chinook salmon travel and/or holdover time between Klickitat River fish traps and Bonneville Dam detection sites, estimating smolt survival rates, and estimating smolt-to-adult return rates.

Methods: Spring Chinook salmon juveniles from the Klickitat Hatchery were injected with PIT tags in June 2006 and released from the hatchery into the Klickitat River in March 2007. A total of 5000 fish were tagged; 4917 fish were released (post-tagging mortality was estimated at 1.67%). A single PIT tag antenna was placed at the outlet of the hatchery pond from which the fish were released, but did not provide an adequate detection rate to estimate the number of tagged fish released (number released was instead calculated by monitoring the hatchery pond for tagged-fish mortalities and subtracting these fish from the total). Fish subsequently captured at the Lyle screw trap located downstream of the release point were scanned for tags; this screw trap, however, was not being operated for much of the time following the hatchery release due to needed repairs resulting from high flows. Tag data was entered into the regional PIT Tag

Information System (PTAGIS) database for monitoring at mainstem Columbia River detection sites.

Results: Following the March 2007 release, 277 fish were detected in March-May 2007 at Bonneville juvenile detection sites (moving downstream) or in estuary trawls, and 3 fish were detected in late June-July 2007 at Bonneville adult ladders (moving upstream).

From the May 2005 release (the earlier tagging effort described in the 2005 annual report [Zendt 2006]), 223 fish were detected in late May-July 2005 at Bonneville juvenile detection sites (moving downstream) or in estuary trawls, and 3 fish were detected in April-May 2006 at Bonneville juvenile detection sites (moving downstream).

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, 2006 – April 30, 2007, the EDT model was updated with additional data acquired from the preceding years. Information and data from recent versions of the EDT model for the Klickitat were used to populate the AHA model (All-H Analyzer) for use in developing the Klickitat Anadromous Fishery Master Plan. Alternatives and scenarios were developed for artificial production management of all Klickitat anadromous stocks (spring Chinook, fall Chinook, steelhead, and coho). These alternatives and scenarios were used by YKFP staff in developing of recent versions of the Master Plan which is currently in the NPCC review process.

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 are collected via electrofishing or capture in rotary screw traps from sites throughout the Klickitat subbasin. Laboratory testing is 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 time required for other fieldwork priorities (see Task 1.a. Juvenile and Resident Salmonid Population Surveys and Task 4.a. Genetic Data Collection), and an existing baseline of pathogen samples having been collected in recent years, no pathogen samples were collected during this reporting period. Previously collected samples have been compiled into existing datasets covering 2002-2005. Additional pathogen samples will likely be collected in future reporting periods concurrent with changes in hatchery practices at the Klickitat Hatchery.

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 in June and July of 2006 in order to augment sampling completed in 2005. A total of 538 samples were collected from 10 different sites on 9 streams. All but one of these sites were sampled in 2005; the 2006 samples provided a temporal replication for the genetic analysis (see Figure 4 in Zendt 2006 for a map of 2005 sampling locations). The additional site was on an east-bank tributary to Tepee Creek (referred to as East Fork Tepee Creek). Fish were captured via backpack electrofishing and non-lethal fin clip samples were collected from individual fish (along with lengths and weights). The samples and subsequent analysis were intended to augment previous genetic analysis of Klickitat *O. mykiss* reported in Narum et al. (2006).

Genetic samples were also collected from 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 was operated in 2006 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 Chinook and steelhead were collected. During the May 1, 2006 - April 30, 2007 reporting

period, a total of 990 genetic samples (616 from steelhead, 374 from Chinook) were collected. These samples will be analyzed by CRITFC and information added to existing databases and incorporated into a future report.

In addition, genetic samples were collected from adult spring Chinook spawned for broodstock at the Klickitat Hatchery in August-September 2006. These samples (681) were also sent to CRITFC for analysis.

Also see the Steelhead section under Task 1.c (Spawning ground surveys) in this report for a description of genetic samples collected from *O. mykiss* fry in the vicinity of a possible steelhead redd identified in April 2007.

Results: A manuscript that gives results of analysis of Klickitat *O. mykiss* genetic samples collected over the past several years has been prepared (with YN/YKFP staff as co-authors), submitted to a peer-reviewed journal for publication, and is currently in the review process. Some of the important findings summarized include geospatial patterns of primarily anadromous and resident populations, physical habitat factors that affect the distribution of these populations, and estimated contributions of important Klickitat tributaries to steelhead production in the subbasin.

5. Appendices

Appendix A. Juvenile & Resident Salmonid Population Surveys.

Table A1. Results of 3-pass depletion electrofishing surveys at four sites identified for future large woody debris placement on lower White Creek. Output from the removal estimator in Program Capture (White et al. 1982) including population estimate (N-hat) for each site is given.

				O. mykiss			Program Capture Removal Estimates						
		Downstream start points		Total No. in Pass					95% CI				
Site	Date	Lat	Long	1	2	3	N-hat	SE	L	U	p	Chi-square	Prob.
Pop 1	8/7/06	46.04311	-121.11620	173	51	25	259	4.74	254	273	0.654	2.18	0.1397
Pop 2	8/15/06	46.05369	-121.10793	125	7	3	135	0.31	135	135	0.912	5.89	0.0152
Pop 3	8/9/06	46.05770	-121.10401	193	18	4	215	0.54	215	215	0.892	2.03	0.1546
Pop 4	8/8/06	46.06207	-121.10263	67	6	0	73	0.18	73	73	0.924	0.57	0.4487

Appendix B. Mobile Juvenile Monitoring Sites (Screw Traps)

Table B1. Catch summary of target species for the Castile Falls screw trap for May 1, 2006 – April 30, 2007.

Month	Days Fished	Wild *O.mykiss*	Wild Chinook	Hatchery Chinook	Brook Trout	***Totals***
May	0					0
June	0					0
July	13	9	39	1		49
August	14	23	108			131
September	15	11	68			79
October	13	6	57			63
Totals	55	49	272	1	0	322

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 of target species for the Hatchery screw trap for May 1, 2006 – April 30, 2007.

Month	Days Fished	Hatchery *O.mykiss*	Wild *O.mykiss*	Chinook	Coho	Brook Trout	***Totals***
May	4		6	8	1		15
June	7		3	91		1	95
July	8		2	3			5
August	18	1	11	45			57
September	16		2	37			39
October	14		2	25			27
November	0						0
December	0						0
January	3						0
February	13						0
March	9		1				1
April	11		4				4
Totals	103	1	31	209	1	1	243

Table B4. Catch summary of target species for the Lyle Falls screw trap for May 1, 2006 – April 30, 2007. High flows in November, December, January, and March caused trap damage and limited fishing time.

Month	Days Fished	Chinook	Coho	Hatchery *O.mykiss*	Wild *O.mykiss*	***Totals***
May	6	18	1745	692	19	2474
June	8	16990	215	14	22	17241
July	12	5578	2	1	2	5583
August	16	2718	1	1	3	2723
September	12	546			10	556
October	15	737			24	761
November	2	113			13	126
December	0					0
January	5	2				2
February	7					0
March	0					0
April	0					0
Totals	83	26702	1963	708	93	29466

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	Hcoho	2065	283	16	5.7%	
4/11/2003	Hcoho	2100	566	26	4.6%	
4/16/2003	Hcoho	2095	377	29	7.7%	
4/17/2003	Hcoho	2031	300	5	1.7%	
4/28/2003	Hcoho	1970	293	23	7.8%	
4/29/2003	Hcoho	2055	94	3	3.2%	
5/5/2003	Homy	2040	300	14	4.7%	
5/6/2003	Homy	1945	300	6	2.0%	
9/4/2003	chk	721	244	49	20.1%	
3/9/2004	Hschk	1525	300	43	14.3%	
3/10/2004	Hschk	1570	92	12	13.0%	
3/12/2004	Hschk	1535	300	28	9.3%	
4/20/2004	Hcoho	1600	311	38	12.2%	
4/21/2004	Hcoho	1550	299	29	9.7%	
5/12/2004	Homy	1620	289	17	5.9%	
5/13/2004	Homy	1570	300	13	4.3%	
8/10/2004	Hfchk	634	329	39	11.9%	
2/14/2005	Wschk, Wchk, Wcoho	814	238	25	10.5%	**
2/28/2005	Wschk, Wcoho	751	62	12	19.4%	
7/25/2005	Hfchk	576	419	5	1.2%	
8/1/2005	Hfchk	565	196	26	13.3%	
4/25/2006	Hcoho	2530	150	7	4.7%	
4/25/2006	Homy	2530	50	1	2.0%	
6/27/2006	Hfchk	1655	301	8	2.7%	

* Flow values are 2-day averages of mean daily flows starting on test date (USGS gage 14113000 Klickitat River 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 2006 Spring Chinook spawning surveys in the Klickitat subbasin.

KLICKITAT WATERSHED - SPRING CHINOOK SPAWNING SURVEY RESULTS, 2006

				REACH		LIVE OBS.			MORTS OBS. Ad-clipped		MORTS OBS. Unclipped	
			#	REDD	REDDS							
STREAM	**REACH**	**MILES**	**PASSES**	**TOTALS**	**/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	3	0	0.00	0	0	0	0	0	0	0
	McCormick Mdws - Cow Camp	8.0	4	4	0.50	0	10	3	0	0	0	3
	Cow Camp - McCreedy Cr.	7.1	3	0	0.00	0	2	0	0	0	0	0
	McCreedy Cr. - Castile Falls	6.0	4	2	0.33	0	5	2	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	0	0	0.00	0	0	0	0	0	0	0
	Subtotal (surveyed reaches)	**27.2**		6	0.2	0	17	5	0	0	0	3
MAIN STEM	**Below Castile Falls**											
	Castile Falls #11 - Castile Falls #1	0.6	3	0	0.00	0	0	0	0	0	0	0
	Castile Falls #1 - Signal Peak Br.	3.3	3	14	4.24	0	9	0	0	0	0	1
	Signal Peak Br. - Big Muddy Cr.	7.2	3	39	5.42	0	29	0	0	0	0	5
	Big Muddy Cr. - Old USGS gage	3.6	3	0	0.00	0	0	0	0	0	0	0
	Old USGS gage - Hatchery	8.2	2	4	0.49	0	2	0	0	0	0	2
	Hatchery - Summit Cr.	5.5	2	15	2.73	0	1	4	0	0	0	0
	Summit Cr. - Leidl Br.	5.6	2	3	0.54	0	0	1	0	0	0	0
	Leidl Br. - Stinson Flats	2.5	2	0	0.00	0	0	0	0	0	0	0
	Stinson Flats - Beeks Canyon	4.5	1	1	0.22	0	0	0	0	0	0	0
	Subtotal (surveyed reaches)	**41.0**		76	1.85	0	41	5	0	0	0	8
	TOTALS	**68.2**		**82**	**1.2**	**0**	**58**	**10**	**0**	**0**	**0**	**11**
	KLICKITAT WATERSHED TOTALS			**82**		**0**	**58**	**10**	**0**	**0**	**0**	**11**
	Above Castile Falls contribution			**7%**		**-**	**29%**	**50%**	**-**	**-**	**-**	**27%**
	Below Castile Falls contribution			**93%**		**-**	**71%**	**50%**	**-**	**-**	**-**	**73%**

Unk = Unknown

Total Floy-tagged Morts Observed	0
Total Morts Observed	11
Percentage Floy-tagged	0.0%

***Note -** No hatchery spring chinook adults were transported above Castile Falls in 2006

Table C2. Spring Chinook spawning surveys (redd counts) in the Klickitat subbasin, 1989-2006.

KLICKITAT WATERSHED - SPRING CHINOOK SPAWNING SURVEY RESULTS, 1989-2006

		Redd Counts																	
REACH	MILES	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Diamond Fork	8.5	ns	0	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	0	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	6
Castile Falls #10 - Falls #1	0.8	ns	ns	ns	ns	ns	ns	ns	ns	3	3	2	0	7	0	4	0	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	14
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	39
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	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	4
WDF Hatchery - Summit Cr.	5.5	ns	ns	2	ns	ns	ns	ns	8	14	1	2	4	1	0	17	3	7	15
Summit Creek - Leidl	5.6	ns	ns	2	ns	ns	ns	ns	8	3	0	1	2	1	0	0	1	3	3
Leidl - Stinson Flats	3.2	ns	ns	ns	ns	ns	ns	ns	5	4	ns	ns	ns	ns	ns	ns	0	1	0
Stinson Flats - Soda Springs	7.5	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	3	0	1
Soda Springs - Twin Bridges	6.4	ns	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	ns
Pitt - Turkey Farm	5	ns	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	ns
Totals	**92.2**	**53**	**59**	**93**	**102**	**132**	**39**	**42**	**110**	**231**	**113**	**83**	**167**	**123**	**389**	**332**	**195**	**50**	**82**
Totals (minus releases above Castile)	**65.7**	**53**	**59**	**93**	**102**	**132**	**39**	**42**	**110**	**231**	**113**	**83**	**103**	**123**	**146**	**167**	**73**	**50**	**82**

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.

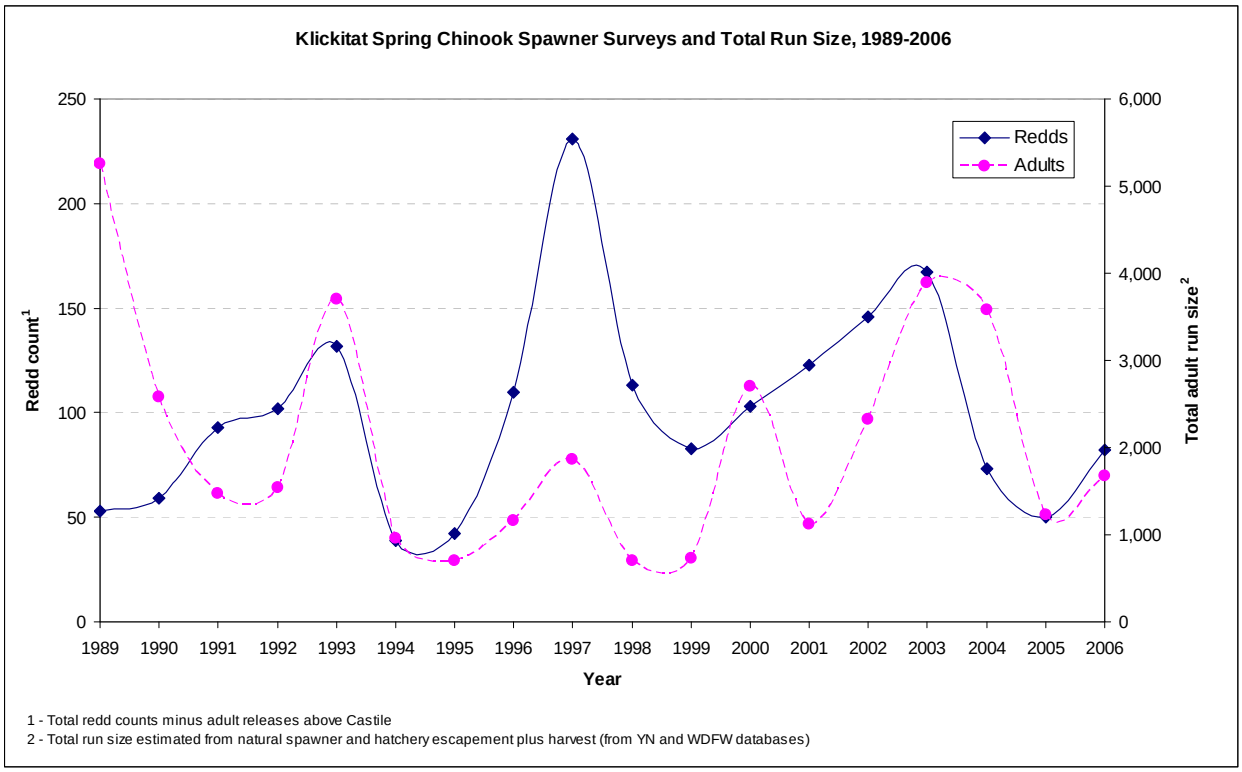

Figure C1. Spring Chinook redd counts and estimated total run size in the Klickitat subbasin, 1989-2006.

Table C3. Results of 2006 Fall Chinook spawning surveys in the Klickitat subbasin.

KLICKITAT WATERSHED - FALL CHINOOK SPAWNING SURVEY RESULTS, 2006

				REACH											
			#	REDD	REDDS	LIVE OBS.			MORTS OBS.					
									Ad-clipped		Unclipped		Unk	
STREAM	REACH	MILES	PASSES	TOTALS	/MILE	Floy Tag	No Floy	Unk	Floy Tag	No Floy	Floy Tag	No Floy	Floy Tag	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	0	0	0.00	0	0	0	0	0	0	0	0	0
	Hatchery - Summit Cr.	5.5	3	72	13.09	0	536	3	0	0	0	16	0	8
	Summit Cr. - Leidl Br.	5.6	1	1	0.18	0	0	26	0	0	0	6	0	0
	Leidl Br. - Stinson Flats	2.5	2	2	0.80	0	23	0	0	0	0	41	0	12
	Stinson Flats - Beeks Canyon	4.5	2	23	5.11	0	32	0	0	3	0	88	0	0
	Beeks Canyon - Little Klick	4.8	2	18	3.75	0	56	0	0	7	0	49	0	39
	Little Klick - Twin Bridges	1.5	2	3	2.00	0	8	0	0	0	0	1	0	1
	Twin Bridges - Klick Field Office	1.2	1	0	0.00	0	0	0	0	0	0	3	0	9
	Klick Field Office - Klickitat Town	3.6	0	0	0.00	0	0	0	0	0	0	0	0	0
	Klickitat Town - Pitt Bridge	3.4	1	0	0.00	0	0	0	0	0	0	0	0	3
	Pitt Bridge - Turkey Farm CG	5.4	1	0	0.00	0	0	0	0	0	0	0	0	0
	Turkey Farm CG - Lyle Falls trap	2.5	1	0	0.00	0	0	0	0	0	0	0	0	0
	Below Lyle Falls	0.1	0	0	0.00	0	0	0	0	0	0	0	0	0
	Mainstem Totals (surveyed reaches)	**36.9**		**119**	**3.2**	**0**	**655**	**29**	**0**	**10**	**0**	**204**	**0**	**72**
	KLICKITAT WATERSHED TOTALS			**119**	**3.2**	**0**	**655**	**29**	**0**	**10**	**0**	**204**	**0**	**72**

n/s = not surveyed
Unk = Unknown

Total Floy-tagged Morts Observed 0
Total Morts Observed 286
Percentage Floy-tagged 0.0%

Note: High flows and turbidity throughout much of Nov. and again in mid Dec. limited survey ability and may have biased redd counts low. November flows and sediment also caused significant pre-spawn mortality of fall chinook.

Table C4. Results of 2006-7 Coho spawning surveys in the Klickitat subbasin.

KLICKITAT WATERSHED - COHO SPAWNING SURVEY RESULTS, 2006/2007

				REACH		LIVE OBS.			MORTS OBS.					
			#	REDD	REDDS				Ad-clipped		Unclipped		Unk	
STREAM	REACH	MILES	PASSES	TOTALS	/MILE	Floy Tag	No Floy	Unk	Floy Tag	No Floy	Floy Tag	No Floy	Floy Tag	No Floy
Klickitat														
MAIN STEM	Castile Falls #10 - Castile Falls #1	0.6	0	0	0.00	0	0	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	0	0
	Signal Peak Br. - Big Muddy Cr.	6.9	0	0	0.00	0	0	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	0	0
	Old USGS gage - WDFW Hatchery	8.2	0	0	0.00	0	0	0	0	0	0	0	0	0
	Hatchery - Summit Cr.	5.4	2	0	0.00	0	0	0	0	0	0	0	0	0
	Summit Cr. - Leidl Br.	5.2	2	0	0.00	0	0	0	0	0	0	0	0	0
	Leidl Br. - Stinson Flat	2.9	2	0	0.00	0	0	0	0	0	0	0	0	0
	Stinson Flat - Beeks Canyon	4.5	2	0	0.00	0	0	0	0	0	0	0	0	0
	Beeks Canyon - Little Klickitat	4.8	2	0	0.00	0	0	0	0	0	0	0	0	0
	Little Klickitat - Twin br.	1.5	2	0	0.00	0	0	0	0	0	0	0	0	0
	Twin Br. - Field Office	1.3	2	0	0.00	0	0	0	0	0	0	0	0	0
	Field office - Ice house landing	1.5	2	0	0.00	0	0	0	0	0	0	0	0	0
	Ice house landing - Klickitat Town	2.1	2	0	0.00	0	0	0	0	0	0	0	0	0
	Klickitat Town - Pitt Bridge	3.4	2	0	0.00	0	0	0	0	0	0	0	0	0
	Pitt - bus turn around	2	2	0	0.00	0	0	0	0	0	0	0	0	0
	Bus turn around - Turkey Farm	3.3	2	0	0.00	0	0	0	0	0	0	0	0	0
	Turkey Farm - Lyle Falls scew trap	2.5	2	0	0.00	0	0	0	0	0	0	0	0	0
	County Park riffle	0.1	1	0	0.00	0	0	23	0	0	0	0	0	0
	Mainstem Totals (surveyed reaches)	**40.5**		**0**	**0.0**	**0**	**0**	**23**	**0**	**0**	**0**	**0**	**0**	**0**
TRIBUTARIES														
Trib of trib														
OUTLET CREEK		0.3	0	0	0.00	0	0	0	0	0	0	0	0	0
WHITE CREEK	Bottom 1.5 miles	1.5	1	0	0.00	0	0	0	0	0	0	0	0	0
SUMMIT CREEK	Falls - mouth	1.3	1	0	0.00	0	0	0	0	0	0	0	0	0
DEAD CANYON CR		1.3	2	0	0.00	0	0	0	0	0	0	0	0	0
BEEKS CANYON		0.5	1	0	0.00	0	0	0	0	0	0	0	0	0
LITTLE KLICKITAT	Bowman Cr. - mouth	1.2	1	0	0.00	0	0	0	0	0	0	0	0	0
Bowman Cr.	Falls - mouth	1.0	3	0	0.00	0	0	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	0	0
	Left bank trib #1 - Weeping Wall	1.0	0	0	0.00	0	0	0	0	0	0	0	0	0
	Weeping wall - mouth	1.0	1	0	0.00	0	0	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	0	0
	Trestle to mouth	1.1	2	0	0.00	0	0	0	0	0	0	0	0	0
SNYDER CREEK	lowermost bridge to mouth	0.8	2	1	1.33	0	0	0	0	0	0	0	0	0
LOGGING CAMP CR	Bedrock slide to mouth	1.0	1	0	0.00	0	0	0	0	0	0	0	0	0
WHEELER CREEK	2nd Falls (abv Johnson Cr) to 1st Falls/Cascade	0.6	1	0	0.00	0	0	0	0	0	0	0	0	0
	1st Falls/Cascade to mouth	0.5	1	0	0.00	0	0	0	0	0	0	0	0	0
DILLACORTE CR	Falls - mouth	1.5	1	0	0.00	0	0	0	0	0	0	0	0	0
SILVA CREEK	Bottom	0.1	1	0	0.00	0	80	0	0	0	0	0	0	0
CANYON CREEK	Bottom 100 meters	0.1	2	unk	-	0	138	0	0	13	0	7	0	25
	Tributary Totals (surveyed reaches)	**14.6**		**1**	**0.1**	**0**	**218**	**0**	**0**	**13**	**0**	**7**	**0**	**25**
	KLICKITAT WATERSHED TOTALS	55.1		**1**		**0**	**218**	**23**	**0**	**13**	**0**	**7**	**0**	**25**
	Tributary Contribution			**100%**		**-**	**100%**	**0%**	**-**	**100%**	**-**	**100%**	**-**	**100%**
	Mainstem Contribution			**0%**		**-**	**0%**	**100%**	**-**	**0%**	**-**	**0%**	**-**	**0%**

unk = unknown

Total Floy-tagged Morts Observed	0
Total Morts Observed	45
Percentage Floy-tagged	0.0%

Note - High flows and turbidity throughout much of Nov., Dec., and early Jan. limited survey ability and may have biased redd counts low.

Table C5. Results of 2006 Steelhead spawning surveys in the Klickitat subbasin.

KLICKITAT WATERSHED - STEELHEAD SPAWNING SURVEY RESULTS, 2006

				REACH		LIVE OBS.			MORTS OBS. Ad-clipped		MORTS OBS. Unclipped	
			#	REDD	REDDS							
STREAM	REACH	MILES	PASSES	TOTALS	/MILE	Floy Tag	No Floy	Unk	Floy Tag	No Floy	Floy Tag	No Floy
Klickitat R.												
MAIN STEM	Huckleberry Cr. confl - road washout	3.4	0	0	0.00	0	0	0	0	0	0	0
	Road washout - outhouse	3.2	0	0	0.00	0	0	0	0	0	0	0
	Outhouse - Cow Camp	2.0	1	0	0.00	0	0	0	0	0	0	0
	Cow Camp - main road bridge	2.2	0	0	0.00	0	0	0	0	0	0	0
	Main road bridge - turnout/turnaround	2.3	0	0	0.00	0	0	0	0	0	0	0
	Turnout/turnaround - McCreedy confluence	2.0	0	0	0.00	0	0	0	0	0	0	0
	McCreedy confl. - Chaparral confluence	2.7	1	0	0.00	0	0	0	0	0	0	0
	Chaparral confluence - old upper trap site	1.7	1	0	0.00	0	0	0	0	0	0	0
	Old upper trap site - top of Castile falls complex	1.3	2	0	0.00	0	0	0	0	0	0	0
	Extent of Castile Falls complex	0.7	0	0	0.00	0	0	0	0	0	0	0
	Bottom of Castile complex - West Fork conflu.	0.8	0	0	0.00	0	0	0	0	0	0	0
	West Fork - Signal Peak bridge	2.3	0	0	0.00	0	0	0	0	0	0	0
	Signal Peak bridge - Surveyors Cr. confluence	2.4	0	0	0.00	0	0	0	0	0	0	0
	Surveyors Cr. confluence - Portage	2.0	0	0	0.00	0	0	0	0	0	0	0
	Portage - Big Muddy conflu.	2.8	0	0	0.00	0	0	0	0	0	0	0
	Big Muddy confluence - old USGS gage site	3.6	0	0	0.00	0	0	0	0	0	0	0
	Old USGS gage - Deer Springs	4.1	0	0	0.00	0	0	0	0	0	0	0
	Deer Springs - Hatchery	4.2	0	0	0.00	0	0	0	0	0	0	0
	Hatchery - White Cr. confluence	2.9	1	1	0.34	0	1	0	0	0	0	0
	White Cr. - Summit Cr. confluence	2.5	1	1	0.40	0	2	1	0	0	0	0
	Summit Cr. - Gage cable above Leidl	2.5	1	1	0.40	0	2	0	0	0	0	0
	Gage cable - Leidl bridge	2.6	1	0	0.00	0	1	0	0	0	0	0
	Leidl bridge - Stinson boat landing	2.9	2	0	0.00	0	0	0	0	0	0	0
	Stinson landing - Matt's pond	2.0	1	0	0.00	0	0	0	0	0	0	0
	Matt's pond - Beeks Cr. confluence	2.0	1	0	0.00	0	2	0	0	0	0	0
	Beeks Cr. confluence - Cattle Gate	2.0	1	1	0.50	0	3	0	0	0	0	0
	Cattle Gate - Little Klickitat confluence	3.4	1	0	0.00	0	5	0	0	1	0	2
	Little Klick - Swale Cr. (KFO)	2.7	2	0	0.00	0	0	0	0	0	0	0
	Swale Cr. - Ice house boat landing	1.3	2	0	0.00	0	0	0	0	0	0	0
	Ice house landing - Klickitat village boat landing	2.1	2	1	0.47	0	1	0	0	0	0	0
	Klickitat boat landing - Pitt Bridge boat landing	3.4	2	0	0.00	0	0	1	0	0	0	0
	Pitt bridge - Logging Camp Cr. confluence	1.2	2	0	0.00	0	1	0	0	0	0	0
	Logging Camp Cr. - Bus Turnaround (RM 8)	0.9	2	0	0.00	0	0	0	0	0	0	0
	Bus Turnaround - Dillacorte Cr. confluence	3.1	2	0	0.00	0	0	0	0	0	0	0
	Dillacorte Cr. - Lyle falls screw trap	2.6	2	0	0.00	0	1	0	0	0	0	0
	County Park area below Lyle Falls	0.2	1	0	0.00	0	0	0	0	0	0	0
	Mainstem Totals (surveyed reaches)	**48.1**		**5**	**0.1**	**0**	**19**	**2**	**0**	**1**	**0**	**2**
TRIBUTARIES												
Trib of trib												
DIAMOND FORK			0	0	-	0	0	0	0	0	0	0
McCREEDY CR.	1 mile upstream to confluence	1.0	1	0	0.00	0	0	0	0	0	0	0
CHAPARRAL CR.	Klick road to confluence	0.8	0	0	0.00	0	0	0	0	0	0	0
PISCOE CR.	Bottom 1 mile	1.0	1	0	0.00	0	0	0	0	0	0	0
SURVEYORS CR.	2nd xing to 1st xing	2.2	0	0	0.00	0	0	0	0	0	0	0
	1st xing to mouth	1.7	0	0	0.00	0	0	0	0	0	0	0
BIG MUDDY	End of Rd. to falls	1.4	0	0	0.00	0	0	0	0	0	0	0
TROUT CREEK	River Route Rd. xing to cascades	2.3	0	0	0.00	0	0	0	0	0	0	0
	cascades to confluence	1.0	2	0	0.00	0	0	0	0	0	0	0
Bear Cr.		1.0	0	0	0.00	0	0	0	0	0	0	0
OUTLET CREEK		0.3	0	0	0.00	0	0	0	0	0	0	0
WHITE CREEK	Upper Rd. Xing - IXL Rd.	2.8	2	0	0.00	0	0	0	0	0	0	0
	IXL Rd. - 191 Rd. Xing	3.1	3	0	0.00	0	0	0	0	0	0	0
	191 Rd. Xing - Cedar Valley Rd.	2.4	3	0	0.00	0	0	0	0	0	0	0
	Cedar Valley Rd. - Brush Cr.	4.6	1	0	0.00	0	0	0	0	0	0	0
	Brush Cr. - Washed out xing	1.8	1	0	0.00	0	0	0	0	0	0	0
	Washed out Xing. - mouth	3.1	2	2	0.65	0	0	0	0	0	0	0
West Fork White Cr.	Lower LB trib. - mouth	1.9	0	0	0.00	0	0	0	0	0	0	0
Tepee Cr.	RB Trib - IXL Rd.	2.2	2	0	0.00	0	0	0	0	0	0	0
	IXL Rd.- Tepee Cr. Rd.	2.5	3	0	0.00	0	0	0	0	0	0	0
	Tepee Cr. Rd. - mouth	3.4	2	0	0.00	0	0	0	0	0	0	0
East Fork Tepee Cr.			0	0	-	0	0	0	0	0	0	0
Brush Creek	Xing 3.8 mi above Coyote Springs Rd.	3.8	1	0	0.00	0	0	0	0	0	0	0
	Coyote Springs Rd. - Cedar Valley Rd.	2.0	1	0	0.00	0	0	0	0	0	0	0
	Cedar Valley Rd. - Blue Creek	2.6	1	0	0.00	0	0	0	0	0	0	0
	Blue Creek - mouth	2.2	1	0	0.00	0	0	0	0	0	0	0
SUMMIT CREEK	Falls - Confluence	1.3	3	0	0.00	0	0	0	0	0	0	0
DEAD CANYON CR	Big falls/Masondale Spr. trib to 1st falls	0.8	0	0	0.00	0	0	0	0	0	0	0
	1st falls to LB trib	1.0	0	0	0.00	0	0	0	0	0	0	0
	LB trib to Willis Canyon	1.5	1	1	0.67	0	0	0	0	0	0	0
	Willis Canyon to Haul Rd. Xing	0.8	4	0	0.00	0	0	0	0	0	0	0
	Haul Rd. Xing to mouth	0.2	4	0	0.00	0	0	0	0	0	0	0
BEEKS CANYON	Falls to mouth	0.5	1	0	0.00	0	0	0	0	0	0	0
LITTLE KLICKITAT	3 Creeks Lodge to Woodland Rd.	4.6	2	0	0.00	0	0	0	0	0	0	0
	Woodland Rd. to Hwy. 97	3.9	2	0	0.00	0	0	0	0	0	0	0
	Hwy. 97 to City Park	2.1	2	0	0.00	0	0	0	0	0	0	0
	City Park to Hwy. 142	1.5	0	0	0.00	0	0	0	0	0	0	0
	Falls to Mill Cr.	2.6	2	0	0.00	0	0	0	0	0	0	0
	Mill Cr. to Bowman Cr.	2.5	2	0	0.00	0	0	0	0	0	0	0
	Bowman Cr. - Hwy. 142 Bridge	0.9	4	0	0.00	0	1	0	0	0	0	0
	Hwy. 142 Bridge to mouth	0.3	4	0	0.00	0	0	1	0	0	0	0
Bowman Cr.	Falls - Hwy. 142	0.6	3	0	0.00	0	0	0	0	0	0	0
	Hwy. 142 to mouth	0.5	3	0	0.00	0	0	0	0	0	0	0
Canyon Cr.	Big falls to mostly impass. cascade (Falls 3)	1.5	1	0	0.00	0	0	0	0	0	0	0
	Cascade/Falls 3 to mouth	1.9	1	0	0.00	0	0	0	0	0	0	0
Mill Cr.			0	0	-	0	0	0	0	0	0	0
East Prong		1.0	0	0	0.00	0	0	0	0	0	0	0
West Prong		1.0	0	0	0.00	0	0	0	0	0	0	0
SWALE CREEK	2nd RR trestle to school bus/houses	1.2	4	0	0.00	0	0	0	0	0	0	0
	school bus/houses to 1st RR tresle (on LB trib)	1.2	4	0	0.00	0	0	0	0	0	0	0
	1st RR trestle (on LB trib) to mouth	1.2	5	0	0.00	0	0	0	0	0	0	0
SNYDER CREEK	Upper falls - Lower falls	0.5	0	0	0.00	0	0	0	0	0	0	0
	Lower falls - upper bridge	1.9	1	0	0.00	0	0	0	0	0	0	0
	Upper bridge - mouth	0.9	5	2	2.22	0	0	0	0	0	0	0
LOGGING CAMP CR	Bedrock slide to mouth	1.0	4	0	0.00	0	0	0	0	0	0	0
WHEELER CREEK	2nd Falls (abv Johnson Cr) to 1st Falls/Cascade	0.6	1	0	0.00	0	0	0	0	0	0	0
	1st Falls/Cascade to mouth	0.5	1	0	0.00	0	0	0	0	0	0	0
DILLACORTE CR	Falls - mouth	1.5	4	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 1/4 mile	0.3	1	0	0.00	0	0	0	0	0	0	0
	Tributary Totals (surveyed reaches)	**75.5**		**5**	**0.1**	**0**	**1**	**1**	**0**	**0**	**0**	**0**
	KLICKITAT WATERSHED TOTALS	**123.6**		**10**		**0**	**20**	**3**	**0**	**1**	**0**	**2**
	Tributary Contribution			**50%**		**-**	**5%**	**33%**	**-**	**0%**	**-**	**0%**
	Mainstem Contribution			**50%**		**-**	**95%**	**67%**	**-**	**100%**	**-**	**100%**

Unk = Unknown

Note - Due to high flows in Jan.-early Feb., an early survey pass was conducted in lower basin tribs. High flows and turbidity in some tributaries (esp. in White Cr. watershed) from mid April - mid May and in mainstem from mid April - early June limited survey ability and effectiveness

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 2006.

2006 Spring Chinook Natural Spawner Scale Age Data

			Fork Length (cm)			Postorbital-Hypural Length (cm)				
Age	Sex	Count	Mean	Min	Max	Mean	Min	Max	% of sex	% of total
4	Female	1	81	81	81	70	70	70	100.0%	50.0%
4	Male	1	77	77	77	60	60	60	100.0%	50.0%
Total Males		1								
Total Females		1								
Grand Total		2								

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 2006.

2006 Fall Chinook Natural Spawner Scale Age Data

			Fork Length (cm)			Postorbital-Hypural Length (cm)				
Age	Sex	Count	Mean	Min	Max	Mean	Min	Max	% of sex	% of total
3	Female	1	83	83	83	62	62	62	1.2%	0.7%
3	Male	12	74	61	88	59.4	48	70	20.3%	8.3%
4	Female	48	88.5	77	99	72.9	64	83	56.5%	33.3%
4	Male	25	86.7	77	96.5	69.5	62	75	42.4%	17.4%
5	Female	36	92.7	80	102.5	76.2	67.5	83	42.4%	25.0%
5	Male	22	100.1	90	113.5	79.8	70	101	37.3%	15.3%
Total Males		59								
Total Females		85								
Grand Total		144								

Table D3. Average, minimum, and maximum fork length and postorbital-hypural length by age and sex for naturally-spawning coho in the Klickitat subbasin in 2006-7.

2006-7 Coho Natural Spawner Scale Age Data

			Fork Length (cm)			Postorbital-Hypural Length (cm)				
Age	Sex	Count	Mean	Min	Max	Mean	Min	Max	% of sex	% of total
3	Female	10	72.8	62	81	60.5	50	68	100.0%	55.6%
3	Male	8	71.1	57	83	57.9	46	67	100.0%	44.4%
Total Males		8								
Total Females		10								
Grand Total		18								

Appendix E. Sediment data

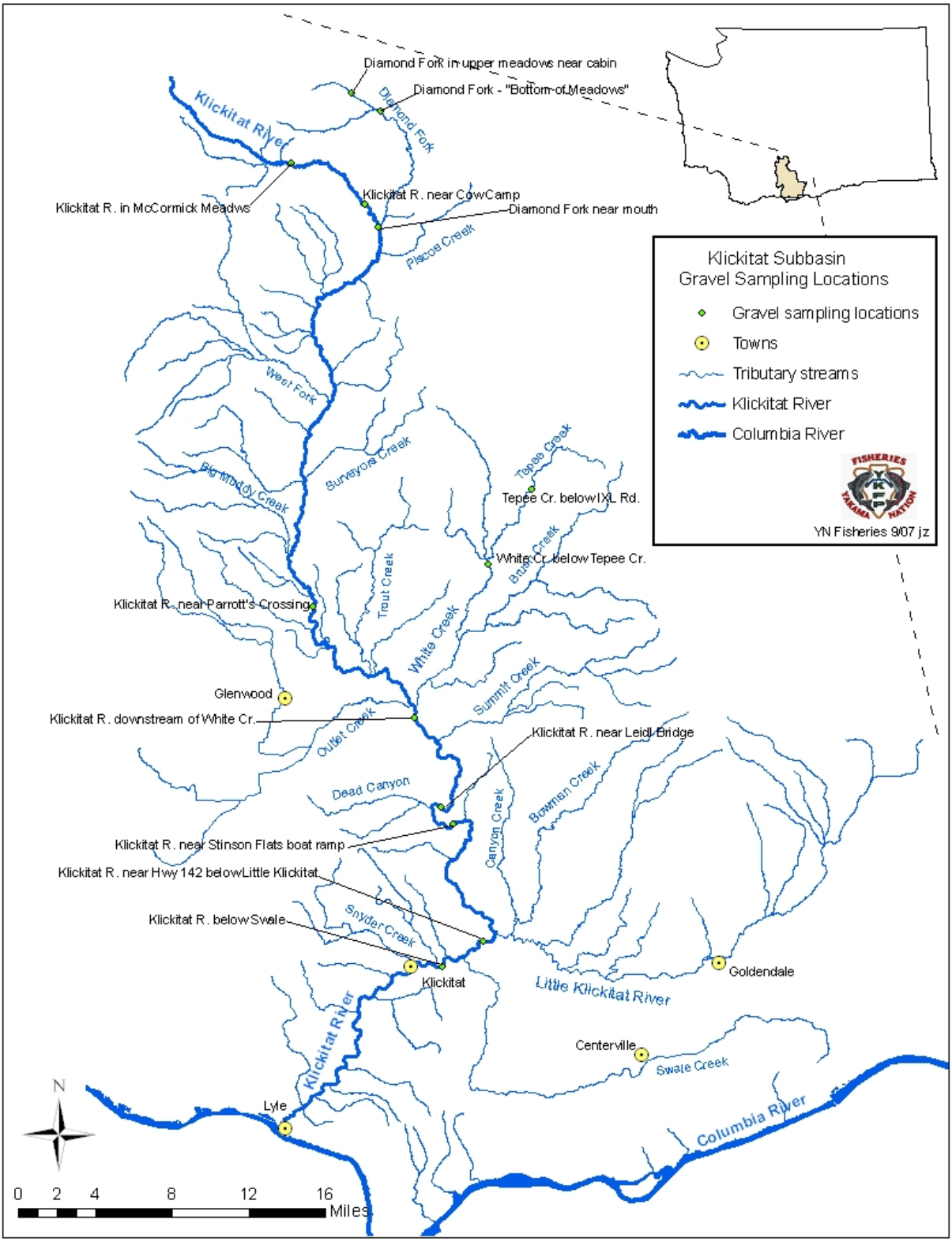

Figure E1. Locations of 2006 Klickitat subbasin sediment sampling sites.

Site Name: Diamond Fork - "Bottom of Meadows"

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
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
2006	100.0	65.8	48.2	41.6	35.5	26.6	20.6	15.3	13.5	7.7	4.4

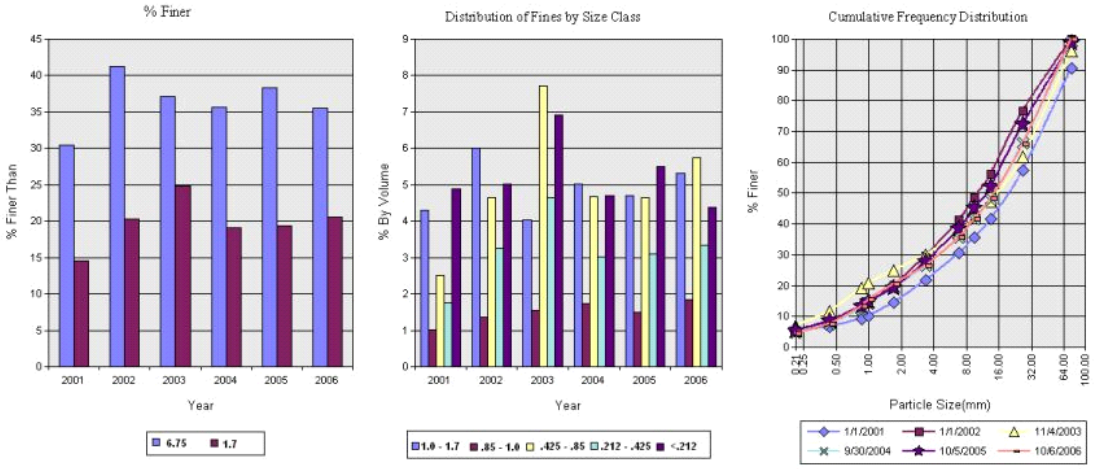

Figure E2. Sediment sampling data from Diamond Fork Bottom of Meadows 2001-2006.

Site Name: Diamond Fork near mouth

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
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
2006	93.8	63.3	46.1	39.2	31.9	22.3	15.0	11.0	9.9	7.3	5.0

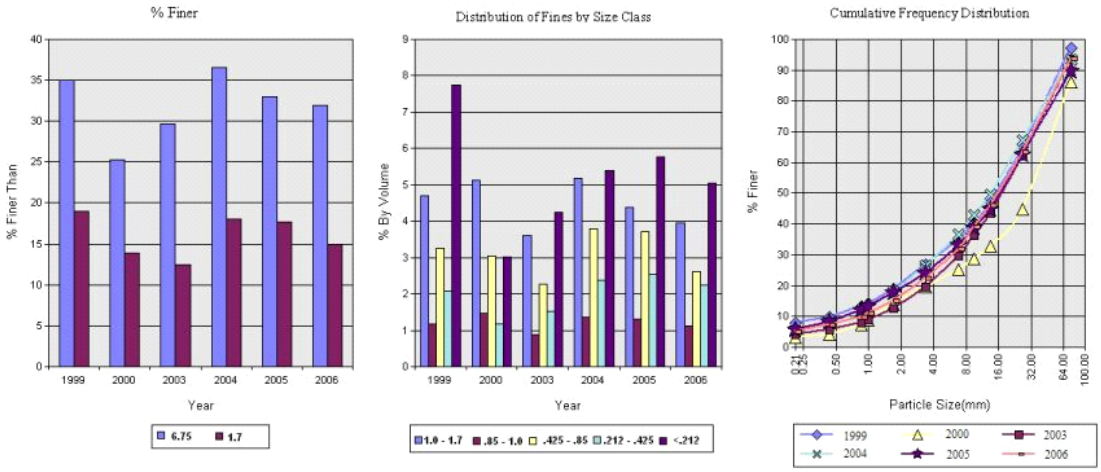

Figure E3. Sediment sampling data from Diamond Fork near mouth 1999-2006.

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
2006	98.6	77.0	56.4	48.6	41.2	30.3	21.6	16.0	14.4	9.4	5.8

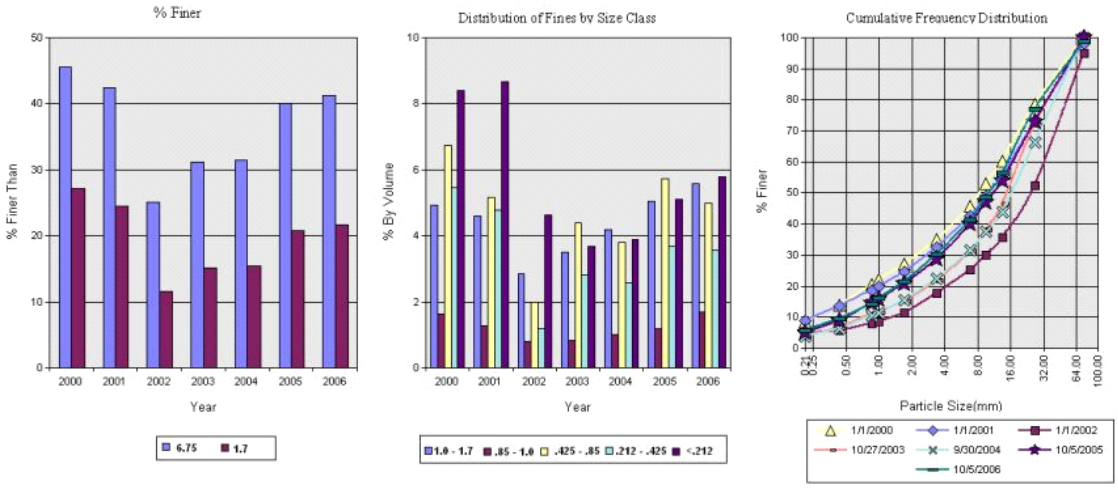

Figure E4. Sediment sampling data from Diamond Fork in upper meadows 2000-2006.

Site Name: Klickitat R. below Swale

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
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
2006	95.5	60.9	44.8	39.6	34.7	29.4	24.2	14.2	11.0	4.5	2.7

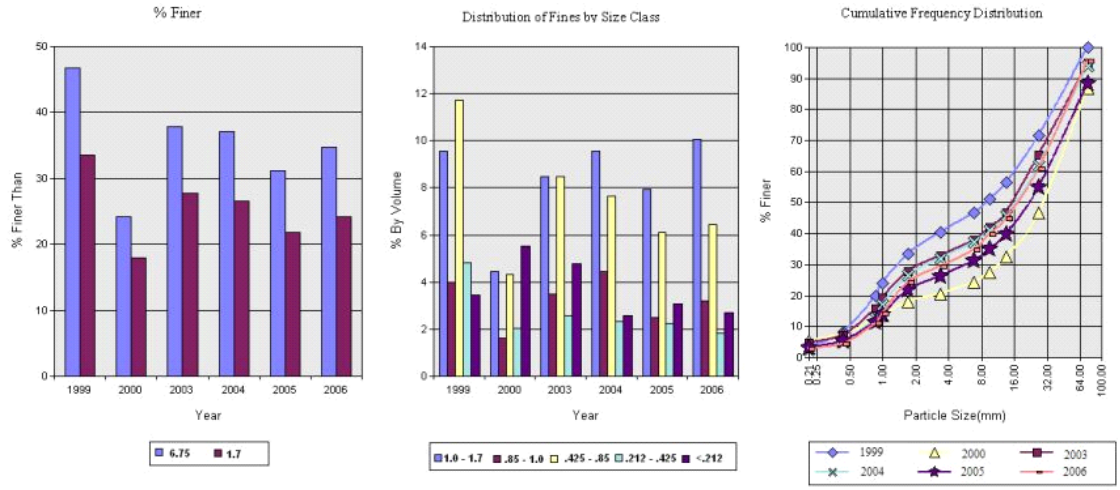

Figure E5. Sediment sampling data from Klickitat R. below Swale Cr. 1999-2006.

Site Name: Klickitat R. downstream of White Cr.

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
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
2006	93.4	63.6	47.5	41.8	37.1	30.7	23.3	14.9	12.6	6.6	4.3

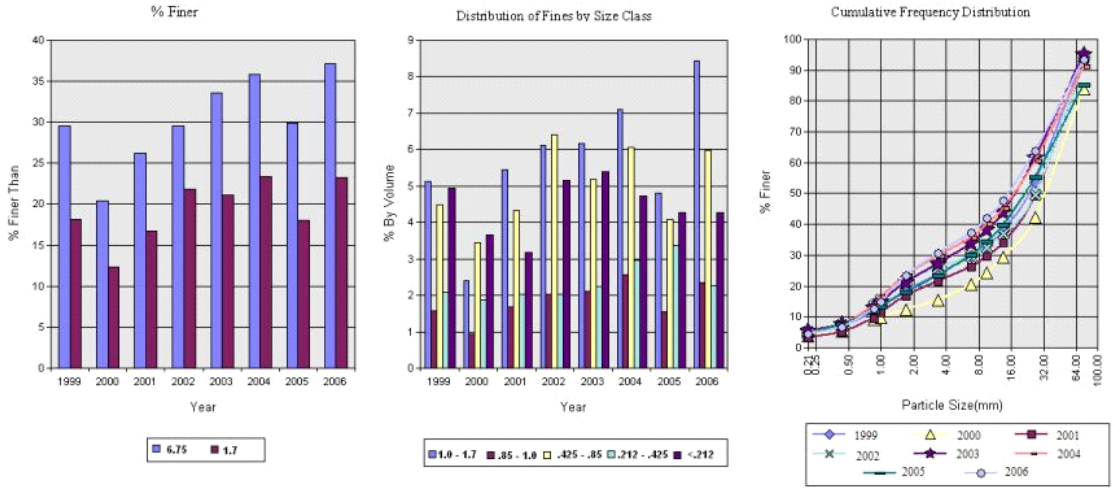

Figure E6. Sediment sampling data from Klickitat R. downstream of White Cr. 1999-2006.

Site Name: Klickitat R. in McCormick Meadows

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
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
2006	99.1	63.3	44.9	38.4	31.9	22.6	15.4	10.8	9.5	5.3	3.7

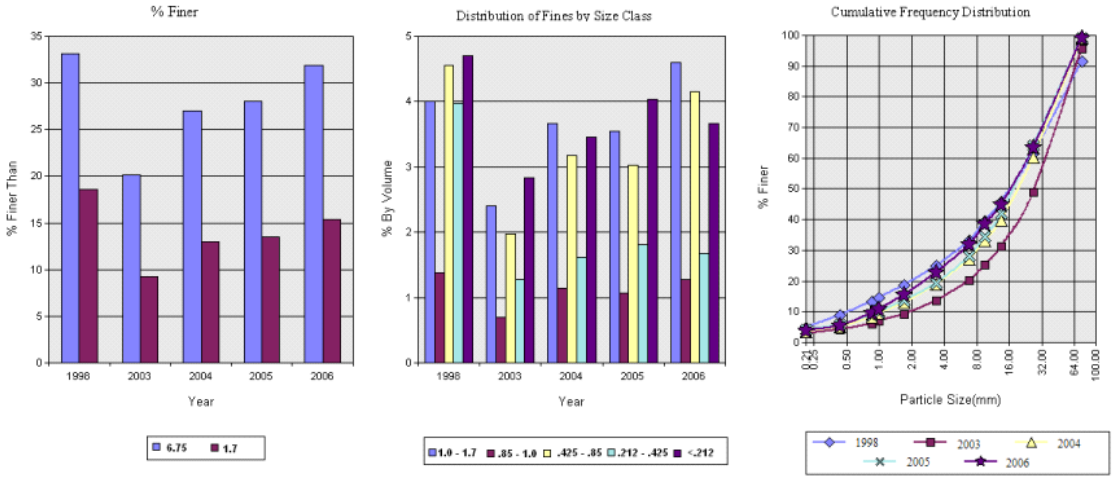

Figure E7. Sediment sampling data from Klickitat R. in McCormick Meadows 1998-2006.

Site Name: Klickitat River near Hwy 142 below the Little Klickitat

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
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
2006	98.3	55.7	40.5	35.4	30.6	25.0	21.3	17.4	15.4	8.9	4.9

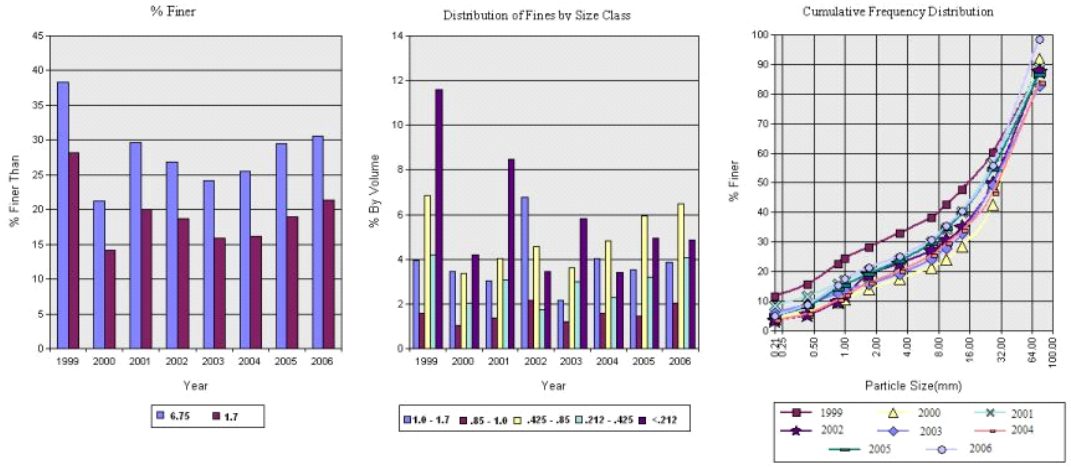

Figure E8. Sediment data from Klickitat R. below Little Klickitat R. 1999-2006.

Site Name: Klickitat R. near Cow Camp

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
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
2006	95.3	66.4	47.8	40.8	33.8	24.0	16.7	12.1	10.9	6.3	4.2

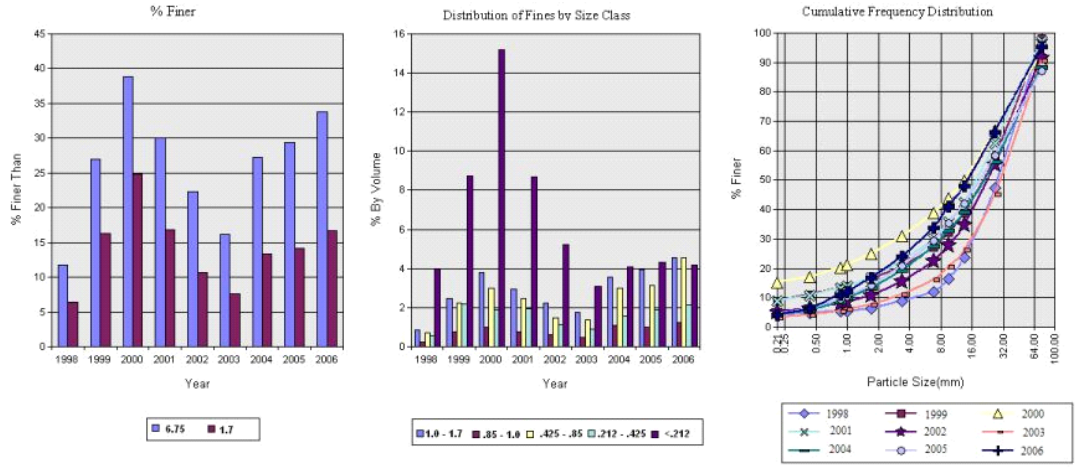

Figure E9. Sediment sampling data from Klickitat R. near Cow Camp 1998-2006.

Site Name: Klickitat River near Leidl Bridge

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
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
2006	99.3	44.1	29.2	26.3	23.9	21.0	17.3	12.3	10.9	6.4	4.1

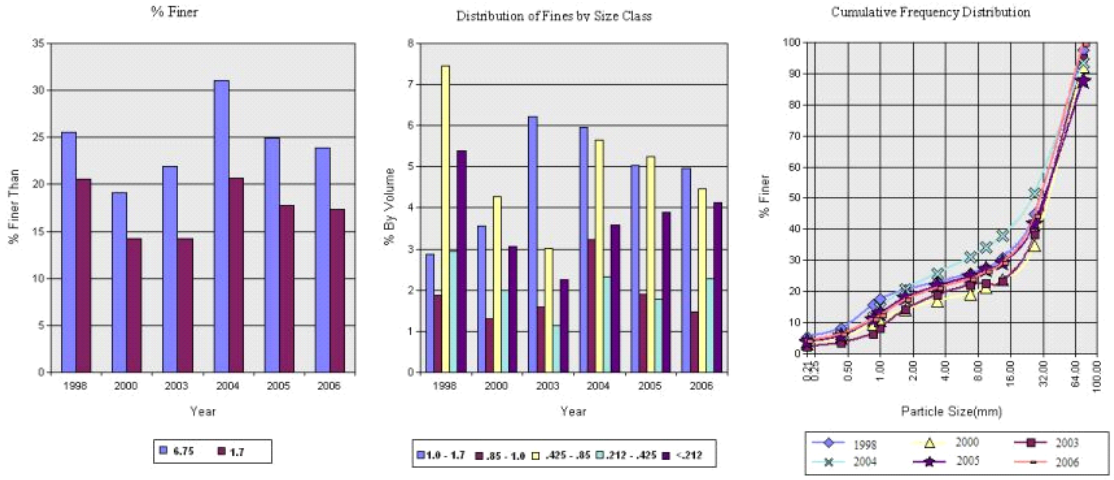

Figure E10. Sediment sampling data from Klickitat R. near Leidl Bridge 1998-2006.

Site Name: Klickitat River near Parrott's Crossing

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
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
2006	87.6	61.5	48.0	43.2	38.6	31.2	24.1	17.7	15.5	8.4	5.6

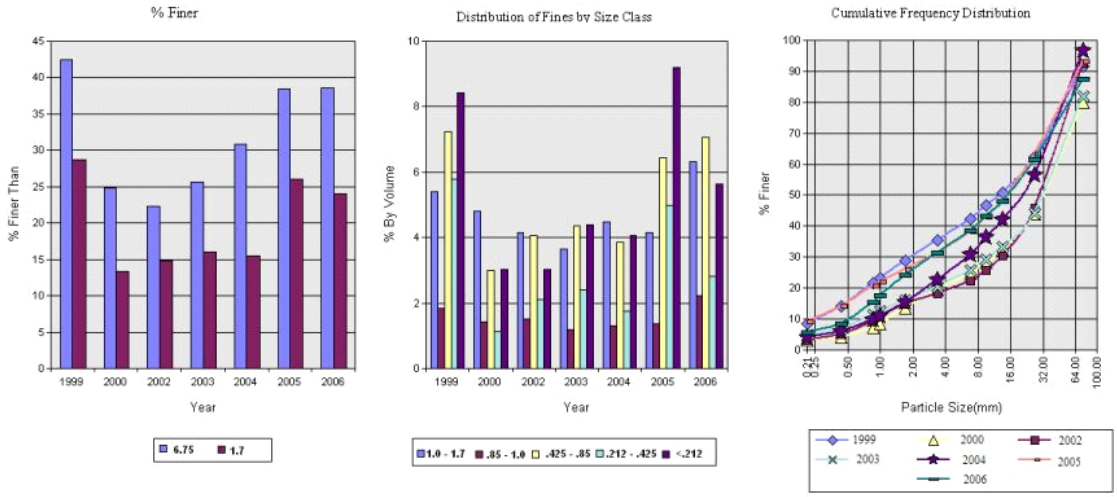

Figure E11. Sediment sampling data from Klickitat R. near Parrott's Crossing 1999-2006.

Site Name: Klickitat River near Stinson Flats boat ramp

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
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
2006	82.1	54.3	39.1	34.2	30.8	26.8	22.8	15.1	12.4	5.9	3.5

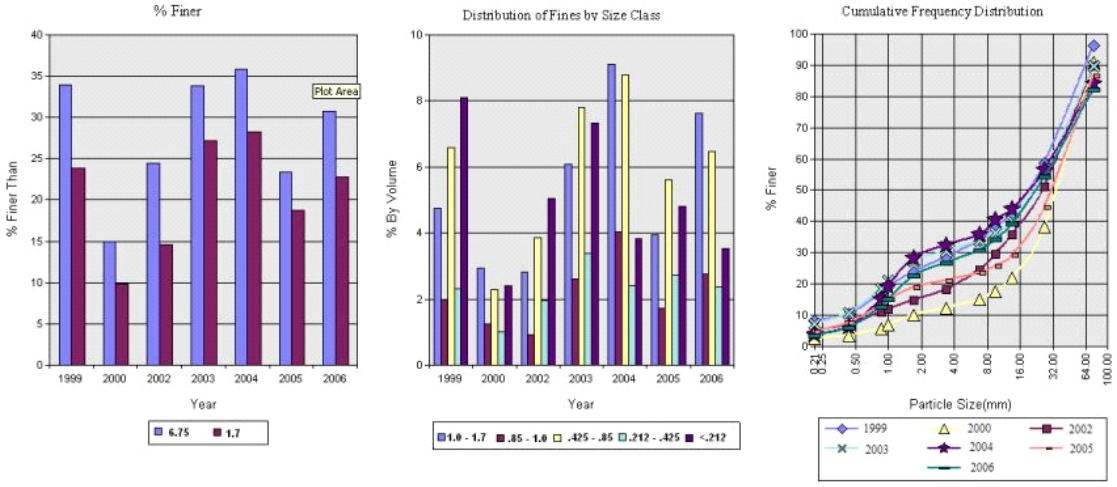

Figure E12. Sediment sampling data from Klickitat R. near Stinson Flats 1999-2006.

Site Name: White Creek meadow below Tepee Creek confluence

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
2005	100.0	78.2	55.8	47.7	40.8	31.9	26.4	23.9	22.7	16.6	12.5
2006	97.9	77.6	51.0	43.0	36.2	27.6	22.2	18.1	16.8	9.8	6.1

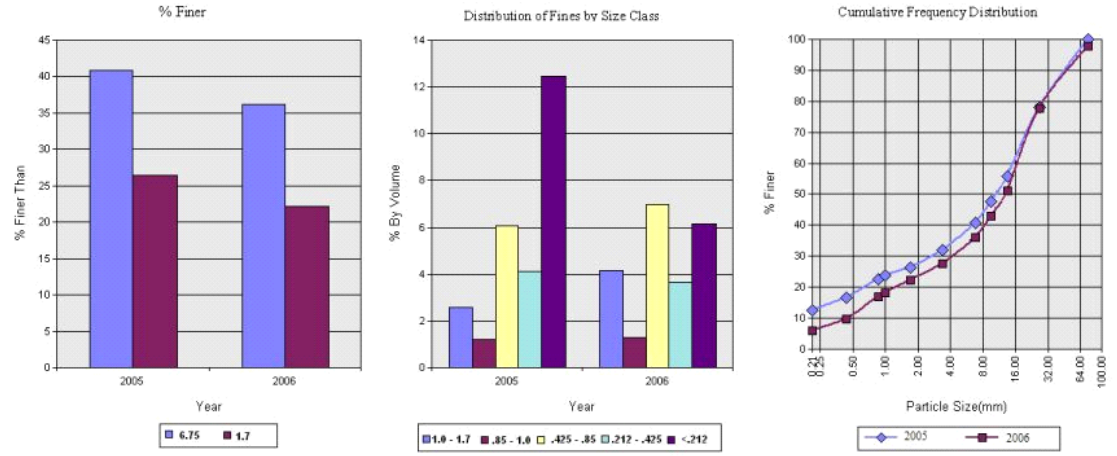

Figure E13. Sediment sampling data from White Cr. below Tepee Cr. 2005-2006.

Site Name: Tepee Creek below IXL Road

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
2006	98.1	77.1	59.8	52.1	45.0	34.4	26.8	22.2	21.1	15.3	12.4

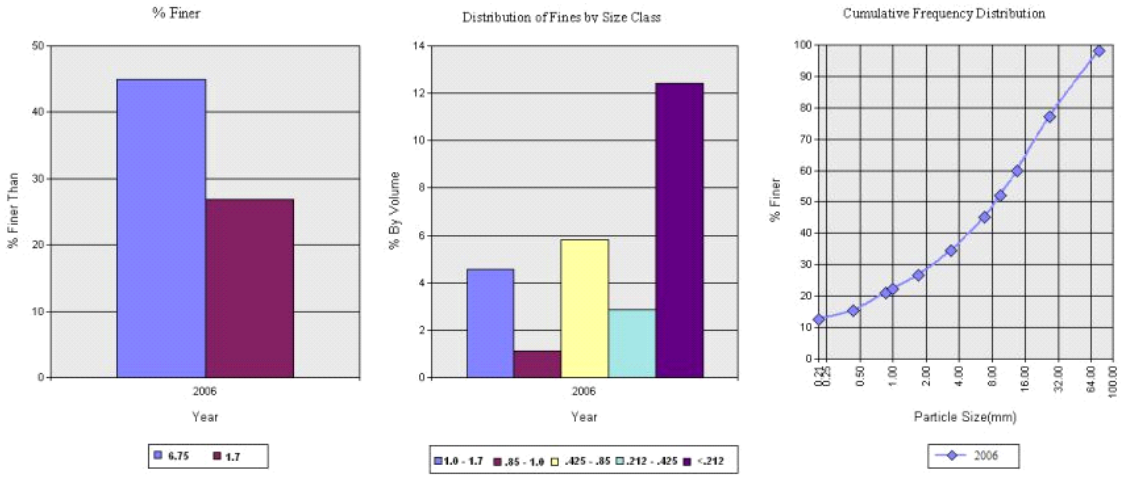

Figure E14. Sediment sampling data from Tepee Cr. below IXL Road 2006.

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

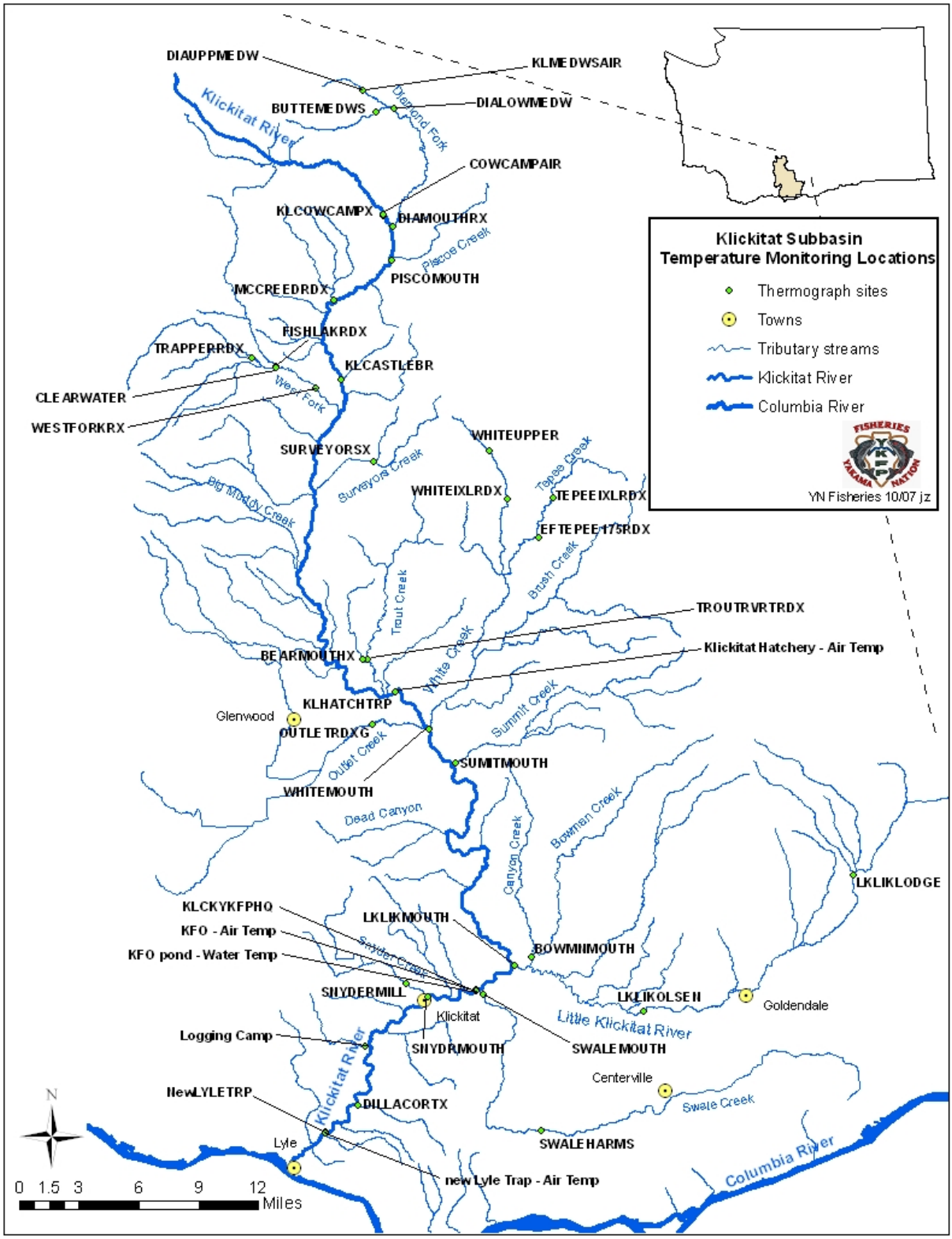

Figure F1. Locations of Klickitat subbasin temperature and water quality monitoring sites

Table F2. Monthly temperature summaries from 36 sites in the Klickitat subbasin. Site names correspond to those in Table F1. 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. Data not collected at several sites shown on above map due to lost thermographs.

BEARMOUTHX

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
May	31	0	0	0	0	0	0	6	0	0	0	0	13.9	5.4	3.7
June	30	0	0	0	0	0	0	10	0	0	0	0	14.1	6.2	3.2
July	31	0	0	0	0	0	0	28	0	0	0	0	13.6	4.5	3.6
August	31	0	0	0	0	0	0	0	0	0	0	0	12.4	3.6	2.3
September	30	0	0	0	0	0	0	0	0	0	0	0	10.5	1.5	1.0
October	31	0	2	0	1	0	0	0	0	0	0	0	8.3	1.3	0.6
November	30	1	19	0	14	0	0	0	0	0	0	0	9.9	3.6	1.4
December	31	1	31	0	31	0	0	0	0	0	0	0	3.7	2.1	1.0
2007															
January	31	5	31	4	31	0	0	0	0	0	0	0	4.0	1.6	1.0
February	28	1	28	0	28	0	0	0	0	0	0	0	5.1	2.2	1.3
March	31	0	21	0	9	0	0	0	0	0	0	0	9.0	4.7	2.7
April	30	0	9	0	0	0	0	0	0	0	0	0	11.3	5.3	3.6

BOWMNMOUTH

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
May	31	0	0	0	0	0	0	15	0	0	0	0	16.1	5.6	3.5
June	30	0	0	0	0	0	0	30	8	4	0	0	19.5	5.6	3.7
July	31	0	0	0	0	0	0	31	30	16	8	0	20.0	5.5	4.3
August	31	0	0	0	0	0	0	31	19	0	0	0	17.9	4.8	4.0
September	30	0	0	0	0	0	0	18	0	0	0	0	16.0	4.3	3.0
October	31	1	2	0	2	0	0	0	0	0	0	0	11.8	4.5	2.2
November	30	1	9	0	7	0	0	0	0	0	0	0	12.4	5.1	1.6
December	31	0	31	0	28	0	0	0	0	0	0	0	5.0	1.7	0.8
2007															
January	31	0	31	0	29	0	0	0	0	0	0	0	5.1	1.7	0.7
February	28	0	22	0	20	0	0	0	0	0	0	0	5.9	1.4	0.7
March	31	0	3	0	3	0	0	0	0	0	0	0	9.1	2.0	1.0
April	30	0	0	0	0	0	0	0	0	0	0	0	10.7	1.3	0.7

BUTTEMEDWS

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
May	31	0	31	0	31	0	0	0	0	0	0	0	7.2	5.8	2.5
June	30	0	23	0	5	0	0	1	0	0	0	0	13.1	7.1	5.2
July	31	0	0	0	0	0	0	30	0	0	0	0	16.2	8.2	6.4
August	31	0	1	0	0	0	0	22	0	0	0	0	14.4	7.3	5.8
September	30	0	19	0	4	0	0	0	0	0	0	0	12.6	6.5	4.4
October	31	12	30	4	25	0	0	0	0	0	0	0	7.3	4.1	2.4
November	30	23	30	16	28	0	0	0	0	0	0	0	6.6	3.9	0.9
December	31	29	31	26	31	0	0	0	0	0	0	0	1.4	1.1	0.2
2007															
January	31	30	31	28	31	0	0	0	0	0	0	0	1.2	0.8	0.2
February	28	19	28	15	28	0	0	0	0	0	0	0	1.7	1.1	0.5
March	31	12	31	3	31	0	0	0	0	0	0	0	3.1	2.2	1.2
April	30	10	30	0	30	0	0	0	0	0	0	0	5.2	4.3	2.5

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
May	31	0	17	0	5	0	0	0	0	0	0	0	7.4	2.8	1.9
June	30	0	0	0	0	0	0	0	0	0	0	0	9.3	3.1	2.0
July	31	0	0	0	0	0	0	0	0	0	0	0	10.8	3.6	2.7
August	31	0	0	0	0	0	0	0	0	0	0	0	9.6	2.9	2.3
September	30	0	1	0	0	0	0	0	0	0	0	0	8.8	2.8	1.8
October	31	0	13	0	2	0	0	0	0	0	0	0	7.0	2.2	1.3
November	28	0	24	0	23	0	0	0	0	0	0	0	7.3	1.7	0.5
December	31	2	31	1	31	0	0	0	0	0	0	0	3.4	1.1	0.4
2007	**# 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	21	31	21	31	0	0	0	0	0	0	0	3.5	2.7	0.7
February	28	28	28	28	28	0	0	0	0	0	0	0	0.2	1.1	0.1
March	31	8	31	8	31	0	0	0	0	0	0	0	4.5	3.0	0.5
April	30	0	24	0	20	0	0	0	0	0	0	0	5.6	1.0	0.5

COWCAMPAIR

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
May	31	15	27	0	5	6	6	31	13	11	10	8	35.7	31.1	17.4
June	11	2	4	0	0	10	9	11	11	11	11	11	36.6	30.0	25.3
July	27	1	9	0	0	25	25	27	27	27	27	27	39.6	30.7	24.4
August		0	0	0	0	0	0	0	0	0	0	0	--	--	--
September		0	0	0	0	0	0	0	0	0	0	0	--	--	--
October		0	0	0	0	0	0	0	0	0	0	0	--	--	--
November	25	22	24	19	23	0	0	0	0	0	0	0	11.4	12.2	5.7
December	31	31	31	31	31	0	0	0	0	0	0	0	2.0	14.2	7.2
2007															
January	31	31	31	29	31	0	0	0	0	0	0	0	5.8	16.5	10.8
February	28	28	28	20	28	0	0	0	0	0	0	0	7.8	19.6	9.1
March	31	29	31	5	26	0	0	7	0	0	0	0	17.1	21.4	14.1
April	21	20	21	5	16	1	0	7	0	0	0	0	23.2	25.2	14.1

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
May	31	0	31	0	28	0	0	0	0	0	0	0	9.1	7.6	4.9
June	30	0	22	0	1	0	0	9	0	0	0	0	14.7	8.7	6.2
July	31	0	0	0	0	0	0	31	13	7	5	0	20.2	10.3	8.3
August	31	0	1	0	0	0	0	31	21	0	0	0	18.7	10.2	8.6
September	30	0	15	0	0	0	0	12	0	0	0	0	16.9	9.9	7.6
October	31	12	29	3	16	0	0	0	0	0	0	0	9.6	7.7	4.5
November	30	21	30	16	28	0	0	0	0	0	0	0	10.7	10.6	1.3
December	31	31	31	30	31	0	0	0	0	0	0	0	1.0	0.8	0.1
2007															
January	31	31	31	31	31	0	0	0	0	0	0	0	0.1	0.0	0.0
February	28	25	28	19	28	0	0	0	0	0	0	0	2.6	1.9	0.6
March	31	16	31	4	31	0	0	0	0	0	0	0	5.3	4.7	2.3
April	30	10	30	0	30	0	0	0	0	0	0	0	8.2	7.5	4.7

DIAMOUTHRX

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
May	31	0	31	0	12	0	0	0	0	0	0	0	8.7	5.8	3.8
June	30	0	2	0	0	0	0	8	0	0	0	0	14.7	6.2	4.5
July	31	0	0	0	0	0	0	31	5	0	0	0	17.5	6.5	5.2
August	31	0	0	0	0	0	0	30	0	0	0	0	15.8	5.9	4.9
September	30	0	3	0	0	0	0	7	0	0	0	0	13.7	5.3	3.8
October	31	2	21	1	12	0	0	0	0	0	0	0	8.9	3.6	2.4
November	30	14	29	9	27	0	0	0	0	0	0	0	8.0	4.1	1.1
December	31	24	31	20	31	0	0	0	0	0	0	0	1.9	1.1	0.4
2007															
January	31	28	31	25	31	0	0	0	0	0	0	0	2.0	1.3	0.3
February	28	11	28	8	28	0	0	0	0	0	0	0	2.8	1.8	0.9
March	31	2	31	2	31	0	0	0	0	0	0	0	5.3	3.3	2.0
April	30	1	30	0	21	0	0	0	0	0	0	0	7.8	5.0	3.1

DIAUPPMEDW

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
May	31	0	31	0	31	0	0	0	0	0	0	0	6.2	4.1	2.2
June	30	0	20	0	8	0	0	1	0	0	0	0	12.7	6.2	3.2
July	31	0	0	0	0	0	0	31	6	2	0	0	20.3	9.8	6.6
August	31	0	1	0	0	0	0	31	0	0	0	0	16.5	8.4	7.3
September	30	0	15	0	0	0	0	11	0	0	0	0	15.3	8.4	6.2
October	31	10	29	2	18	0	0	0	0	0	0	0	9.3	6.4	3.9
November	30	19	30	11	28	0	0	0	0	0	0	0	7.8	7.7	1.2
December	31	18	31	11	31	0	0	0	0	0	0	0	1.8	1.1	0.5
2007															
January	31	21	31	16	31	0	0	0	0	0	0	0	1.5	1.1	0.4
February	28	14	28	9	28	0	0	0	0	0	0	0	2.3	1.3	0.6
March	31	4	31	2	31	0	0	0	0	0	0	0	3.4	2.2	1.3
April	30	1	30	0	30	0	0	0	0	0	0	0	5.3	2.8	1.7

DILLACORTX

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
May		0	0	0	0	0	0	0	0	0	0	0	--	--	--
June	5	0	0	0	0	1	0	5	5	5	5	0	23.6	5.3	3.0
July	31	0	0	0	0	16	12	31	31	31	31	19	29.5	8.6	5.5
August	31	0	0	0	0	22	11	31	31	31	31	31	25.9	12.2	7.2
September	30	0	0	0	0	15	13	30	25	19	19	16	38.3	26.0	11.5
October	31	0	0	0	0	0	0	29	0	0	0	0	15.9	4.1	1.9
November	30	0	3	0	2	0	0	5	0	0	0	0	13.4	2.0	0.8
December	31	0	26	0	21	0	0	0	0	0	0	0	6.9	2.5	0.8
2007															
January	31	5	28	4	28	0	0	0	0	0	0	0	6.6	2.4	1.0
February	28	0	22	0	20	0	0	0	0	0	0	0	7.8	3.0	1.4
March	31	0	4	0	2	0	0	0	0	0	0	0	11.2	4.5	2.7
April	21	0	0	0	0	0	0	12	0	0	0	0	17.3	12.3	5.7

EFTEPEE175RDX

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
May	31	0	0	0	0	0	0	0	0	0	0	0	10.6	0.8	0.5
June	30	0	0	0	0	0	0	9	0	0	0	0	15.8	4.2	1.3
July	31	0	0	0	0	0	0	31	9	4	0	0	18.7	4.9	3.8
August	31	0	0	0	0	0	0	30	0	0	0	0	15.8	4.2	3.0
September	30	0	0	0	0	0	0	4	0	0	0	0	12.9	3.4	2.1
October	31	2	16	1	15	0	0	0	0	0	0	0	8.1	2.5	1.2
November	30	9	27	8	26	0	0	0	0	0	0	0	9.0	4.2	1.1
December	31	23	31	13	31	0	0	0	0	0	0	0	1.2	0.8	0.4
2007															
January	31	20	31	15	31	0	0	0	0	0	0	0	1.7	0.8	0.3
February	28	6	28	3	28	0	0	0	0	0	0	0	2.2	1.3	0.7
March	31	2	29	0	23	0	0	0	0	0	0	0	5.9	2.4	1.7
April	30	0	18	0	4	0	0	0	0	0	0	0	8.9	3.1	2.0

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
May	31	0	19	0	13	0	0	0	0	0	0	0	8.5	3.7	2.3
June	30	0	0	0	0	0	0	8	0	0	0	0	13.8	4.2	2.5
July	31	0	0	0	0	0	0	12	0	0	0	0	13.6	4.3	3.4
August	31	0	0	0	0	0	0	0	0	0	0	0	11.0	3.7	3.1
September	30	0	3	0	0	0	0	0	0	0	0	0	9.5	3.4	2.3
October	31	1	17	0	11	0	0	0	0	0	0	0	6.8	2.5	1.5
November	28	5	24	1	24	0	0	0	0	0	0	0	7.5	2.2	0.9
December	31	8	31	2	31	0	0	0	0	0	0	0	2.9	1.6	0.9
2007															
January	31	10	31	7	31	0	0	0	0	0	0	0	2.9	1.4	0.8
February	28	2	28	1	28	0	0	0	0	0	0	0	3.4	1.6	0.9
March	31	1	31	0	31	0	0	0	0	0	0	0	4.3	2.1	1.3
April	30	0	30	0	25	0	0	0	0	0	0	0	6.5	2.8	1.8

HATCAIRTEM

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
May		0	0	0	0	0	0	0	0	0	0	0	--	--	--
June	9	0	0	0	0	9	9	9	9	9	9	9	34.4	24.5	20.7
July	31	0	2	0	0	28	28	31	31	31	31	31	38.8	25.5	19.9
August	31	0	2	0	0	29	27	31	31	31	31	31	33.6	25.8	21.4
September	30	2	20	0	0	21	18	30	30	30	30	20	31.9	26.6	20.5
October	31	19	26	3	13	0	0	22	14	8	6	0	21.0	22.2	13.9
November	30	20	27	9	25	0	0	0	0	0	0	0	14.5	15.2	5.1
December	4	4	4	4	4	0	0	0	0	0	0	0	–1.1	5.1	3.8
2007															
January		0	0	0	0	0	0	0	0	0	0	0	--	--	--
February		0	0	0	0	0	0	0	0	0	0	0	--	--	--
March		0	0	0	0	0	0	0	0	0	0	0	--	--	--
April		0	0	0	0	0	0	0	0	0	0	0	--	--	--

KLCASTLEBR

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
May	31	0	19	0	1	0	0	0	0	0	0	0	9.5	5.4	3.7
June	30	0	0	0	0	0	0	9	0	0	0	0	14.4	5.4	4.1
July	31	0	0	0	0	0	0	31	9	4	0	0	18.7	6.0	4.9
August	31	0	0	0	0	0	0	31	6	0	0	0	17.3	5.6	4.7
September	30	0	0	0	0	0	0	12	0	0	0	0	15.2	5.3	3.7
October	31	1	13	1	5	0	0	0	0	0	0	0	10.7	3.6	2.5
November	30	7	27	6	26	0	0	0	0	0	0	0	8.1	2.8	1.1
December	31	22	31	17	31	0	0	0	0	0	0	0	2.1	1.6	0.7
2007															
January	31	28	31	22	31	0	0	0	0	0	0	0	2.6	1.9	0.6
February	28	7	28	3	28	0	0	0	0	0	0	0	3.4	2.1	1.2
March	31	2	31	0	30	0	0	0	0	0	0	0	5.9	3.3	2.2
April	30	0	26	0	14	0	0	0	0	0	0	0	8.5	4.7	3.0

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
May	31	0	0	0	0	0	0	0	0	0	0	0	12.7	3.4	2.1
June	30	0	0	0	0	0	0	27	6	0	0	0	18.3	4.7	2.1
July	31	0	0	0	0	0	0	31	31	29	18	0	20.5	5.8	4.7
August	31	0	0	0	0	0	0	31	29	11	5	0	19.1	5.7	4.9
September	30	0	0	0	0	0	0	30	0	0	0	0	16.7	5.1	3.6
October	31	0	1	0	1	0	0	2	0	0	0	0	12.4	3.3	2.0
November	30	0	4	0	4	0	0	0	0	0	0	0	9.6	1.7	0.5
December	31	0	28	0	26	0	0	0	0	0	0	0	6.5	2.5	0.7
2007															
January	31	4	29	3	29	0	0	0	0	0	0	0	6.1	2.4	0.9
February	28	0	20	0	10	0	0	0	0	0	0	0	7.8	2.3	1.3
March	31	0	3	0	2	0	0	0	0	0	0	0	11.2	3.3	2.1
April	30	0	0	0	0	0	0	0	0	0	0	0	12.3	3.7	2.5

KLCOWCAMPX

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
May	31	0	29	0	10	0	0	0	0	0	0	0	8.7	5.6	2.3
June	30	0	9	0	0	0	0	0	0	0	0	0	12.3	6.6	4.4
July	31	0	0	0	0	0	0	30	6	0	0	0	18.0	7.8	6.1
August	31	0	1	0	0	3	0	31	27	20	20	1	24.0	17.4	11.3
September	30	0	21	0	0	0	0	27	13	11	11	0	22.9	17.5	12.8
October	31	19	28	3	18	0	0	2	0	0	0	0	12.8	11.8	6.8
November	30	6	27	3	25	0	0	0	0	0	0	0	7.6	3.6	1.1
December	31	10	31	5	31	0	0	0	0	0	0	0	2.6	2.1	0.3

2007	# 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	17	31	14	31	0	0	0	0	0	0	0	1.8	1.3	0.2
February	28	4	28	4	28	0	0	0	0	0	0	0	1.8	0.8	0.1
March	31	0	31	0	31	0	0	0	0	0	0	0	4.5	2.5	1.3
April	30	0	29	0	24	0	0	0	0	0	0	0	7.6	3.5	2.1

KLHATCHTRP

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
May	31	0	3	0	0	0	0	0	0	0	0	0	10.4	3.4	2.5
June	30	0	0	0	0	0	0	11	0	0	0	0	15.7	4.8	2.9
July	31	0	0	0	0	0	0	31	6	0	0	0	17.4	4.7	3.9
August	31	0	0	0	0	0	0	31	0	0	0	0	16.0	4.8	3.9
September	30	0	0	0	0	0	0	11	0	0	0	0	14.1	3.9	2.9
October	31	0	7	0	2	0	0	0	0	0	0	0	10.2	2.5	1.7
November	6	1	4	0	3	0	0	0	0	0	0	0	7.6	2.0	1.4
December		0	0	0	0	0	0	0	0	0	0	0	--	--	--
2007															
January		0	0	0	0	0	0	0	0	0	0	0	--	--	--
February		0	0	0	0	0	0	0	0	0	0	0	--	--	--
March		0	0	0	0	0	0	0	0	0	0	0	--	--	--
April		0	0	0	0	0	0	0	0	0	0	0	--	--	--

KLMEDWSAIR

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
May		0	0	0	0	0	0	0	0	0	0	0	--	--	--
June	3	0	2	0	0	1	0	3	3	3	3	3	23.2	19.1	17.2
July	31	5	17	0	0	15	13	31	31	29	29	15	29.5	22.9	16.6
August	31	6	26	0	0	8	7	31	31	30	29	5	26.3	23.9	18.2
September	30	21	29	0	6	9	6	23	18	17	15	6	26.3	25.9	18.3
October	31	27	31	9	20	0	0	13	2	0	0	0	20.6	24.4	15.0
November	30	28	29	23	24	2	2	6	3	2	0	0	32.8	33.4	9.5
December	31	31	31	31	31	0	0	0	0	0	0	0	2.0	15.6	9.3
2007															
January	31	31	31	30	31	0	0	0	0	0	0	0	5.4	20.9	12.7
February	28	28	28	24	28	0	0	0	0	0	0	0	10.6	23.2	8.6
March	31	29	31	17	28	0	0	0	0	0	0	0	11.0	14.9	9.5
April	14	12	14	7	13	0	0	0	0	0	0	0	11.4	13.8	8.5

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
May	31	6	12	0	0	22	20	31	31	31	31	30	44.4	35.0	22.7
June	16	0	0	0	0	14	14	16	16	16	16	16	45.9	33.3	20.0
July	31	0	0	0	0	31	31	31	31	31	31	31	54.7	40.5	31.4
August	31	0	1	0	0	30	30	31	31	31	31	31	36.6	27.9	21.7
September	30	2	11	0	0	24	22	30	30	30	30	26	34.0	30.3	22.5
October	25	9	20	0	1	16	14	25	25	25	25	23	31.5	30.2	22.4
November		0	0	0	0	0	0	0	0	0	0	0	--	--	--
December		0	0	0	0	0	0	0	0	0	0	0	--	--	--
2007															
January		0	0	0	0	0	0	0	0	0	0	0	--	--	--
February		0	0	0	0	0	0	0	0	0	0	0	--	--	--
March		0	0	0	0	0	0	0	0	0	0	0	--	--	--
April		0	0	0	0	0	0	0	0	0	0	0	--	--	--

LKLIKLODGE

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
May	31	0	6	0	0	0	0	9	0	0	0	0	15.2	7.7	5.4
June	30	0	0	0	0	0	0	30	9	7	7	0	20.8	7.8	5.6
July	31	0	0	0	0	3	1	31	31	31	31	5	24.0	8.6	7.4
August	31	0	0	0	0	0	0	31	31	31	30	0	21.5	9.2	8.0
September	30	0	0	0	0	0	0	28	11	10	7	0	20.0	8.8	6.7
October	31	1	12	0	3	0	0	4	0	0	0	0	12.9	6.2	4.2
November	30	1	18	0	11	0	0	0	0	0	0	0	10.5	3.6	1.7
December	31	3	31	0	30	0	0	0	0	0	0	0	5.1	1.9	1.2

2007	# 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	5	31	0	0	0	0	0	0	0	5.0	1.9	1.1
February	28	3	28	1	28	0	0	0	0	0	0	0	5.7	2.8	1.6
March	31	0	23	0	8	0	0	0	0	0	0	0	8.7	5.1	2.9
April	26	0	15	0	2	0	0	0	0	0	0	0	11.5	7.4	4.5

LKLIKMOUTH

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
May	31	0	0	0	0	0	0	28	6	0	0	0	18.9	5.1	3.3
June	30	0	0	0	0	0	0	30	28	11	10	0	23.0	4.9	3.4
July	31	0	0	0	0	7	3	31	31	31	31	7	24.7	5.6	4.2
August	31	0	0	0	0	0	0	31	31	29	28	0	22.0	4.8	3.8
September	30	0	0	0	0	0	0	30	11	2	0	0	18.9	3.9	2.7
October	31	0	3	0	1	0	0	4	0	0	0	0	12.5	2.5	1.9
November	30	1	9	1	8	0	0	0	0	0	0	0	11.8	2.6	1.1
December	31	0	29	0	28	0	0	0	0	0	0	0	5.6	1.9	0.8
2007															
January	31	6	30	5	28	0	0	0	0	0	0	0	5.6	2.2	0.9
February	28	0	20	0	14	0	0	0	0	0	0	0	7.6	2.8	1.2
March	31	0	5	0	2	0	0	0	0	0	0	0	10.5	3.3	2.1
April	30	0	1	0	0	0	0	7	0	0	0	0	14.4	4.0	2.8

LKLIKOLSEN

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
May		0	0	0	0	0	0	0	0	0	0	0	--	--	--
June		0	0	0	0	0	0	0	0	0	0	0	--	--	--
July		0	0	0	0	0	0	0	0	0	0	0	--	--	--
August		0	0	0	0	0	0	0	0	0	0	0	--	--	--
September		0	0	0	0	0	0	0	0	0	0	0	--	--	--
October		0	0	0	0	0	0	0	0	0	0	0	--	--	--
November		0	0	0	0	0	0	0	0	0	0	0	--	--	--
December		0	0	0	0	0	0	0	0	0	0	0	--	--	--

2007	# 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		0	0	0	0	0	0	0	0	0	0	0	--	--	--
February		0	0	0	0	0	0	0	0	0	0	0	--	--	--
March		0	0	0	0	0	0	0	0	0	0	0	--	--	--
April		0	0	0	0	0	0	0	0	0	0	0	--	--	--

LOGGCAMPCR

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
May	31	0	0	0	0	0	0	20	3	0	0	0	18.9	5.1	2.7
June	30	0	0	0	0	1	0	30	25	14	12	0	23.1	8.4	3.8
July	31	0	0	0	0	0	0	31	31	31	29	0	21.0	1.8	1.1
August	31	0	0	0	0	2	0	31	31	31	31	0	23.5	8.5	4.2
September	30	0	0	0	0	0	0	30	14	11	10	0	21.1	7.1	2.4
October	31	0	0	0	0	0	0	9	0	0	0	0	13.8	1.1	0.3
November	30	0	1	0	0	0	0	0	0	0	0	0	12.1	2.0	0.8
December	31	0	16	0	12	0	0	0	0	0	0	0	6.4	1.6	0.6

2007	# 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	28	0	24	0	0	0	0	0	0	0	6.4	1.6	0.8
February	28	3	19	1	12	0	0	0	0	0	0	0	7.4	5.0	2.1
March	31	0	3	0	2	0	0	0	0	0	0	0	9.6	2.8	1.7
April	30	0	0	0	0	0	0	0	0	0	0	0	11.8	3.1	2.1

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
May	31	0	30	0	15	0	0	0	0	0	0	0	7.5	4.1	2.2
June	30	0	1	0	0	0	0	0	0	0	0	0	11.0	4.3	3.0
July	31	0	0	0	0	0	0	0	0	0	0	0	11.8	3.7	2.6
August	31	0	0	0	0	0	0	0	0	0	0	0	10.2	2.8	2.1
September	30	0	1	0	0	0	0	0	0	0	0	0	9.5	2.5	1.7
October	31	0	13	0	3	0	0	0	0	0	0	0	7.5	2.2	1.4
November	30	0	28	0	26	0	0	0	0	0	0	0	7.5	2.3	1.0
December	31	0	31	0	31	0	0	0	0	0	0	0	3.4	1.4	0.9
2007															
January	31	5	31	1	31	0	0	0	0	0	0	0	3.6	1.4	0.9
February	28	0	28	0	28	0	0	0	0	0	0	0	4.0	1.4	0.8
March	31	0	31	0	31	0	0	0	0	0	0	0	4.7	2.1	1.0
April	30	0	30	0	25	0	0	0	0	0	0	0	6.4	2.7	1.7

OUTLETRDXG

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
May	31	0	0	0	0	0	0	31	7	4	2	0	20.0	6.4	4.0
June	29	0	0	0	0	3	0	29	29	21	13	1	23.7	6.0	3.9
July	29	0	0	0	0	10	7	29	29	29	29	18	26.5	6.0	3.2
August	31	0	0	0	0	0	0	31	31	31	29	0	22.8	4.6	2.9
September	30	0	0	0	0	0	0	30	15	10	7	0	19.7	3.6	2.6
October	31	0	2	0	1	0	0	7	0	0	0	0	14.6	2.2	1.2
November	30	5	24	5	23	0	0	0	0	0	0	0	11.2	3.9	1.1
December	31	22	31	19	31	0	0	0	0	0	0	0	1.5	1.1	0.5

2007	# 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	21	31	0	0	0	0	0	0	0	2.1	1.6	0.6
February	28	4	27	3	25	0	0	0	0	0	0	0	6.7	2.5	1.3
March	31	0	4	0	3	0	0	0	0	0	0	0	13.0	4.5	2.7
April	30	0	0	0	0	0	0	15	0	0	0	0	16.1	6.0	3.7

PISCOMOUTH

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
May	31	0	14	0	6	0	0	0	0	0	0	0	10.8	5.6	3.6
June	30	0	0	0	0	0	0	8	0	0	0	0	14.7	4.2	2.9
July	31	0	0	0	0	0	0	31	0	0	0	0	16.5	4.6	3.7
August	31	0	0	0	0	0	0	28	0	0	0	0	14.7	4.3	3.5
September	30	0	0	0	0	0	0	3	0	0	0	0	12.9	3.9	2.6
October	31	2	15	1	11	0	0	0	0	0	0	0	8.8	3.0	1.7
November	30	8	27	6	27	0	0	0	0	0	0	0	7.7	3.0	0.9
December	31	18	31	9	31	0	0	0	0	0	0	0	2.0	1.8	0.7
2007															
January	31	15	31	13	31	0	0	0	0	0	0	0	2.4	1.8	0.5
February	28	3	28	2	28	0	0	0	0	0	0	0	3.1	1.3	0.7
March	31	3	31	0	31	0	0	0	0	0	0	0	5.3	2.8	1.6
April	30	0	27	0	17	0	0	0	0	0	0	0	8.2	3.9	2.6

SNYDERMILL

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
May	31	0	1	0	0	0	0	3	0	0	0	0	13.6	4.2	2.8
June	30	0	0	0	0	0	0	13	0	0	0	0	14.9	4.0	2.6
July	31	0	0	0	0	0	0	31	0	0	0	0	14.4	2.3	0.9
August	31	0	0	0	0	0	0	13	0	0	0	0	12.7	1.6	0.5
September	30	0	0	0	0	0	0	0	0	0	0	0	11.2	1.2	0.7
October	31	1	16	1	13	0	0	0	0	0	0	0	7.5	1.1	0.7
November	7	3	6	3	6	0	0	0	0	0	0	0	6.4	1.7	1.1
December		0	0	0	0	0	0	0	0	0	0	0	--	--	--
2007															
January		0	0	0	0	0	0	0	0	0	0	0	--	--	--
February		0	0	0	0	0	0	0	0	0	0	0	--	--	--
March		0	0	0	0	0	0	0	0	0	0	0	--	--	--
April		0	0	0	0	0	0	0	0	0	0	0	--	--	--

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
May	31	0	0	0	0	0	0	31	9	4	2	0	20.4	6.5	4.3
June	28	0	0	0	0	3	2	28	28	25	24	6	26.1	9.6	5.0
July	31	0	0	0	0	0	0	31	31	24	20	0	21.5	3.5	2.2
August	6	0	0	0	0	0	0	6	6	2	0	0	17.9	2.7	2.0
September		0	0	0	0	0	0	0	0	0	0	0	--	--	--
October		0	0	0	0	0	0	0	0	0	0	0	--	--	--
November		0	0	0	0	0	0	0	0	0	0	0	--	--	--
December		0	0	0	0	0	0	0	0	0	0	0	--	--	--
2007															
January		0	0	0	0	0	0	0	0	0	0	0	--	--	--
February		0	0	0	0	0	0	0	0	0	0	0	--	--	--
March		0	0	0	0	0	0	0	0	0	0	0	--	--	--
April		0	0	0	0	0	0	0	0	0	0	0	--	--	--

SUMITMOUTH

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
May	31	0	2	0	0	0	0	7	0	0	0	0	15.2	5.7	3.6
June	30	0	0	0	0	0	0	30	7	0	0	0	18.7	5.3	3.8
July	31	0	0	0	0	0	0	31	30	14	7	0	20.5	5.7	4.4
August	31	0	0	0	0	0	0	31	9	0	0	0	18.1	5.3	4.3
September	30	0	0	0	0	0	0	12	0	0	0	0	15.7	4.5	3.3
October	31	2	13	1	9	0	0	0	0	0	0	0	10.1	3.4	2.2
November	6	2	4	2	3	0	0	0	0	0	0	0	10.6	4.0	1.9
December		0	0	0	0	0	0	0	0	0	0	0	--	--	--
2007															
January		0	0	0	0	0	0	0	0	0	0	0	--	--	--
February		0	0	0	0	0	0	0	0	0	0	0	--	--	--
March		0	0	0	0	0	0	0	0	0	0	0	--	--	--
April		0	0	0	0	0	0	0	0	0	0	0	--	--	--

SURVEYORSX

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
May	31	0	9	0	0	0	0	0	0	0	0	0	11.0	3.7	2.3
June	20	0	0	0	0	0	0	0	0	0	0	0	10.8	3.4	2.1
July		0	0	0	0	0	0	0	0	0	0	0	--	--	--
August		0	0	0	0	0	0	0	0	0	0	0	--	--	--
September		0	0	0	0	0	0	0	0	0	0	0	--	--	--
October		0	0	0	0	0	0	0	0	0	0	0	--	--	--
November	23	3	21	0	18	0	0	0	0	0	0	0	6.3	2.4	1.1
December	31	3	31	0	31	0	0	0	0	0	0	0	3.8	2.2	1.0
2007															
January	31	9	31	4	31	0	0	0	0	0	0	0	4.0	1.6	0.8
February	28	2	28	2	28	0	0	0	0	0	0	0	4.3	1.3	0.8
March	31	0	30	0	19	0	0	0	0	0	0	0	6.0	2.2	1.2
April	30	0	16	0	6	0	0	0	0	0	0	0	8.0	3.1	1.8

TEPEEIXLRDX

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
May	31	0	2	0	0	0	0	2	0	0	0	0	13.6	4.7	3.0
June	27	0	0	0	0	0	0	5	5	0	0	0	17.5	6.7	3.2
July	31	0	0	0	0	0	0	31	28	6	5	0	19.6	7.8	6.3
August	31	0	0	0	0	0	0	29	3	0	0	0	17.1	6.7	5.1
September	30	0	1	0	0	0	0	0	0	0	0	0	10.7	4.2	2.2
October	31	0	3	0	1	0	0	0	0	0	0	0	7.3	2.0	0.6
November	30	8	27	4	26	0	0	0	0	0	0	0	9.3	4.3	1.7
December	31	14	31	7	31	0	0	0	0	0	0	0	2.7	2.1	1.0
2007															
January	31	16	31	12	31	0	0	0	0	0	0	0	3.1	1.7	0.6
February	28	4	28	3	28	0	0	0	0	0	0	0	3.7	1.8	1.0
March	31	2	28	0	23	0	0	0	0	0	0	0	6.6	3.4	1.7
April	30	0	19	0	4	0	0	0	0	0	0	0	10.4	5.6	3.4

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
May	31	0	26	0	7	0	0	0	0	0	0	0	7.5	3.3	2.3
June	30	0	0	0	0	0	0	0	0	0	0	0	8.6	2.7	1.9
July	31	0	0	0	0	0	0	0	0	0	0	0	9.4	2.6	2.0
August	31	0	0	0	0	0	0	0	0	0	0	0	8.1	2.3	1.8
September	30	0	3	0	0	0	0	0	0	0	0	0	7.7	2.0	1.5
October	31	0	15	0	9	0	0	0	0	0	0	0	6.4	2.0	1.1
November	30	0	27	0	26	0	0	0	0	0	0	0	6.9	2.0	0.9
December	31	0	31	0	31	0	0	0	0	0	0	0	3.5	1.4	0.8
2007															
January	31	0	31	0	31	0	0	0	0	0	0	0	3.5	1.1	0.7
February	28	0	28	0	28	0	0	0	0	0	0	0	4.1	1.4	0.6
March	31	0	31	0	31	0	0	0	0	0	0	0	4.7	1.6	0.9
April	30	0	29	0	22	0	0	0	0	0	0	0	6.0	1.9	1.2

TROUTRVRTRDX

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
May	31	0	0	0	0	0	0	14	0	0	0	0	16.3	5.7	4.0
June	30	0	0	0	0	0	0	30	11	8	7	0	20.7	8.3	4.3
July	31	0	0	0	0	0	0	31	31	31	31	2	22.8	6.1	5.1
August	31	0	0	0	0	0	0	31	30	26	23	0	20.8	6.0	5.6
September	30	0	0	0	0	0	0	14	7	0	0	0	17.9	6.1	4.4
October	31	2	16	1	10	0	0	0	0	0	0	0	11.6	4.0	2.8
November	30	8	26	5	21	0	0	0	0	0	0	0	9.8	3.7	1.3
December	31	4	31	3	31	0	0	0	0	0	0	0	4.0	2.1	0.9
2007															
January	31	11	31	8	31	0	0	0	0	0	0	0	4.0	1.6	0.8
February	28	3	28	3	28	0	0	0	0	0	0	0	4.0	1.6	1.0
March	31	0	27	0	13	0	0	0	0	0	0	0	7.3	3.4	2.0
April	30	0	14	0	3	0	0	0	0	0	0	0	10.3	4.5	3.0

WESTFORKRX

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
May	31	0	16	0	10	0	0	0	0	0	0	0	8.0	3.4	2.2
June	30	0	0	0	0	0	0	0	0	0	0	0	11.6	3.6	2.3
July	31	0	0	0	0	0	0	0	0	0	0	0	11.9	3.7	3.0
August	31	0	0	0	0	0	0	0	0	0	0	0	10.5	3.4	2.7
September	30	0	2	0	0	0	0	0	0	0	0	0	9.3	3.1	2.1
October	31	1	15	0	10	0	0	0	0	0	0	0	7.1	2.5	1.5
November	30	4	26	0	25	0	0	0	0	0	0	0	7.3	2.5	1.1
December	31	3	31	0	31	0	0	0	0	0	0	0	3.2	1.8	1.0
2007															
January	31	8	31	4	31	0	0	0	0	0	0	0	3.4	1.8	1.0
February	28	2	28	0	28	0	0	0	0	0	0	0	4.2	1.6	1.0
March	31	0	31	0	31	0	0	0	0	0	0	0	4.8	2.0	1.3
April	30	0	29	0	21	0	0	0	0	0	0	0	7.0	3.0	1.8

WHITEIXLRDX

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
May	31	0	8	0	0	0	0	0	0	0	0	0	12.9	4.8	3.0
June	30	0	0	0	0	0	0	14	0	0	0	0	16.7	6.4	4.3
July	31	0	0	0	0	0	0	31	31	9	7	0	20.4	8.0	6.7
August	20	0	0	0	0	0	0	20	20	17	15	0	20.5	9.9	8.3
September	4	0	4	0	0	0	0	4	0	0	0	0	17.8	16.9	14.0
October	10	10	10	5	10	0	0	0	0	0	0	0	7.8	11.3	8.4
November	30	13	26	7	26	0	0	0	0	0	0	0	8.4	6.4	1.7
2007															
January	31	12	31	11	31	0	0	0	0	0	0	0	3.3	1.7	0.8
February	28	4	28	2	28	0	0	0	0	0	0	0	3.6	1.7	1.1
March	31	1	31	0	29	0	0	0	0	0	0	0	5.8	2.5	1.6
April	30	0	20	0	10	0	0	0	0	0	0	0	9.3	4.5	2.4

WHITEMOUTH

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
May	31	0	0	0	0	0	0	19	0	0	0	0	16.5	5.1	3.4
June	30	0	0	0	0	0	0	30	15	9	8	0	21.2	5.6	3.9
July	31	0	0	0	0	4	0	31	31	31	31	6	23.7	7.5	5.9
August	31	0	0	0	0	0	0	31	31	31	31	0	22.5	8.0	7.2
September	30	0	0	0	0	0	0	30	15	12	11	0	20.5	7.6	5.7
October	31	0	1	0	1	0	0	12	0	0	0	0	14.4	4.8	3.3
November	30	4	21	2	13	0	0	0	0	0	0	0	9.8	2.7	1.1
December	31	9	31	2	31	0	0	0	0	0	0	0	3.4	1.8	0.8
2007															
January	31	11	31	7	31	0	0	0	0	0	0	0	3.7	1.6	0.7
February	28	3	28	3	28	0	0	0	0	0	0	0	3.7	1.4	0.9
March	31	0	22	0	12	0	0	0	0	0	0	0	7.9	3.6	1.9
April	30	0	8	0	2	0	0	0	0	0	0	0	11.2	4.3	2.9

WHITEUPPER

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
May	31	0	10	0	0	0	0	0	0	0	0	0	12.5	5.0	3.1
June	30	0	0	0	0	0	0	7	0	0	0	0	13.9	3.9	2.6
July	31	0	0	0	0	0	0	31	0	0	0	0	15.9	4.2	3.2
August	31	0	0	0	0	0	0	25	0	0	0	0	14.2	3.9	3.2
September	30	0	1	0	0	0	0	5	0	0	0	0	13.4	3.9	2.8
October	31	2	15	2	12	0	0	0	0	0	0	0	8.7	3.0	2.0
November	30	16	27	9	27	0	0	0	0	0	0	0	8.3	3.8	1.2
December	31	15	31	8	31	0	0	0	0	0	0	0	2.5	1.9	1.0
2007	**# 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	15	31	11	31	0	0	0	0	0	0	0	3.0	2.1	0.7
February	28	5	28	3	28	0	0	0	0	0	0	0	3.2	1.5	0.9
March	31	2	31	0	31	0	0	0	0	0	0	0	5.3	2.5	1.3
April	30	0	23	0	15	0	0	0	0	0	0	0	8.4	3.9	2.4

Appendix G. References

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