YAKIMA/KLICKITAT FISHERIES PROJECT - KLICKITAT MONITORING AND EVALUATION

2008 Annual Report

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The Yakama Nation

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YAKIMA/KLICKITAT FISHERIES PROJECT - KLICKITAT MONITORING AND EVALUATION

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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. YKFP is a joint project between YN and Washington Department of Fish and Wildlife (WDFW). 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. Ecological Interactions – to determine presence of pathogens in wild and naturally produced salmonids in the Klickitat Basin and develop supplementation strategies using this information.
3. 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 website (www.ykfp.org/klickitat/).

Acknowledgements

YN Fisheries/YKFP technicians (Sandy Pinkham, Rodger Begay, Roger Stahi, Jeremy Takala, Bennie Martinez, Micah Maldonado, and Scott Spino) collected most of the field data presented in this report. YN 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 habitat monitoring tasks. Jeanette Burkhardt, YN/YKFP watershed planner/outreach coordinator, provided website content development. Shawn Narum with Columbia River Inter-Tribal Fish Commission (CRITFC) provided genetic analysis information. Lyle adult trap operation and population estimation began as a joint project between WDFW and YN/YKFP – methods have been adapted from that effort as begun by Steve Gray and Dan Rawding of WDFW.

1. Monitoring & Evaluation

Overall Objective: Continue existing efforts to gather baseline information on the demographics, life history and abundance, as well as habitat quantity and quality, 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 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 2008. 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 2010; the 2008 sampling represents population abundance at these sites before the habitat action occurs (sampling also occurred at these same sites in 2006 [see Zendt and Babcock 2007 for results]). 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.

In addition, a 300- ft. single-pass snorkel survey was conducted on the upper mainstem Klickitat R. at the lower Huckleberry Cr. confluence in August 2008 in conjunction with a Timber, Fish, and Wildlife (TFW) habitat survey (see Task 1.h for details on habitat surveys). This survey was conducted to document fish species presence at this site.

Results: Results from the population surveys at the four White Creek 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.

The upper Klickitat R. snorkel survey documented small numbers of juvenile Chinook salmon (3 fish) and juvenile steelhead/rainbow trout (2 fish) within a 300-ft. section of this habitat survey site.

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 were fished at two locations in 2008-2009. One trap located just above Lyle Falls (RM 2.8) was operated on a year-round basis. A second trap located above Castile Falls (RM 64.6) was fished seasonally as access and flows allowed.

Trap efficiency studies have been conducted at all three traps in order to establish 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 have been conducted at various streamflows over the last several years, but no additional trials were conducted in 2008.

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: The five-foot trap located above Castile Falls was fished from July through mid October. High flows delayed the start time for this trap significantly in 2008. 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 May 2008 precluded fishing this trap for that month. 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 to date 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. Gaps in trap operation during high flows and

hatchery releases during peak smolt outmigration periods continue to make precise smolt abundance estimates difficult to obtain. Preliminary investigation of other potential methods of smolt monitoring (primarily hydroacoustic monitoring) was conducted during this reporting period; results of initial testing of this method will be presented in a future report.

Task 1.c Adult salmonid monitoring at Lyle Falls fishway

Objective: Monitor adult salmonid passage, run size, and run timing, and collect biological data at the Lyle Falls fishway on the lower Klickitat River.

Methods: Adult salmonids were trapped, enumerated, and released in the upstream end of the Lyle Falls fish ladder at RM 2.4 on the Klickitat R. Biological data was collected from individual fish including fork length, sex, scales, DNA samples, body and gill color, existing marks, and presence of CWT (coded wire tag) and PIT (passive integrated transponder) tags. Marks (opercle punches and floy tags) were administered to assist in subsequent resight/recapture and development of population estimates. Population estimates and confidence intervals were made using the Lincoln-Peterson estimator with modification for small sample size (Chapman 1951, Seber 1982, and Arnason et al. 1991, as described in Gray 2006). Spring Chinook population estimates were made following recapture of hatchery fish at the adult holding ponds at the Klickitat Hatchery. Steelhead recapture data collection (primarily via angler surveys) is currently under development. Carcass recovery during spawner surveys also provides resight/recapture data on marked fish for salmon species, but to date too few marked carcasses have been observed to yield precise population estimates with that method.

Results: A total of 1814 adult steelhead, spring Chinook, fall Chinook, and coho salmon were trapped and released at Lyle Falls during this reporting period. Fish counts by date, species, and marks are presented in Appendix C (Table C1). Results of scale sampling are presented under Task 1.e and results of genetic sampling are presented under Task 3.a. Results of spring Chinook mark-recapture population estimation are presented in Figure D1.

Data, including current updated daily count data, is also available at the YKFP website (http://www.ykfp.org/klickitat/Data_lyleadulttrap.htm).

Task 1.d 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 2.4) 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 – late October through mid December; coho – late October through late January; steelhead – late February through mid 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 4 show the observed spawning distribution for spring Chinook, fall Chinook, coho, and steelhead, respectively. A tabular summary of spawning ground survey results by species is presented in Appendix D.

Spring Chinook

Spring Chinook redd counts provide a more accurate indicator of annual spawner escapement than other species due to the fairly limited geographic area of spawning and relatively good survey conditions in most years (low flows and good visibility). Spring Chinook surveys were conducted between August 11 and October 2, 2008, covering over 60 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 adult fish have been transported above Castile Falls since 2004. 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 may have decreased fish numbers above the falls from historic levels. In 2008 above Castile Falls, no redds were observed, and 1 live spring Chinook adult was observed. This was a substantial decrease from 2007 (in which 36 redds were observed above Castile Falls) and altered what had appeared to be an increasing trend in redd counts above Castile since the recent improvements were completed (see Figure D2 in Appendix D). A total of 76 redds were observed from Castile Falls downstream to Leidl Bridge (about 33 river miles). Most of these redds (49) were located in the 10.3 river miles between Big Muddy Creek and Castile Falls. The total redd count of 76 is among the lowest on record since 1989 (see Table D2 in Appendix D). This reflects what appeared to be a relatively low overall run size of Klickitat spring Chinook in 2008, giving some cause for concern regarding the status and recent trend of this depressed population. A total of 6 spring Chinook carcasses were counted; one was floy-tagged. Two out of 6 carcasses were adipose-clipped; the rest were wild fish (Klickitat Hatchery spring Chinook are 100% adipose fin clipped). The two hatchery fish carcasses that were found were just below the West Fork Klickitat River (below Castile Falls) and just below the Klickitat Hatchery. See Table D1 in Appendix D for detailed results of 2008 spring Chinook spawner surveys. See Table D2 and Figure D1 for a summary of spring Chinook redd counts (as well as estimated total run size in the Klickitat River) from 1989-2008.

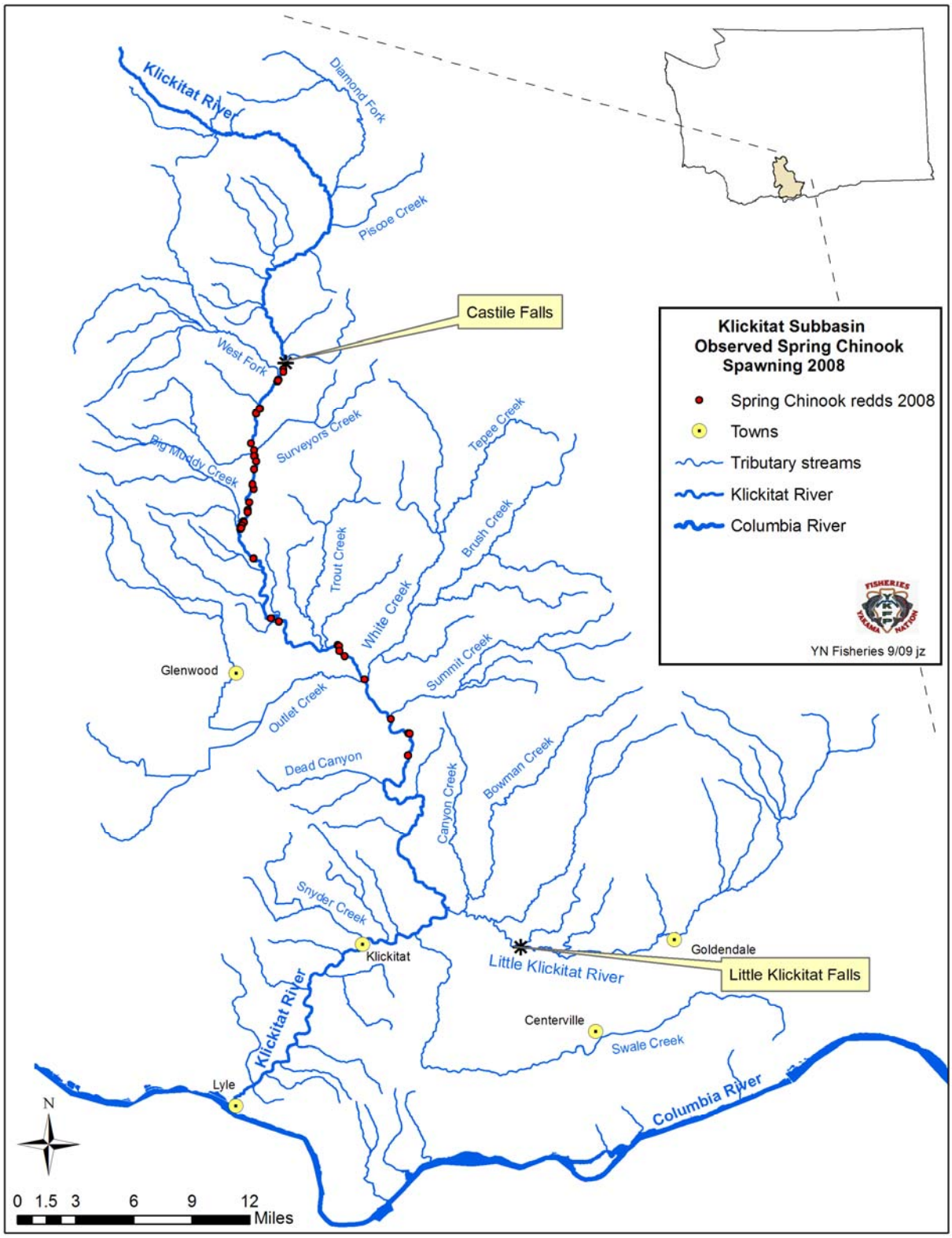

Figure 1. Observed spring Chinook spawning distribution in the Klickitat subbasin in 2008.

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 27 and December 11, 2008. The total redd count was 147, significantly lower than average redd counts of recent years. High flows and turbidity for about 2 weeks in early-mid November, and then snow and ice in mid-December, limited survey ability and probably biased redd counts somewhat low for 2008. The highest redd densities were found in the 5.5 miles from Klickitat Hatchery downstream to Summit Creek. This segment contained 92 redds (63% of the total redd count) with a density of about 17 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 the lower river below Lyle Falls. Average redd densities observed in 2008 were 3.2 redds per mile (lower than average compared to previous years, but see above regarding possibly low-biased redd counts). A total of 112 fall Chinook carcasses were counted; none were floy-tagged. Of the carcasses for which adipose fin presence/absence could be determined, 3 out of 57 were adipose-clipped; the rest were either wild or unmarked hatchery fish. See Table D3 in Appendix D for detailed results of 2008 fall Chinook spawner surveys.

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 on November 24, 2008 and continued until February 23, 2009. High flows and turbidity for about 2 weeks in early-mid November and again in early January, and snow and ice in mid-December, limited survey ability and probably biased redd counts somewhat low for 2008-9. Overall, however, many more coho adults and redds were observed above Lyle Falls (RM 2.4) in 2008-9 than in recent years. The total redd count was 555. More redds were observed in the reach below the Klickitat Hatchery (42.5% of the total) than in any other reach. No floy-tagged fish were observed. Of the carcasses for which adipose fin presence/absence could be determined, 26 out of 92 were adipose-clipped; the rest were either wild or unmarked hatchery fish. See Table D4 in Appendix D for detailed results of 2008-9 coho spawner surveys.

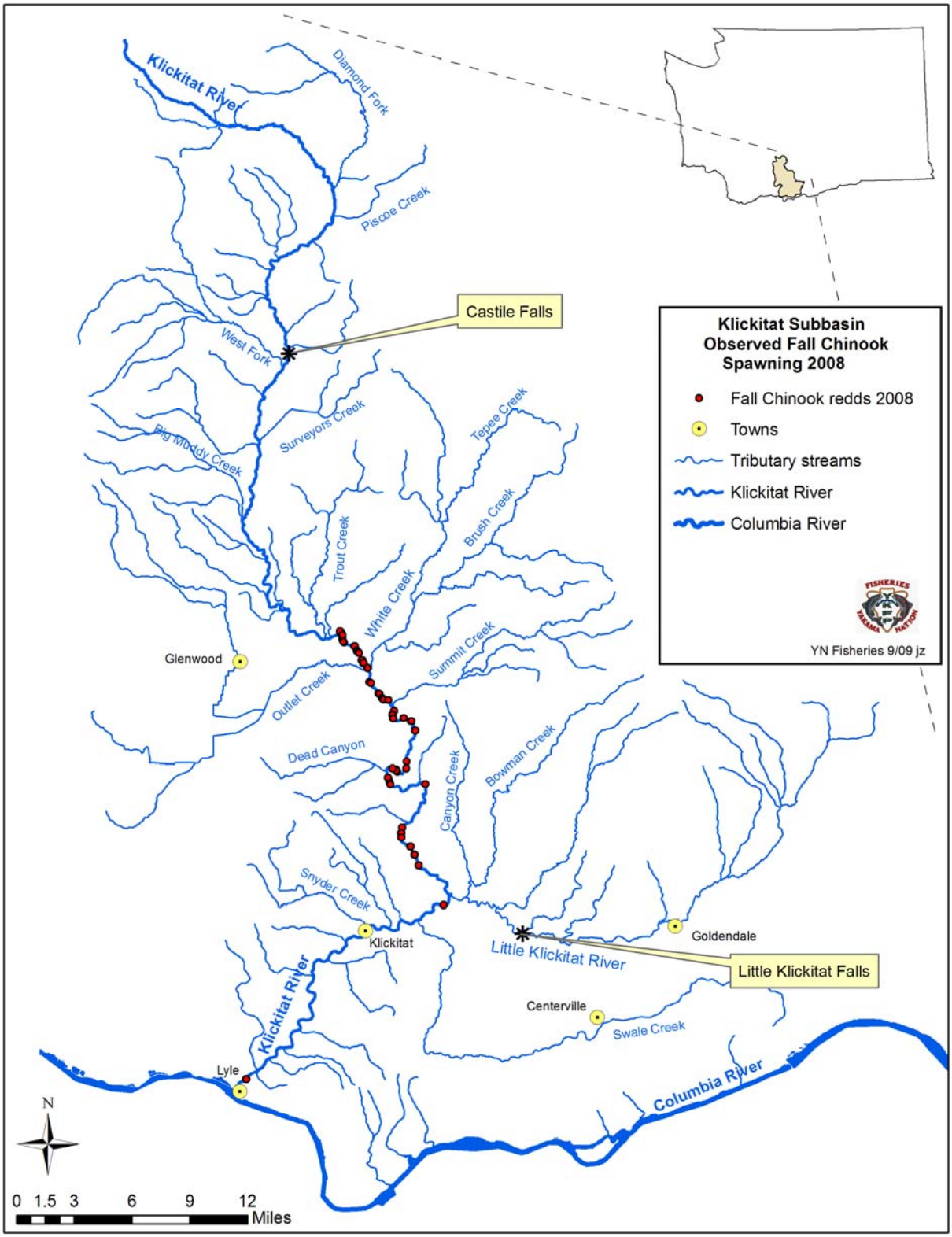

Figure 2. Observed fall Chinook spawning distribution in the Klickitat subbasin in 2008.

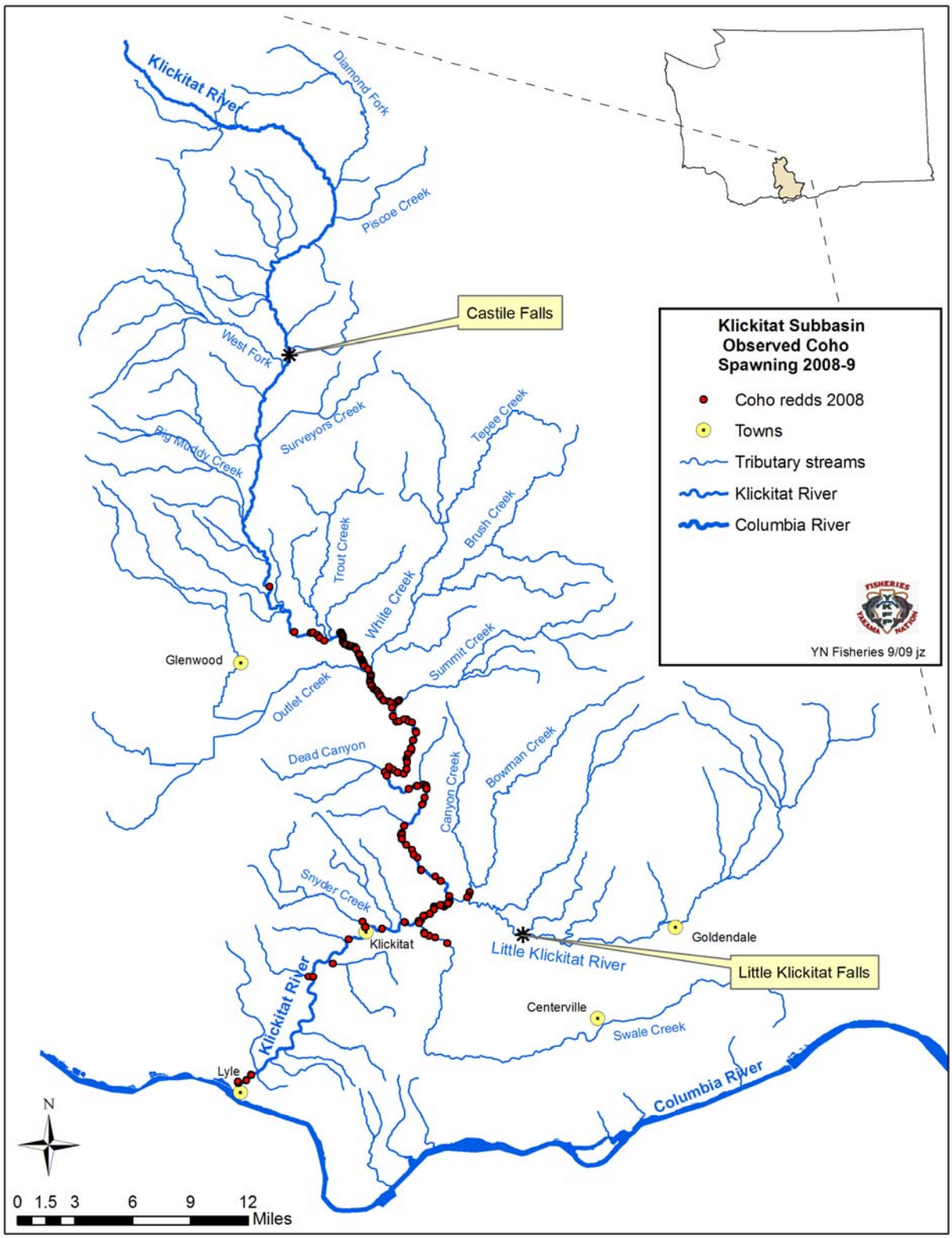

Figure 3. Observed coho spawning distribution in the Klickitat subbasin in 2008.

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 2008 and a progress report for spring 2009. Surveys in 2008 began in late February and ended in mid June.

In most years, high spring flows and turbidity limit the effectiveness of the mainstem Klickitat steelhead redd surveys, leading to an unavoidable bias toward undercounting of redds. In 2008, unusually low and clear flows in the mainstem in late March-April provided good survey conditions and relatively good redd counts until May, when higher mainstem flows and turbidity limited visibility. High snowpack in the mid and upper watershed prevented access to much of the area (from White Cr. and above) until late April/early May. High flows and some turbidity into late June prevented complete surveys in the upper Klickitat River above Castile Falls. All of these factors probably biased the total redd count quite low.

The total redd count was 52, and included 36 in the mainstem Klickitat and 16 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, only limited late-season surveys were conducted in the upper Klickitat. The White Creek watershed (including Tepee and Brush creeks) had 21% of the total observed redds. Dead Canyon Creek, Bowman Creek, and Snyder Creek each had observed redds as well. See Table D5 in Appendix D for detailed results of 2007 steelhead spawner surveys.

Steelhead spawner surveys for 2009 also began during this reporting period. High flows, turbidity, and snowpack also impacted survey ability in 2009, again biasing redd counts low. Final results will be presented in the 2009 annual report.

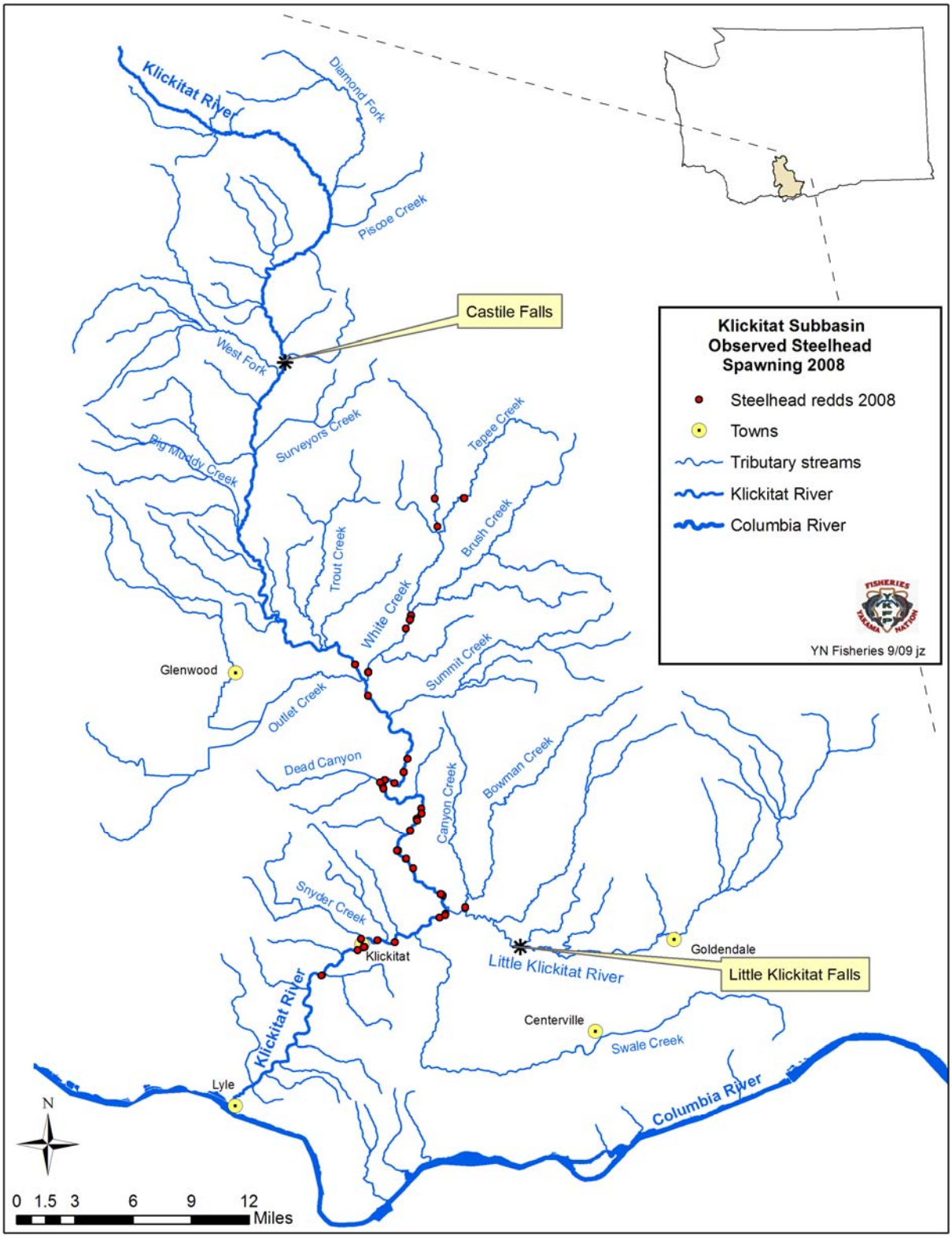

Figure 4. Observed steelhead spawning distribution in the Klickitat subbasin in 2008.

Task 1.e Scale analysis

Objective: Determine age composition and length-at-age of adult salmonid stocks.

Methods: Scale samples were obtained from adult carcasses encountered during spawner surveys and from fish captured at the Lyle Falls adult trap (RM 2.4 on the Klickitat R.). Scales were analyzed by YKFP/YN Fisheries Program staff. Results are used by state and tribal fisheries managers for run reconstruction and forecasting.

Results: Scale samples were obtained from a total of 140 adult spring Chinook, fall Chinook, and coho salmon carcasses during 2008-2009 spawner surveys. A total of 100 adult spring Chinook, fall Chinook, and coho salmon were sampled for scales in the Lyle adult trap in 2008-2009. A total of 218 steelhead were sampled for scales at the adult trap in during this reporting period (steelhead carcasses are rarely encountered on spawner surveys). A brief description of the results by species is below. Appendix E 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 fall Chinook and coho stocks, origin (hatchery or wild) of these fish sampled could not always be reliably determined. Klickitat Hatchery spring Chinook salmon are 100% adipose-clip marked, as are Skamania Hatchery steelhead released in the Klickitat River, and results for these stocks are presented in Appendix E separately for adipose-clipped fish and adipose-present fish.

Scale samples were obtained from a total of 5 spring Chinook carcasses during 2008 spawner surveys; 1 of these was adipose-clipped. Of scale-sampled spring Chinook at Lyle adult trap, 46 out of 65 were adipose-clipped. As in most years, 4-year-old fish comprised most of the adult spring Chinook return; 80% of the spawner survey fish and 65% of adult trap fish were 4-year-olds.

During 2008 spawner surveys 51 fall Chinook carcasses were sampled for scales. Seventeen fall Chinook were also sampled at the Lyle adult trap in 2008. For spawner survey samples, 43.1% were 4-year-olds and 52.9% were 5-year-olds. At the adult trap, 4- and 5-year-olds were evenly divided at 47.1% each.

For coho, 84 fish were sampled on spawner surveys and 18 fish were sampled at Lyle adult trap. Nearly all were 3-year-olds (98.8% of spawner survey fish and 100% of adult trap fish).

A total of 218 steelhead were sampled at the adult trap from 5/1/2008 to 4/30/2009 (121 hatchery fish and 97 wild fish). Most of these fish were 4-year-olds (66.9% of hatchery fish and 57.7% of wild fish).

Task 1.f 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: Eleven sites throughout the basin (8 in the mainstem Klickitat and 3 in Diamond Fork Creek) were sampled in 2008. See Appendix F (Figure F1) 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. Samples from each site were 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 these 11 sites sampled in 2008, including particle size distributions and percentages of fine sediments (presented as particles < 1.7 mm and particles < 6.73 mm), are presented in Appendix F. 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 2008. Changes in channel morphology at 2 sites (Klickitat R. near Stinson Flats and Klickitat R. at Ice House Park) led to sampling of different riffles than what had been sampled in previous years; recent data are presented for these sites but is not lumped with past data for trend analysis.

At most of the 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 near Cow Camp, and the Diamond Fork sites. Fines percentages at most other sites range higher, up to 25-30%.

Data is also available at the YKFP website (http://www.ykfp.org/klickitat/Data_SedRpts.htm).

Task 1.g 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 31 locations on 21 streams within the Klickitat subbasin. Air temperatures were also monitored at five 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 G 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 G. 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.

Additional data (including temperature data from the full period of record for each monitored site) is also available at the YKFP website (http://www.ykfp.org/klickitat/Data_thermo.htm).

Task 1.h 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: Due to prioritization of other field activities (such as Task 1.a Juvenile and resident salmonid surveys and Task 1.i Hatchery Spring Chinook PIT tagging), habitat surveys were conducted at only one site in 2008. The site was on the upper mainstem Klickitat River at the confluence of lower Huckleberry Creek, at a site that is part of a habitat restoration project being implemented by Klickitat Watershed Enhancement Project (BPA Project # 199705600) staff. The 2008 survey will provide baseline pre-project data for comparison with future survey data. Data from these surveys is stored in a relational database and will soon be available at the YKFP website (http://www.ykfp.org/klickitat/Data.htm).

Task 1.i 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 2008 and released from the hatchery into the Klickitat River in late February 2009. Approximately 7000 fish were tagged; an estimated 6848 fish were released. The most reliable estimate of number of fish released came from monitoring the hatchery pond for tagged-fish mortalities and subtracting these fish from the total number of fish tagged. Tag data was entered

into the regional PIT Tag Information System (PTAGIS) database for monitoring at mainstem Columbia River detection sites. Returning adult fish are detected at Bonneville Dam adult fish ladders to provide smolt-to-adult return rate (SAR) information.

Results: To date, returning adult information is available up through return year 2009 (which includes returns up to age-4 fish for brood year 2005 Klickitat Hatchery spring Chinook tagging groups). A summary of tagging and returning fish detections is given below in Table 1. A preliminary SAR estimate (using projected returns of 5- and 6-year-old fish based on average age compositions) for brood year 2005 fish is fairly low, at 0.5%. Additional returns in subsequent years will yield more complete SAR estimates for Klickitat Hatchery spring Chinook.

Table 1. Klickitat Hatchery spring Chinook PIT tag returns to date.

Brood Year	Tagging Year	Release Year	Total Jack/Adult Returns[3] (Age 3-6)	Total Adult Returns[3] (Age 4-6)	Number of Tagged Fish Released[2]	SAR[3] (incl. jacks)
2004	2005	2005	0	0	9830	0%[4]
2005	2006	2007	*22*	*19*	4917	*0.45%*
2006	2007	2008			4644	
2007	2008	2009			6848	

[1]Based on detections at Bonneville adult ladders
[2]Based on known tagged fish minus known pre-release mortalities at Klickitat Hatchery
[3]Italicized numbers are projections based on partial brood year returns and average age composition
[4]2005 release was thinning release group with lower survival expected

2. 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 2.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 (such as Task 1.a Juvenile and resident salmonid surveys and Task 1.i Hatchery Spring Chinook PIT tagging), and an existing baseline of pathogen samples having been collected in recent years, very few pathogen samples

were collected during this reporting period. These samples were delivered to the Lower Columbia River Fish Health Center for analysis. 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.

3. 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 3.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 were collected from adult steelhead and Chinook salmon at the Lyle adult trap on the lower Klickitat River (RM 2.4). As fish were enumerated, netted and removed from the live trap, small fin clips or opercle punches of Chinook and steelhead were collected. These samples will be analyzed by CRITFC geneticists and information added to existing databases and incorporated into future reports and management actions.

In addition, genetic samples were collected from adult spring Chinook spawned for broodstock at the Klickitat Hatchery in August-September 2008. These samples were also sent to CRITFC for analysis.

Results: During this reporting period, genetic analysis focused on spring Chinook samples. Analysis by CRITFC geneticists indicated that in the Klickitat spring Chinook population there is a mixing of stream-type (spring) Chinook and ocean-type (summer or fall) Chinook alleles. This appears to be an unusual genotype as compared to other Columbia basin spring Chinook populations, and it appears to be present in both hatchery and wild Klickitat fish. Several possible explanations exist for this finding: broodstock mixing of stream- and ocean-type stocks during hatchery spawning operations, mixing of hatchery and wild fish or spring and summer Chinook on natural spawning grounds, or perhaps this is a natural genotype found in the Klickitat subbasin. Previous releases of summer Chinook stocks in the Klickitat River as well as past operational evidence from Klickitat Hatchery staff point to the possibility of broodstock mixing (late-arriving, late-ripening fish that were incorporated into spring Chinook broodstock spawning). Alternatively, this genotype could be naturally present in the Klickitat River, an intermediate river basin in between coastal and inland watersheds, with an intermediate genotype between stream- and ocean-type stocks. It is unknown if presence of this genotype has any

effects on fitness or survival. Ongoing analysis will focus on determining the most likely explanation for the existence of this genotype, any possible affects on fitness, and appropriate management options.

4. 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 Total No. in Pass			Program Capture Removal Estimates						
		Downstream start points								95% CI				
Site	Date	Lat	Long	Length (m)	1	2	3	N-hat	SE	L	U	p	Chi-square	Prob.
Pop 1	7/1/08	46.04311	-121.11620	146.9	22	18	4	49	4.74	46	67	0.514	3.77	0.0522
Pop 2	7/11/08	46.05369	-121.10793	116.1	42	13	5	61	1.83	61	70	0.690	0.36	0.5493
Pop 3	7/10/08	46.05770	-121.10401	110.6	56	25	3	86	2.08	85	94	0.696	4.05	0.0442
Pop 4	7/8/08	46.06207	-121.10263	119.8	43	11	3	57	1.05	57	64	0.764	0.57	0.4496

Appendix B. Mobile Juvenile Monitoring Sites (Screw Traps)

Table B1. Catch summary of target species for the Castile Falls screw trap for May 1, 2008 – April 30, 2009.

Month	Days Fished	Wild *O.mykiss*	Wild Chinook	Hatchery Chinook	Brook Trout	***Totals***
May						0
June						0
July	5	2				2
August	11	16	892			908
September	14	6	81			87
October	13	5				5
Totals	43	29	973	0	0	1002

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 Lyle Falls screw trap for May 1, 2008 – April 30, 2009.

Month	Days Fished	Chinook	Coho	Hatchery *O.mykiss*	Wild *O.mykiss*	***Totals***
May	0					0
June	5		268	32		300
July	1			1		1
August	1					0
September	11	564	7		41	612
October	16	369	127	3	57	556
November	2					0
December	1		9			9
January	4		18	1	8	27
February	11	131	6		17	154
March	16	302	177		8	487
April	24	14	9345		32	9391
Totals	92	1380	9957	37	163	11537

Table B4. 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. Adult salmonid monitoring at Lyle Falls fishway

Table C1. Daily fish counts at the Lyle adult trap by species and mark for May 1, 2008 - April 30, 2009.

Date	Ad Present Chinook	Ad Present Chinook Jack	Ad Clipped Chinook	Ad Clipped Chinook Jack	Ad Present Coho	Ad Present Coho Jack	Ad Clipped Coho	Ad Clipped Coho Jack	Wild Steelhead	Hatchery Steelhead
01-May-08	0	0	0	0	0	0	0	0	2	2
05-May-08	1	0	2	0	0	0	0	0	5	8
06-May-08	1	0	1	0	0	0	0	0	1	2
03-Jun-08	2	0	4	1	0	0	0	0	0	6
04-Jun-08	1	0	5	2	0	0	0	0	1	4
05-Jun-08	2	0	2	1	0	0	0	0	0	3
06-Jun-08	2	0	3	2	0	0	0	0	2	0
10-Jun-08	2	1	7	10	0	0	0	0	2	34
11-Jun-08	3	0	4	6	0	0	0	0	3	21
12-Jun-08	0	0	1	1	0	0	0	0	0	4
13-Jun-08	1	1	0	2	0	0	0	0	0	6
27-Jun-08	1	0	1	1	0	0	0	0	1	15
30-Jun-08	7	0	4	3	0	0	0	0	8	5
01-Jul-08	0	0	4	3	0	0	0	0	1	5
02-Jul-08	3	0	2	2	0	0	0	0	2	8
03-Jul-08	0	0	0	1	0	0	0	0	1	4
09-Jul-08	0	0	0	0	0	0	0	0	1	1
10-Jul-08	0	0	0	0	0	0	0	0	0	2
14-Jul-08	0	0	0	0	0	0	0	0	1	0
17-Jul-08	0	0	0	0	0	0	0	0	1	2
18-Jul-08	0	0	0	0	0	0	0	0	2	11
22-Jul-08	0	0	0	0	0	0	0	0	1	4
23-Jul-08	0	0	1	0	0	0	0	0	5	3
25-Jul-08	0	0	0	0	0	0	0	0	5	8
29-Jul-08	0	0	0	0	0	0	0	0	0	2
30-Jul-08	0	0	0	0	0	0	0	0	1	2
31-Jul-08	0	0	0	0	0	0	0	0	3	3
06-Aug-08	0	0	0	0	0	0	0	0	3	3
08-Aug-08	1	0	1	0	0	0	0	0	3	1
12-Aug-08	1	1	0	0	0	0	0	0	2	0
13-Aug-08	1	0	0	0	0	0	0	0	2	0
15-Aug-08	0	0	0	0	0	0	0	0	6	5
20-Aug-08	5	0	1	0	0	0	0	0	1	4
26-Aug-08	3	0	0	0	0	0	0	0	0	0
06-Sep-08	2	0	0	0	0	0	0	0	1	0
16-Sep-08	1	0	0	0	0	0	0	0	1	0
17-Sep-08	2	0	0	0	0	0	0	0	0	0
01-Oct-08	3	0	0	0	2	0	0	0	0	0
14-Oct-08	0	0	0	0	6	0	0	0	0	0
15-Oct-08	0	0	0	0	533	1	0	0	0	0
17-Oct-08	2	0	0	0	511	0	4	0	0	0
25-Nov-08	0	0	0	0	0	0	0	0	0	0
26-Nov-08	0	0	0	0	0	0	0	0	0	0
02-Dec-08	0	0	0	0	94	0	2	0	5	0
03-Dec-08	0	0	0	0	80	0	3	0	2	0
04-Dec-08	0	0	0	0	0	0	0	0	0	0
05-Dec-08	0	0	0	0	0	0	0	0	0	0
09-Dec-08	0	0	0	0	1	0	0	0	0	0
10-Dec-08	0	0	0	0	0	0	0	0	0	0
11-Dec-08	0	0	0	0	1	0	0	0	0	0
12-Dec-08	0	0	0	0	0	0	0	0	0	0

Date	Ad Present Chinook	Ad Present Chinook Jack	Ad Clipped Chinook	Ad Clipped Chinook Jack	Ad Present Coho	Ad Present Coho Jack	Ad Clipped Coho	Ad Clipped Coho Jack	Wild Steelhead	Hatchery Steelhead
29-Dec-08	0	0	0	0	0	0	0	0	0	0
30-Dec-08	0	0	0	0	0	0	0	0	0	0
31-Dec-08	0	0	0	0	0	0	0	0	0	0
02-Jan-09	0	0	0	0	0	0	0	0	0	0
22-Jan-09	0	0	0	0	0	0	0	0	0	0
23-Jan-09	0	0	0	0	0	0	0	0	0	0
03-Feb-09	0	0	0	0	0	0	0	0	0	0
04-Feb-09	0	0	0	0	0	0	0	0	0	0
05-Feb-09	0	0	0	0	0	0	0	0	0	0
06-Feb-09	0	0	0	0	0	0	0	0	0	0
10-Feb-09	0	0	0	0	0	0	0	0	0	0
12-Feb-09	0	0	0	0	0	0	0	0	0	0
13-Feb-09	0	0	0	0	0	0	0	0	0	0
18-Feb-09	0	0	0	0	0	0	0	0	2	1
19-Feb-09	0	0	0	0	0	0	0	0	0	0
20-Feb-09	0	0	0	0	0	0	0	0	0	0
24-Feb-09	0	0	0	0	0	0	0	0	0	0
25-Feb-09	0	0	0	0	0	0	0	0	0	0
04-Mar-09	0	0	0	0	0	0	0	0	0	0
05-Mar-09	0	0	0	0	0	0	0	0	0	0
12-Mar-09	0	0	0	0	0	0	0	0	2	0
13-Mar-09	0	0	0	0	0	0	0	0	0	0
17-Mar-09	0	0	0	0	0	0	0	0	5	6
18-Mar-09	0	0	0	0	0	0	0	0	1	0
19-Mar-09	0	0	0	0	0	0	0	0	2	1
20-Mar-09	0	0	0	0	0	0	0	0	3	2
24-Mar-09	0	0	0	0	0	0	0	0	0	0
25-Mar-09	0	0	0	0	0	0	0	0	2	0
26-Mar-09	0	0	0	0	0	0	0	0	2	1
27-Mar-09	0	0	0	0	0	0	0	0	5	0
31-Mar-09	0	0	0	0	0	0	0	0	0	0
01-Apr-09	0	0	0	0	0	0	0	0	8	9
02-Apr-09	0	0	0	0	0	0	0	0	0	0
06-Apr-09	0	0	0	0	0	0	0	0	8	12
07-Apr-09	0	0	0	0	0	0	0	0	9	7
08-Apr-09	0	0	0	0	0	0	0	0	13	5
09-Apr-09	0	0	0	0	0	0	0	0	3	4
10-Apr-09	0	0	0	0	0	0	0	0	0	0
14-Apr-09	0	0	0	0	0	0	0	0	1	5
15-Apr-09	0	0	0	0	0	0	0	0	2	3
16-Apr-09	0	0	0	0	0	0	0	0	0	0
17-Apr-09	0	0	0	0	0	0	0	0	3	7
20-Apr-09	0	0	0	0	0	0	0	0	1	6
21-Apr-09	0	0	0	0	0	0	0	0	1	5
22-Apr-09	0	0	0	0	0	0	0	0	5	2
23-Apr-09	0	0	0	0	0	0	0	0	0	5
24-Apr-09	0	0	0	0	0	0	0	0	0	0
25-Apr-09	0	0	0	0	0	0	0	0	0	0
28-Apr-09	0	0	1	0	0	0	0	0	2	9
30-Apr-09	0	0	1	0	0	0	0	0	0	23
Total:	**47**	**3**	**45**	**35**	**1228**	**1**	**9**	**0**	**155**	**291**

Appendix D. Spawning ground surveys (redd counts)

Table D1. Results of 2008 Spring Chinook spawning surveys in the Klickitat subbasin.

				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	
Klickitat R.													
MAINSTEM	Huckleberry Cr. confl - road washout	3.4	3	0	0.00	0	0	0	0	0	0	0	0
	Road washout - Caldwell Prairie outhouse	3.2	3	0	0.00	0	0	0	0	0	0	0	0
	Caldwell Prairie outhouse - Cow Camp	2.0	3	0	0.00	0	0	0	0	0	0	0	0
	Cow Camp - 255 Road bridge	2.2	3	0	0.00	0	0	0	0	0	0	0	0
	255 Road bridge - turnout/turnaround	2.3	3	0	0.00	0	0	0	0	0	0	0	0
	Turnout/turnaround - McCreedy confluence	2.0	3	0	0.00	0	0	0	0	0	0	0	0
	McCreedy confl. - Chaparral confluence	2.7	3	0	0.00	0	1	0	0	0	0	0	0
	Chaparral confluence - old upper trap site	1.7	3	0	0.00	0	0	0	0	0	0	0	0
	Old upper trap site - top of Castile falls complex	1.3	3	0	0.00	0	0	0	0	0	0	0	0
	Extent of Castile Falls complex	0.7	2	0	0.00	0	0	0	0	0	0	0	0
	Bottom of Castile complex - West Fork conflu.	0.8	4	6	8.00	0	7	0	0	0	0	1	0
	West Fork - Signal Peak bridge	2.3	4	9	3.84	0	2	0	0	1	0	0	0
	Signal Peak bridge - Surveyors Cr. confluence	2.4	3	5	2.08	0	3	0	0	0	0	0	0
	Surveyors Cr. confluence - Portage	2.0	3	5	2.50	0	1	0	0	0	0	0	0
	Portage - Big Muddy confluence	2.8	3	24	8.57	1	9	1	0	0	0	2	0
	Big Muddy confluence - old USGS gage site	3.6	3	2	0.55	0	0	0	0	0	0	0	0
	Old USGS gage - Deer Springs	4.1	3	4	0.97	0	1	1	0	0	0	0	0
	Deer Springs - Hatchery	4.2	3	1	0.24	0	0	0	0	0	0	0	0
	Hatchery - White Cr. confluence	2.9	2	9	3.10	0	10	21	1	0	0	0	0
	White Cr. - Summit Cr. confluence	2.5	2	0	0.00	0	0	1	0	0	0	0	0
	Summit Cr. - Gage cable above Leidl	2.5	2	10	4.00	0	0	4	0	0	0	0	0
	Gage cable - Leidl bridge	2.6	2	1	0.38	0	0	1	0	0	0	0	0
	Leidl bridge - Stinson boat landing	2.9	2	0	0.00	0	2	0	0	0	0	1	0
	Stinson landing - Matt's pond	2.0	2	0	0.00	0	0	0	0	0	0	0	0
	Matt's pond - Beeks Cr. confluence	2.0	2	0	0.00	0	0	0	0	0	0	0	0
	Beeks Cr. confluence - Cattle Gate	2.0	0	0	0.00	0	0	0	0	0	0	0	0
	Cattle Gate - Little Klickitat confluence	3.4	0	0	0.00	0	0	0	0	0	0	0	0
	Mainstem Totals (surveyed reaches)	**61.2**		**76**	**1.2**	**1**	**36**	**29**	**1**	**1**	**0**	**4**	**0**
TRIBUTARIES													
DIAMOND FORK	Butte Meadows Cr. to Cuitin Cr.	2.8	1	0	0.00	0	0	0	0	0	0	0	0
	Cuitin Cr. to Rd. Xing/ford	3.3	0	0	0.00	0	0	0	0	0	0	0	0
	Rd. Xing ford to confluence	5.0	0	0	0.00	0	0	0	0	0	0	0	0
	Tributary Totals (surveyed reaches)	**2.8**		**0**	**0.0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	KLICKITAT WATERSHED TOTALS	**64.0**		**76**		**1**	**36**	**29**	**1**	**1**	**0**	**4**	**0**
	Above Castile Falls contribution			**0%**		**0%**	**3%**	**0%**	**0%**	**0%**	**-**	**0%**	**-**
	Below Castile Falls contribution			**100%**		**100%**	**97%**	**100%**	**100%**	**100%**	**-**	**100%**	**-**

Unk = Unknown

Total Floy-tagged Morts Observed	1
Total Morts Observed (excluding unk.)	6
Percentage Floy-tagged	16.7%

Table D2. Spring Chinook spawning surveys (redd counts) in the Klickitat subbasin, 1989-2008.

		Redd Counts																			
REACH	MILES	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Diamond Fork	8.5	ns	0	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	0	0	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	36	0
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	3	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	18	15
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	34	34
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	0	2
Old USGS gage - Klickitat Hatchery	8.2	ns	ns	ns	ns	ns	ns	ns	14	2	0	0	27	1	16	34	10	15	4	8	5
Klickitat Hatchery - Summit Cr.	5.5	ns	ns	2	ns	ns	ns	ns	8	14	1	2	4	1	0	17	3	7	15	5	9
Summit Creek - Leidl	5.6	ns	ns	2	ns	ns	ns	ns	8	3	0	1	2	1	0	0	1	3	3	0	11
Leidl - Stinson Flats	3.2	ns	ns	ns	ns	ns	ns	ns	5	4	ns	ns	ns	ns	ns	ns	0	1	0	0	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	0	0
Soda Springs - Twin Bridges	6.4	ns	ns	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	ns	ns
Pitt - Turkey Farm	5	ns	ns	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	ns	ns
Totals	**92.2**	**53**	**59**	**93**	**102**	**132**	**39**	**42**	**110**	**231**	**113**	**83**	**167**	**123**	**389**	**332**	**195**	**50**	**82**	**104**	**76**
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**	**104**	**76**
Totals above Castile (minus releases)		**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**4**	**6**	**36**	**0**
Totals in Wild index reach		53	59	89	97	117	38	42	75	205	109	78	68	111	125	112	56	20	53	52	49
Percent of Total in Wild index reach		100%	100%	96%	95%	89%	97%	100%	68%	89%	96%	94%	66%	90%	86%	67%	77%	40%	65%	50%	64%

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 almost exclusively 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 in the Klickitat subbasin. The "Totals above Castile (minus releases)" row provides an across-year comparison of natural spawner escapement and passage above Castile Falls, assuming virtually no natural passage in 2000, 2002, 2003, and 2004. The "Wild Index Reach" is Castile Falls to Big Muddy Cr.

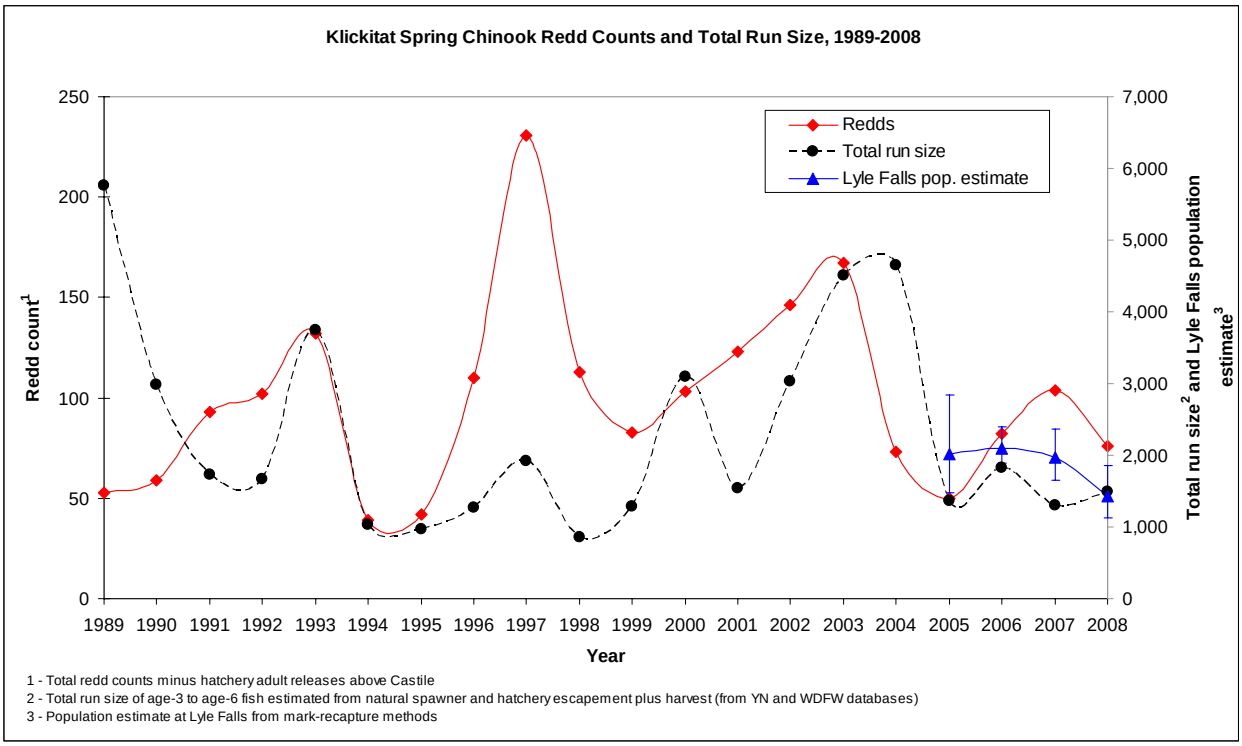

Figure D1. Spring Chinook redd counts, estimated total run size, and mark-recapture population estimates in the Klickitat subbasin, 1989-2008. Error bars on Lyle Falls mark-recapture population estimates represent 95% confidence intervals.

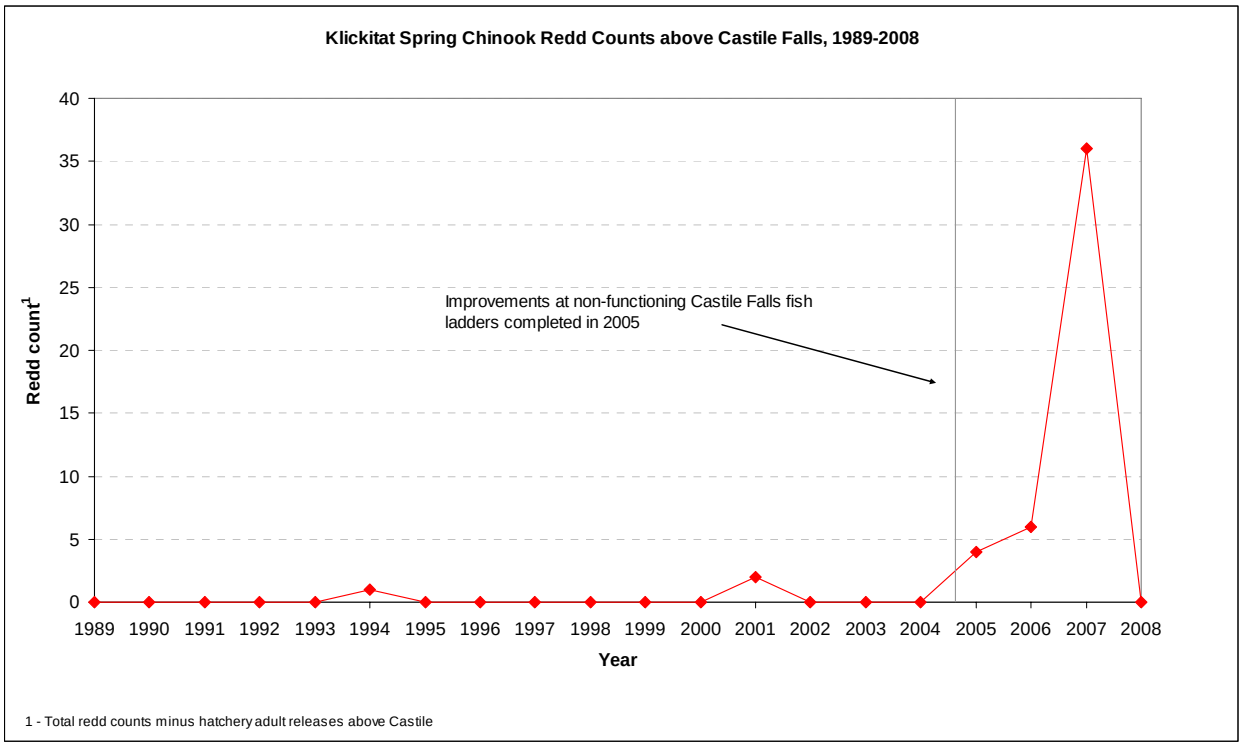

Figure D2. Spring Chinook redd counts above Castile Falls on the upper Klickitat River, 1989-2008.

Table D3. Results of 2008 Fall Chinook spawning surveys in the Klickitat subbasin.

STREAM	REACH	MILES	# PASSES	REACH REDD TOTALS	REDDS /MILE	LIVE OBS.			MORTS OBS.				
									Ad-clipped		Unclipped		Unk
						Floy Tag	No Floy	Unk	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
	Castile Falls #1 - Signal Peak Br.	3.3	0	0	0.00	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
	Old USGS gage - Hatchery	8.2	1	0	0.00	0	0	0	0	0	0	0	0
	Hatchery - Summit Cr.	5.5	2	92	16.73	0	277	31	0	0	0	18	31
	Summit Cr. - Leidl Br.	5.6	2	16	2.86	0	0	33	0	0	0	3	1
	Leidl Br. - Stinson Flats	2.5	2	21	8.40	0	0	51	0	2	0	7	11
	Stinson Flats - Beeks Canyon	4.5	2	2	0.44	0	0	56	0	0	0	5	0
	Beeks Canyon - Little Klick	4.8	2	11	2.29	0	0	72	0	1	0	4	0
	Little Klick - Twin Bridges	1.5	2	1	0.67	0	0	21	0	0	0	5	0
	Twin Bridges - Klick Field Office	1.2	2	0	0.00	0	0	2	0	0	0	2	0
	Klick Field Office - Klickitat Town	3.6	2	0	0.00	0	0	14	0	0	0	6	6
	Klickitat Town - Pitt Bridge	3.4	1	0	0.00	0	0	8	0	0	0	4	5
	Pitt Bridge - Turkey Farm CG	5.4	1	0	0.00	0	0	2	0	0	0	0	0
	Turkey Farm CG - Lyle Falls trap	2.5	0	0	0.00	0	0	0	0	0	0	0	0
	Below Lyle Falls	0.1	1	4	40.00	0	0	4	0	0	0	0	1
	Mainstem Totals (surveyed reaches)	**46.3**		**147**	**3.2**	**0**	**277**	**294**	**0**	**3**	**0**	**54**	**55**
	KLICKITAT WATERSHED TOTALS			**147**	**3.2**	**0**	**277**	**294**	**0**	**3**	**0**	**54**	**55**

n/s = not surveyed
Unk = Unknown

Total Floy-tagged Morts Observed 0
Total Morts Observed (excluding unk.) 57
Percentage Floy-tagged 0.0%

Note: High flows and turbidity in early-mid Nov. precluded surveys for ~ 2 weeks, and snow and ice limited surveys in mid Dec., probably biasing redd counts somewhat low.

Table D4. Results of 2008-9 Coho spawning surveys in the Klickitat subbasin.

STREAM	REACH	MILES	# PASSES	REACH REDD TOTALS	REDDS /MILE	LIVE OBS.			MORTS OBS.				
									Ad-clipped		Unclipped		Unk
						Floy Tag	No Floy	Unk	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
	Castile Falls - Signal Peak Br.	3.3	0	0	0.00	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
	Big Muddy Cr. - old USGS gage	3.3	0	0	0.00	0	0	0	0	0	0	0	0
	Old USGS gage - WDFW Hatchery	8.2	1	11	1.34	0	35	85	0	1	0	0	7
	Hatchery - Summit Cr.	5.4	2	236	43.70	0	0	647	0	16	0	11	122
	Summit Cr. - Leidl Br.	5.2	2	58	11.15	0	53	0	0	0	0	8	49
	Leidl Br. - Stinson Flat	2.9	2	6	2.07	0	0	35	0	5	0	4	20
	Stinson Flat - Beeks Canyon	4.5	2	39	8.67	0	12	0	0	0	0	2	8
	Beeks Canyon - Little Klickitat	4.8	2	68	14.17	0	146	0	0	0	0	4	4
	Little Klickitat - Twin br.	1.5	2	24	16.00	0	109	0	0	0	0	3	4
	Twin Br. - Field Office	1.3	2	15	11.54	0	53	0	0	0	0	2	6
	Field office - Ice house landing	1.5	2	4	2.67	0	5	0	0	0	0	0	2
	Ice house landing - Klickitat Town	2.1	2	3	1.43	0	49	0	0	0	0	0	4
	Klickitat Town - Pitt Bridge	3.4	1	6	1.76	0	0	0	0	0	0	0	2
	Pitt - bus turn around	2	1	0	0.00	0	0	0	0	0	0	0	0
	Bus turn around - Turkey Farm	3.3	1	0	0.00	0	0	0	0	0	0	0	1
	Turkey Farm - Lyle Falls screw trap	2.5	0	0	0.00	0	0	0	0	0	0	0	0
	Below Lyle Falls (County Park riffle)	0.1	2	8	80.00	0	0	52	0	0	0	0	8
	Mainstem Totals (surveyed reaches)	**46.2**		**478**	**10.3**	**0**	**462**	**819**	**0**	**22**	**0**	**34**	**237**
TRIBUTARIES													
Trib of trib													
OUTLET CREEK		0.3	0	0	0.00	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
SUMMIT CREEK	Falls - mouth	1.3	3	9	6.92	0	32	2	0	1	0	3	4
DEAD CANYON CR	Willis Canyon to Haul Rd. Xing	0.8	1	1	1.25	0	0	0	0	0	0	1	0
	Haul Rd. Xing to mouth	0.2	1	2	10.00	0	0	0	0	0	0	1	0
BEEKS CANYON		0.5	0	0	0.00	0	0	0	0	0	0	0	0
LITTLE KLICKITAT	Bowman Cr. - mouth	1.2	1	3	2.50	0	0	0	0	0	0	0	5
Bowman Cr.	Falls - mouth	1.0	1	4	4.00	0	0	0	0	0	0	0	4
Canyon Cr.	Right bank trib #3 - left bank trib #1	1.0	0	0	0.00	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
	Weeping wall - mouth	1.0	0	0	0.00	0	0	0	0	0	0	0	0
SWALE CREEK	2nd RR trestle to school bus/houses	1.2	2	2	1.67	0	4	0	0	0	0	3	0
	school bus/houses to 1st RR tresle (on LB trib)	1.2	2	6	5.00	0	12	0	0	0	0	2	4
	1st RR trestle (on LB trib) to mouth	1.2	2	8	6.67	0	8	1	0	0	0	5	10
SNYDER CREEK	Upper bridge to mouth	0.9	2	5	5.56	0	0	19	0	0	0	3	4
LOGGING CAMP CR	Bedrock slide to mouth	1.0	2	10	10.00	0	3	5	0	0	0	7	8
WHEELER CREEK	2nd Falls (abv Johnson Cr) to 1st Falls/Cascade	0.6	0	0	0.00	0	0	0	0	0	0	0	0
	1st Falls/Cascade to mouth	0.5	1	1	2.00	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
SILVA CREEK	Bottom	0.1	0	0	0.00	0	0	0	0	0	0	0	0
CANYON CREEK	Bottom 1/4 mile	0.3	3	26	86.67	0	0	25	0	3	0	7	58
	Tributary Totals (surveyed reaches)	**13.8**		**77**	**5.6**	**0**	**59**	**52**	**0**	**4**	**0**	**32**	**97**
	KLICKITAT WATERSHED TOTALS	60.0		**555**		**0**	**521**	**871**	**0**	**26**	**0**	**66**	**334**
	Tributary Contribution			**14%**		**-**	**11%**	**6%**	**-**	**15%**	**-**	**48%**	**29%**
	Mainstem Contribution			**86%**		**-**	**89%**	**94%**	**-**	**85%**	**-**	**52%**	**71%**

unk = unknown

Total Floy-tagged Morts Observed	0
Total Morts Observed (excluding unk.)	92
Percentage Floy-tagged	0.0%

Note - High flows and turbidity precluded surveys for ~ 2 weeks in early-mid Nov. and again in early Jan., and snow and ice limited surveys in mid Dec., possibly biasing redd counts somewhat low. Limited surveys in certain tribs through late Jan. (snow/access in Dead Canyon Cr., turbidity in Snyder Cr.) may also be biasing redd counts low there. Overall, however, many more coho and redds have been observed above Lyle Falls than in recent years.

Table D5. Results of 2008 Steelhead spawning surveys in the Klickitat subbasin.

				REACH		LIVE OBS.			MORTS OBS.			
			#	REDD	REDDS				Ad-clipped		Unclipped	
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	1	0	0.00	0	0	0	0	0	0	0
	Road washout - outhouse	3.2	1	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	0	0	0.00	0	0	0	0	0	0	0
	Chaparral confluence - old upper trap site	1.7	0	0	0.00	0	0	0	0	0	0	0
	Old upper trap site - top of Castile falls complex	1.3	0	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 confluence	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	4	1	0.34	0	3	0	0	0	0	0
	White Cr. - Summit Cr. confluence	2.5	4	1	0.40	0	5	0	0	0	0	0
	Summit Cr. - Gage cable above Leidl	2.5	4	0	0.00	0	1	0	0	0	0	0
	Gage cable - Leidl bridge	2.6	4	2	0.77	0	1	0	0	0	0	0
	Leidl bridge - Stinson boat landing	2.9	4	4	1.38	0	3	0	0	0	0	0
	Stinson landing - Matt's pond	2.0	4	1	0.51	0	1	0	0	0	0	0
	Matt's pond - Beeks Cr. confluence	2.0	4	6	2.96	0	1	0	0	0	0	0
	Beeks Cr. confluence - Cattle Gate	2.0	4	2	1.00	0	2	0	0	0	0	0
	Cattle Gate - Little Klickitat confluence	3.4	4	8	2.35	0	9	0	0	0	0	0
	Little Klick - Klickitat Field Office	2.7	4	4	1.48	0	4	0	0	0	0	0
	Klickitat Field Office - Ice house boat landing	1.3	4	0	0.00	0	0	0	0	0	0	0
	Ice house landing - Klickitat town boat landing	2.1	4	2	0.94	0	3	0	0	0	0	0
	Klickitat town boat landing - Pitt Bridge boat landing	3.4	4	5	1.47	0	4	2	0	0	0	0
	Pitt bridge - Logging Camp Cr. confluence	1.2	4	0	0.00	0	0	0	0	0	0	0
	Logging Camp Cr. - Bus Turnaround (RM 8)	0.9	4	0	0.00	0	0	0	0	0	0	0
	Bus Turnaround - Dillacort Cr. confluence	3.1	2	0	0.00	0	1	0	0	0	0	0
	Dillacort Cr. - Lyle falls screw trap	2.6	1	0	0.00	0	0	0	0	0	0	0
	County Park area below Lyle Falls	0.2	0	0	0.00	0	0	0	0	0	0	0
	Mainstem Totals (surveyed reaches)	**48.8**		**36**	**0.7**	**0**	**38**	**2**	**0**	**0**	**0**	**0**
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	1	0	0.00	0	0	0	0	0	0	0
	1st xing to mouth	1.7	1	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	1	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	1	0	0.00	0	0	0	0	0	0	0
	IXL Rd. - 191 Rd. Xing	3.1	1	1	0.32	0	0	0	0	0	0	0
	191 Rd. Xing - Cedar Valley Rd.	2.4	1	1	0.42	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	4	2.22	0	0	0	0	0	0	1
	Washed out Xing. - mouth	3.1	1	3	0.97	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	2	0	0.00	0	0	0	0	0	0	0
	Tepee Cr. Rd. - mouth	3.4	2	2	0.59	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	1	0	0.00	0	3	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	2	0	0.00	0	0	0	0	0	0	0
	Willis Canyon to Haul Rd. Xing	0.8	3	1	1.25	0	0	0	0	0	0	0
	Haul Rd. Xing to mouth	0.2	3	0	0.00	0	0	0	0	0	0	0
BEEKS CANYON	Falls to mouth	0.5	2	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	2	0	0.00	0	0	1	0	0	0	0
	Hwy. 142 Bridge to mouth	0.3	2	0	0.00	0	0	0	0	0	0	0
Bowman Cr.	Falls - Hwy. 142	0.6	2	0	0.00	0	1	0	0	0	0	0
	Hwy. 142 to mouth	0.5	2	1	2.00	0	0	0	0	0	0	0
Canyon Cr.	Big falls to mostly impass. cascade (Falls 3)	1.5	0	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	3	0	0.00	0	0	0	0	0	0	0
	school bus/houses to 1st RR tresle (on LB trib)	1.2	3	0	0.00	0	0	1	0	0	0	0
	1st RR trestle (on LB trib) to mouth	1.2	3	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	0	0	0.00	0	0	0	0	0	0	0
	Upper bridge - mouth	0.9	5	3	3.33	1	8	0	0	0	0	0
LOGGING CAMP CR	Bedrock slide to mouth	1.0	3	0	0.00	0	0	0	0	0	0	0
WHEELER CREEK	2nd Falls (abv Johnson Cr) to 1st Falls/Cascade	0.6	2	0	0.00	0	0	0	0	0	0	0
	1st Falls/Cascade to mouth	0.5	2	0	0.00	0	0	0	0	0	0	0
DILLACORT CR	Falls - mouth	1.5	2	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	0	0	0.00	0	0	0	0	0	0	0
	Tributary Totals (surveyed reaches)	**75.7**		**16**	**0.2**	**1**	**12**	**2**	**0**	**0**	**0**	**1**
	KLICKITAT WATERSHED TOTALS	**124.5**		**52**		**1**	**50**	**4**	**0**	**0**	**0**	**1**
	Tributary Contribution			**31%**		**100%**	**24%**	**50%**	**-**	**-**	**-**	**100%**
	Mainstem Contribution			**69%**		**0%**	**76%**	**50%**	**-**	**-**	**-**	**0%**

Unk = Unknown

Note - Unusually low and clear flows in mainstem in late March-April provided good survey conditions and relatively good redd counts until May, when higher mainstem flows and turbidity limited visibility. High snowpack in mid and upper watershed prevented access to much of the area (White Cr. and above) until late April/early May. High flows and some turbidity into late June prevented complete surveys above Castile Falls.

Appendix E. Scale analysis

Table E1. Average, minimum, and maximum fork length and postorbital-hypural length by age and sex for naturally-spawning spring Chinook in the Klickitat R. in 2008.

2008 Spring Chinook Natural Spawner Scale Age Data - Adipose Clipped Fish

			Fork Length (mm)			Postorbital-Hypural Length (mm)				
Age	Sex	Count	Mean	Min	Max	Mean	Min	Max	% of sex	% of total
4	Male	1	720	720	720	578	578	578	100.0%	100.0%
Total Females		0								
Total Males		1								
Grand Total		1								

2008 Spring Chinook Natural Spawner Scale Age Data - Adipose Present Fish

			Fork Length (mm)			Postorbital-Hypural Length (mm)				
Age	Sex	Count	Mean	Min	Max	Mean	Min	Max	% of sex	% of total
4	Female	2	741	721	760	615	599	630	66.7%	50.0%
4	Male	1	590	590	590	556	556	556	100.0%	25.0%
5	Female	1	922	922	922	745	745	745	33.3%	25.0%
Total Females		3								
Total Males		1								
Grand Total		4								

Table E2. Average, minimum, and maximum fork length and postorbital-hypural length by age and sex for naturally-spawning fall Chinook in the Klickitat R. in 2008.

2008 Fall Chinook Natural Spawner Scale Age Data

			Fork Length (mm)			Postorbital-Hypural Length (mm)				
Age	Sex	Count	Mean	Min	Max	Mean	Min	Max	% of sex	% of total
3	Male	2	497	495	499	399	396	401	8.0%	3.9%
4	Female	11	760	582	935	634	477	767	42.3%	21.6%
4	Male	11	747	632	899	603	509	734	44.0%	21.6%
5	Female	15	903	765	1026	757	650	828	57.7%	29.4%
5	Male	12	967	737	1109	761	568	868	48.0%	23.5%
Total Females		26								
Total Males		25								
Grand Total		51								

Table E3. Average, minimum, and maximum fork length and postorbital-hypural length by age and sex for naturally-spawning coho in the Klickitat subbasin in 2008-9.

2008-9 Coho Natural Spawner Scale Age Data

			Fork Length (mm)			Postorbital-Hypural Length (mm)				
Age	Sex	Count	Mean	Min	Max	Mean	Min	Max	% of sex	% of total
3	Female	33	755	667	844	620	557	723	100.0%	39.3%
3	Male	50	722	537	857	575	445	673	98.0%	59.5%
4	Male	1	757	757	757	643	643	643	2.0%	1.2%
Total Females		33								
Total Males		51								
Grand Total		84								

Table E4. Average, minimum, and maximum fork length by age and sex for spring Chinook captured in the Lyle Falls adult fish trap in 2008.

2008 Spring Chinook Adult Fish Trap Scale Age Data - Adipose Clipped Fish

			Fork Length (mm)				
Age	Sex	Count	Mean	Min	Max	% of sex	% of total
3	Female	1	642	642	642	9.1%	2.2%
3	Male	5	472	457	488	14.3%	10.9%
4	Female	9	705	610	790	81.8%	19.6%
4	Male	23	597	473	834	65.7%	50.0%
5	Female	1	906	906	906	9.1%	2.2%
5	Male	7	810	630	965	20.0%	15.2%
Total Females		11					
Total Males		35					
Grand Total		46					

2008 Spring Chinook Adult Fish Trap Scale Age Data - Adipose Present Fish

			Fork Length (mm)				
Age	Sex	Count	Mean	Min	Max	% of sex	% of total
3	Female	1	632	632	632	10.0%	5.3%
3	Male	2	544	440	647	22.2%	10.5%
4	Female	7	733	645	820	70.0%	36.8%
4	Male	3	795	654	1050	33.3%	15.8%
5	Female	2	921	900	942	20.0%	10.5%
5	Male	4	848	790	910	44.4%	21.1%
Total Females		10					
Total Males		9					
Grand Total		19					

Table E5. Average, minimum, and maximum fork length by age and sex for fall Chinook captured in the Lyle Falls adult fish trap in 2008.

2008 Fall Chinook Adult Fish Trap Scale Age Data

			Fork Length (mm)				
Age	Sex	Count	Mean	Min	Max	% of sex	% of total
3	Male	1	478	478	478	8.3%	5.9%
4	Female	2	681	650	711	40.0%	11.8%
4	Male	6	698	640	800	50.0%	35.3%
5	Female	3	922	861	975	60.0%	17.6%
5	Male	5	943	845	1100	41.7%	29.4%
Total Females		5					
Total Males		12					
Grand Total		17					

Table E6. Average, minimum, and maximum fork length by age and sex for coho captured in the Lyle Falls adult fish trap in 2008-9.

2008-9 Coho Adult Fish Trap Scale Age Data

			Fork Length (mm)				
Age	Sex	Count	Mean	Min	Max	% of sex	% of total
3	Female	13	742	680	791	100.0%	72.2%
3	Male	5	770	590	877	100.0%	27.8%
Total Females		13					
Total Males		5					
Grand Total		18					

Table E7. Average, minimum, and maximum fork length by age and sex for steelhead captured in the Lyle Falls adult fish trap from 5/1/2008 to 4/30/2009.

2008-9 Steelhead Adult Fish Trap Scale Age Data - Adipose Clipped Fish

			Fork Length (mm)				
Age	Sex	Count	Mean	Min	Max	% of sex	% of total
3	Unk.	1	560	560	560	-	0.8%
3	Female	2	620	615	625	3.4%	1.7%
3	Male	5	631	600	699	8.2%	4.1%
4	Unk.	1	695	695	695	-	0.8%
4	Female	39	704	580	824	67.2%	32.2%
4	Male	41	711	550	786	67.2%	33.9%
5	Female	17	751	640	847	29.3%	14.0%
5	Male	15	784	710	870	24.6%	12.4%
Total Females		58					
Total Males		61					
Grand Total (incl. unk.)		121					

2008-9 Steelhead Adult Fish Trap Scale Age Data - Adipose Present Fish

			Fork Length (mm)				
Age	Sex	Count	Mean	Min	Max	% of sex	% of total
3	Unk.	2	585	570	600	-	2.1%
3	Female	12	579	535	620	24.5%	12.4%
3	Male	10	595	525	670	34.5%	10.3%
4	Unk.	8	672	535	760	-	8.2%
4	Female	33	670	553	780	67.3%	34.0%
4	Male	15	690	585	865	51.7%	15.5%
5	Unk.	9	792	695	950	-	9.3%
5	Female	4	828	790	880	8.2%	4.1%
5	Male	4	798	730	827	13.8%	4.1%
Total Females		49					
Total Males		29					
Grand Total (incl. unk.)		97					

Appendix F. Sediment data

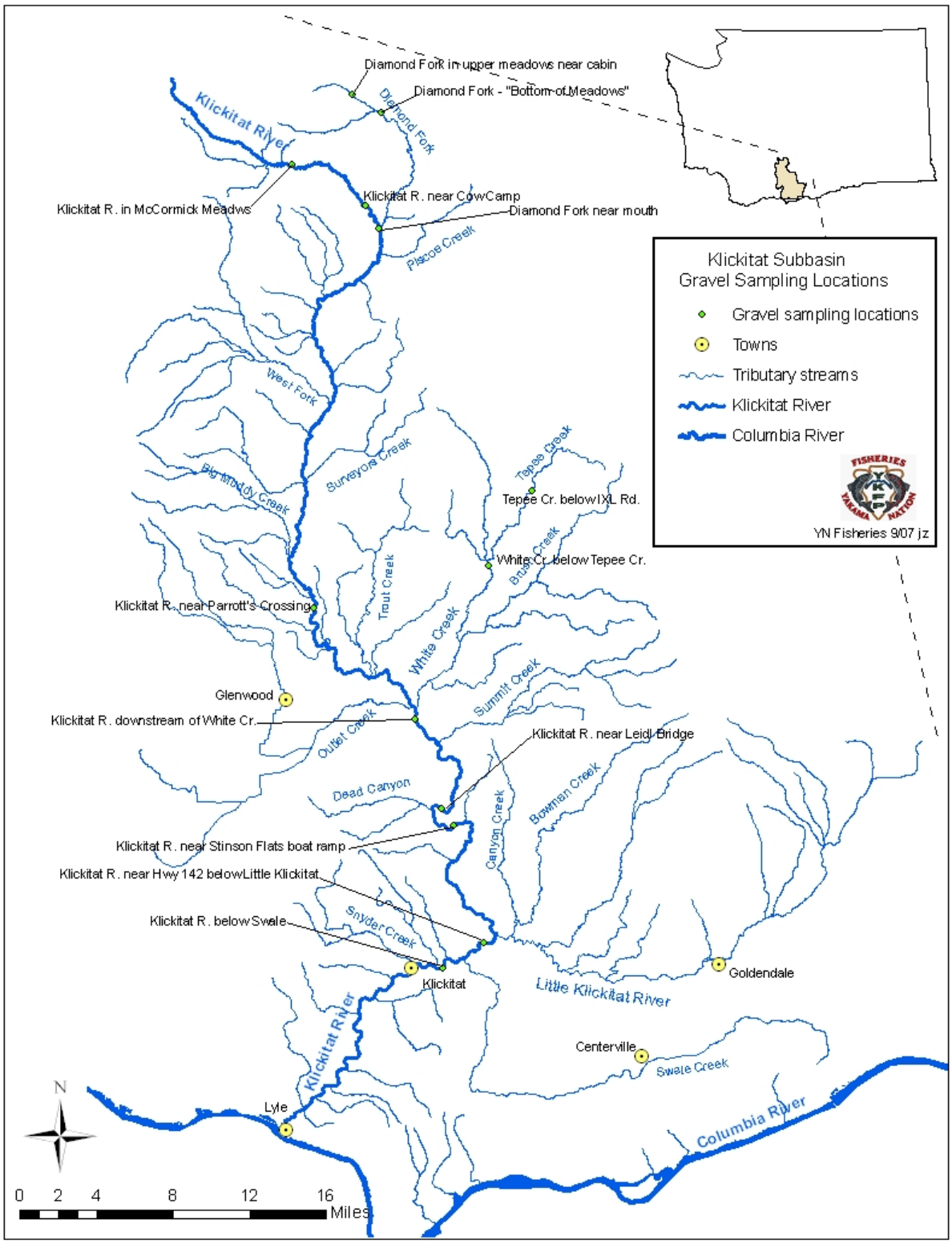

Figure F1. Locations of Klickitat subbasin sediment sampling sites.

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	90.3	57.4	41.4	35.8	30.4	21.8	14.5	10.2	9.1	6.6	4.8
2002	100.0	76.5	56.2	48.6	41.2	29.5	20.3	14.3	12.9	8.2	5.0
2003	96.0	61.6	47.2	42.0	37.1	30.0	24.8	20.8	19.2	11.5	6.9
2004	99.0	66.3	47.9	41.6	35.6	26.5	19.1	14.1	12.3	7.7	4.6
2005	98.6	72.0	52.0	45.0	38.3	27.7	19.4	14.7	13.2	8.6	5.5
2006	100.0	65.7	48.1	41.5	35.4	26.5	20.6	15.3	13.4	7.7	4.3
2007	96.9	63.4	44.0	37.2	30.9	22.7	17.1	12.8	11.4	6.8	3.6
2008	96.7	60.8	41.3	35.0	29.0	21.1	14.8	10.3	9.0	5.1	2.8

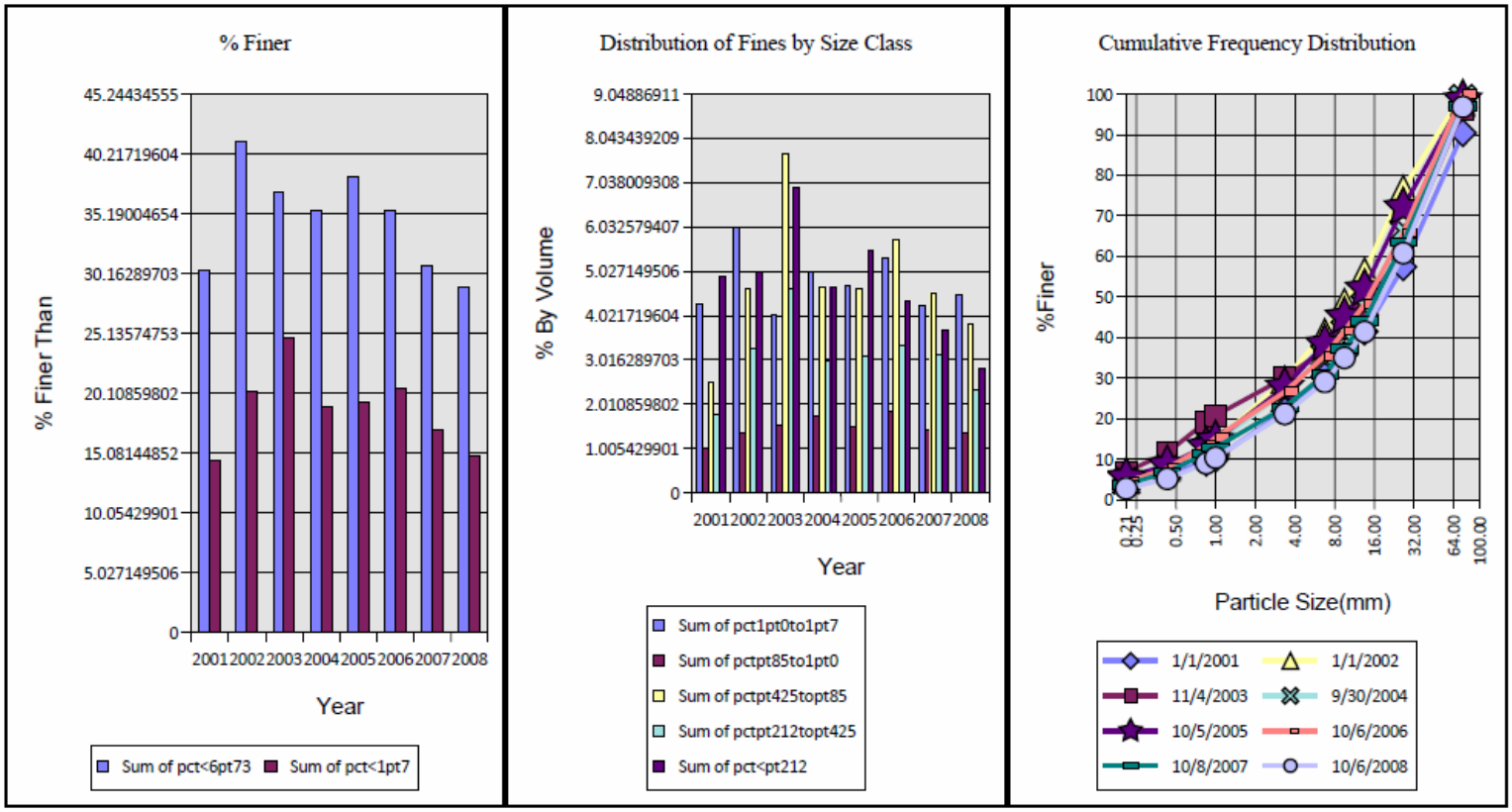

Figure F2. Sediment sampling data from Diamond Fork Bottom of Meadows 2001-2008.

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	97.2	64.8	47.0	40.1	35.0	26.6	18.9	14.2	13.0	9.8	7.7
2000	86.0	44.9	32.7	28.5	25.3	19.6	13.8	8.7	7.2	4.1	3.0
2003	93.7	62.2	43.4	36.2	29.7	19.6	12.5	8.9	8.0	5.7	4.2
2004	93.3	67.2	49.4	42.9	36.5	26.5	18.0	12.9	11.5	7.7	5.3
2005	89.5	62.3	44.9	38.8	33.0	24.0	17.6	13.3	12.0	8.2	5.7
2006	93.8	63.2	46.0	39.2	31.9	22.3	14.9	11.0	9.9	7.2	5.0
2007	97.0	60.0	43.6	37.6	31.3	21.8	15.5	12.0	11.0	7.5	5.4
2008	91.4	59.1	43.5	37.6	31.6	22.6	15.4	11.3	10.3	6.9	4.6

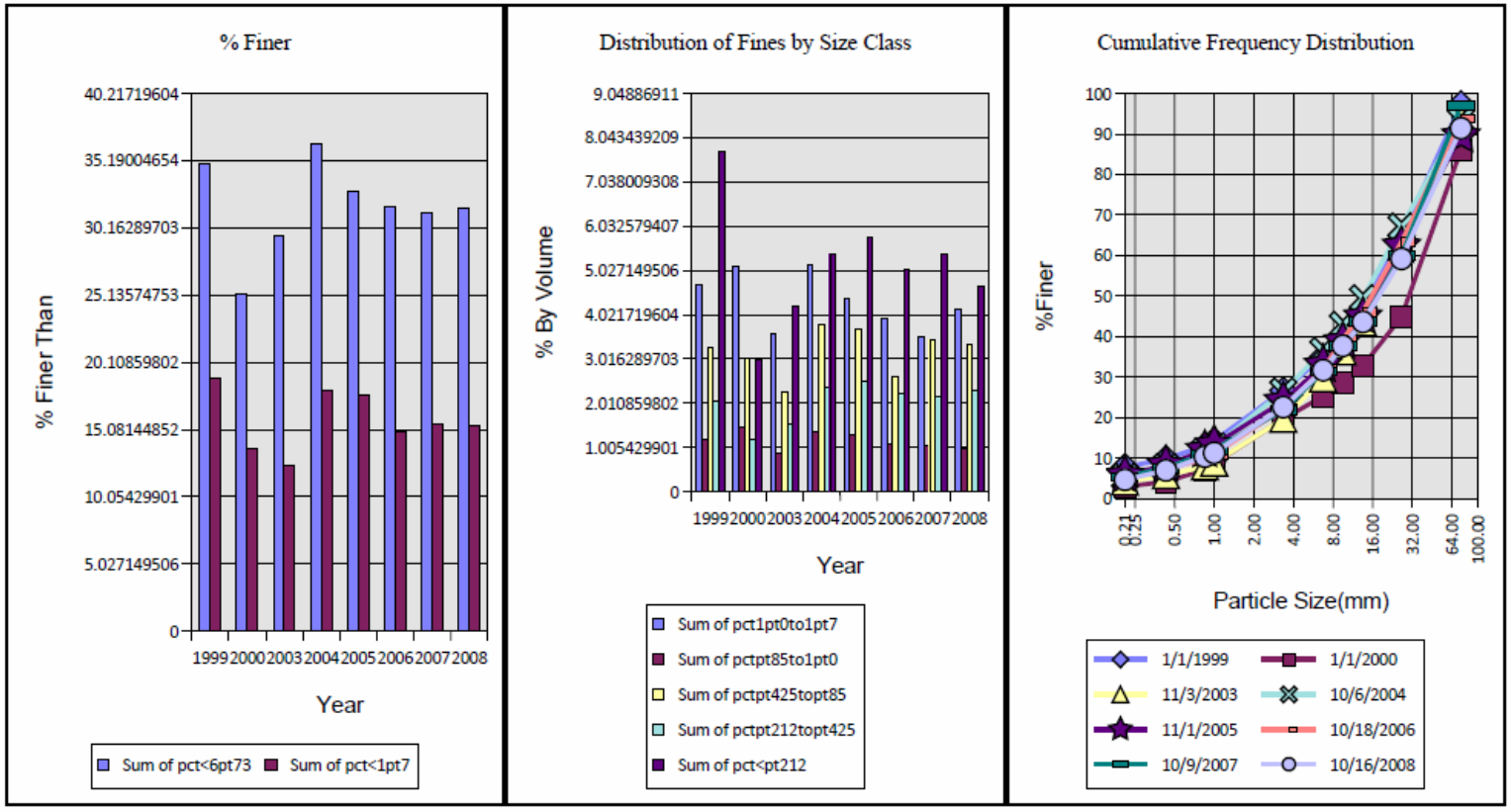

Figure F3. Sediment sampling data from Diamond Fork near mouth 1999-2008.

Site Name: Diamond Fork in upper meadows near cabin

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
2000	100.0	78.6	60.0	52.9	45.6	35.0	27.1	22.2	20.5	13.8	8.3
2001	98.1	73.1	55.4	48.8	42.4	32.3	24.5	19.8	18.6	13.4	8.6
2002	95.0	52.4	35.5	30.1	25.1	17.7	11.4	8.6	7.8	5.8	4.6
2003	100.0	72.0	46.3	38.3	31.1	21.7	15.2	11.7	10.8	6.5	3.6
2004	100.0	66.3	43.7	37.4	31.3	22.2	15.4	11.2	10.2	6.4	3.8
2005	100.0	72.7	53.7	47.0	40.0	28.8	20.7	15.6	14.5	8.7	5.0
2006	98.6	76.9	56.4	48.5	41.2	30.3	21.5	16.0	14.3	9.3	5.7
2007	98.7	66.7	45.0	37.8	30.7	20.8	14.5	11.2	10.2	6.9	4.1
2008	98.8	69.6	51.6	44.5	36.8	26.3	18.5	13.7	12.1	7.8	4.5

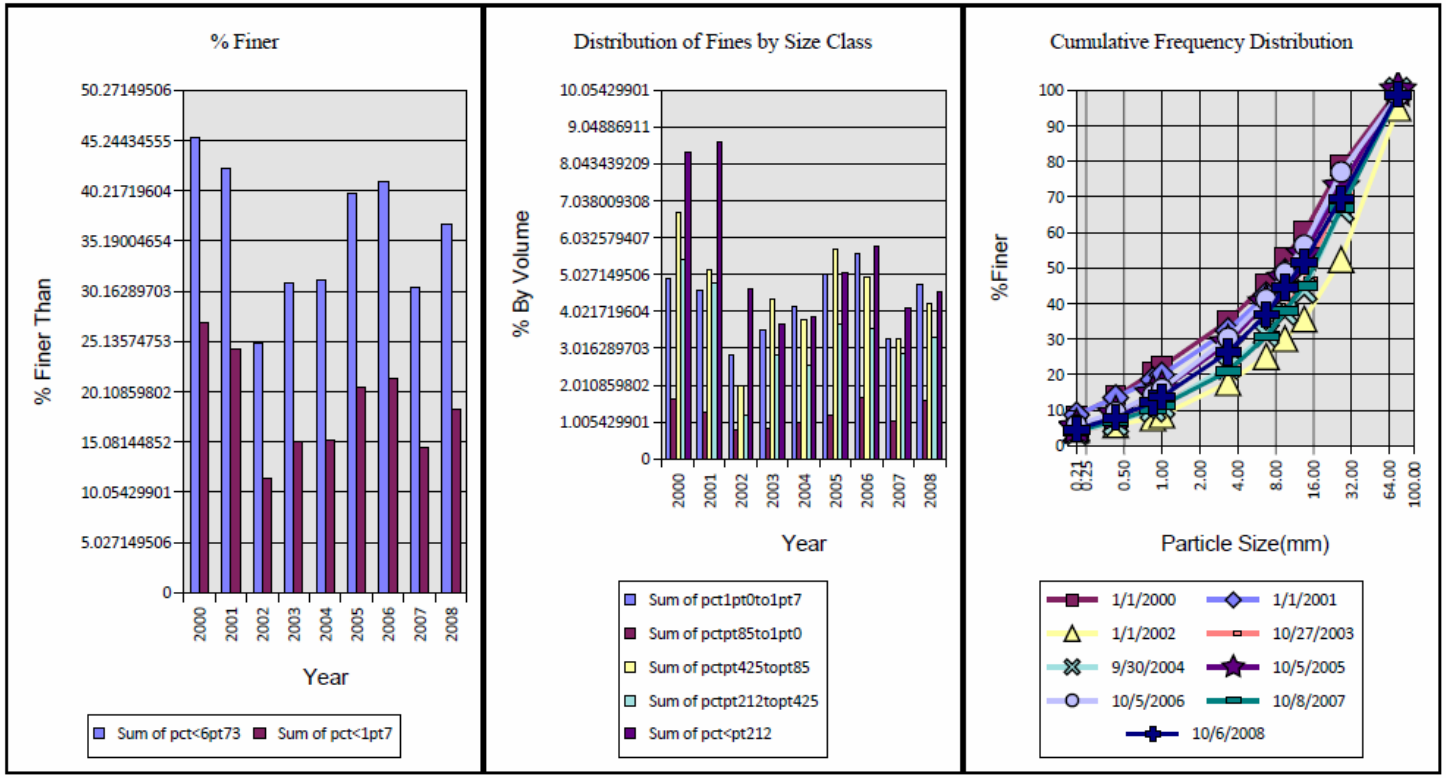

Figure F4. Sediment sampling data from Diamond Fork in upper meadows 2000-2008.

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	53.5	37.9	33.2	29.5	23.8	18.2	13.0	11.5	7.0	4.9
2000	83.8	42.4	29.2	24.3	20.3	15.3	12.3	9.9	8.9	5.5	3.6
2001	92.0	49.1	33.9	29.7	26.2	21.5	16.6	11.2	9.5	5.2	3.1
2002	92.3	49.4	36.8	32.6	29.4	25.8	21.7	15.6	13.5	7.1	5.1
2003	94.8	61.5	43.7	38.2	33.5	27.1	21.1	14.9	12.8	7.6	5.3
2004	91.2	60.5	45.1	40.0	35.7	29.5	23.3	16.2	13.7	7.7	4.7
2005	85.2	55.2	39.8	34.4	29.8	23.4	18.1	13.2	11.7	7.6	4.2
2006	93.3	63.5	47.4	41.8	37.0	30.6	23.3	14.9	12.5	6.5	4.2
2007	93.7	65.3	50.2	45.0	40.0	32.5	25.0	17.8	15.1	7.4	3.8
2008	99.4	60.1	43.4	38.5	33.7	27.7	21.7	14.5	11.7	6.5	3.5

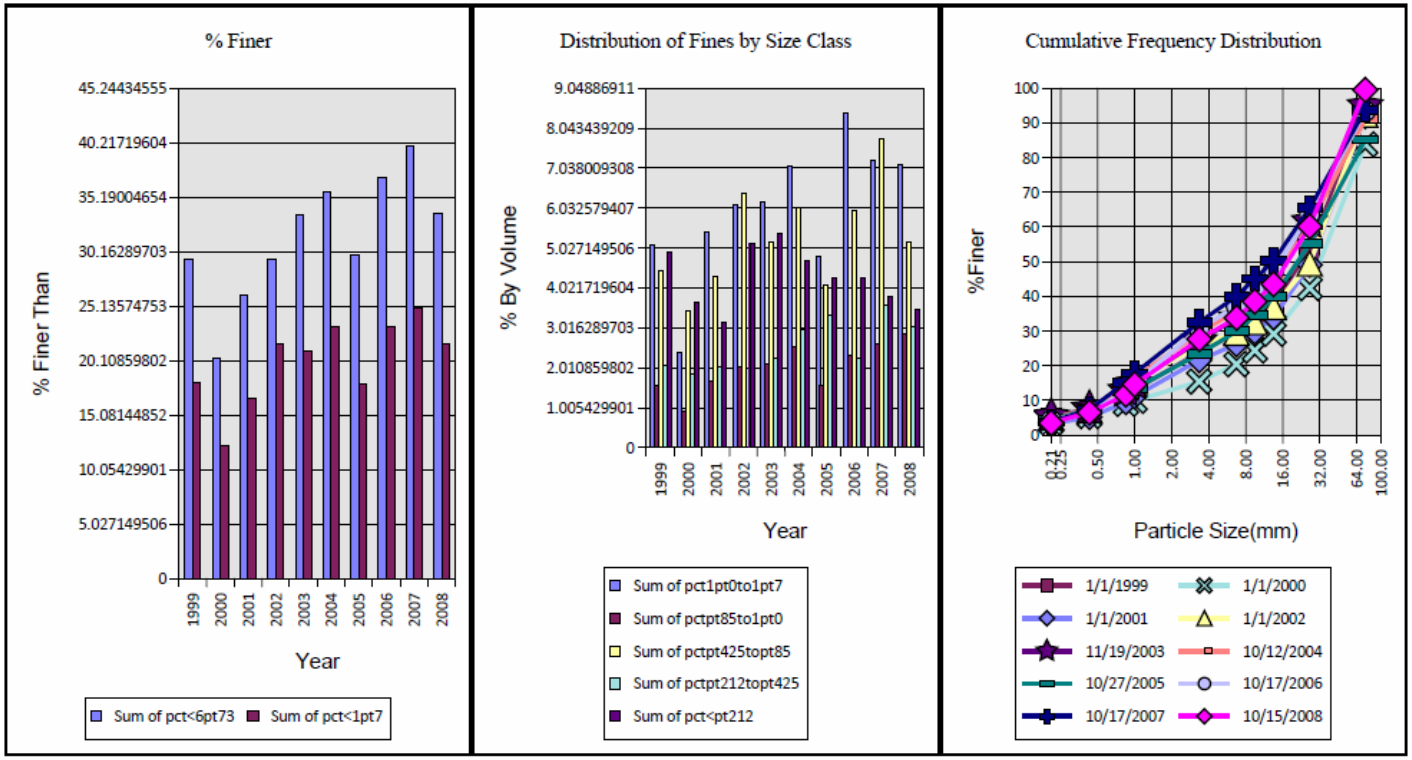

Figure F5. Sediment sampling data from Klickitat R. downstream of White Cr. 1999-2008.

Site Name: Klickitat R. in McCormick Meadws

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
2003	95.5	48.9	31.1	25.1	20.1	13.6	9.1	6.7	6.0	4.0	2.8
2004	99.1	60.3	39.9	33.2	27.0	18.7	13.0	9.3	8.2	5.0	3.4
2005	98.9	63.9	41.9	34.3	28.0	19.3	13.4	9.9	8.8	5.8	4.0
2006	99.1	63.2	44.9	38.3	31.9	22.6	15.3	10.7	9.5	5.3	3.6
2007	100.0	54.3	33.1	27.4	22.5	15.7	11.3	8.7	8.1	5.4	3.8
2008	96.1	57.0	39.8	33.4	27.1	17.8	11.4	8.5	7.8	5.1	3.0

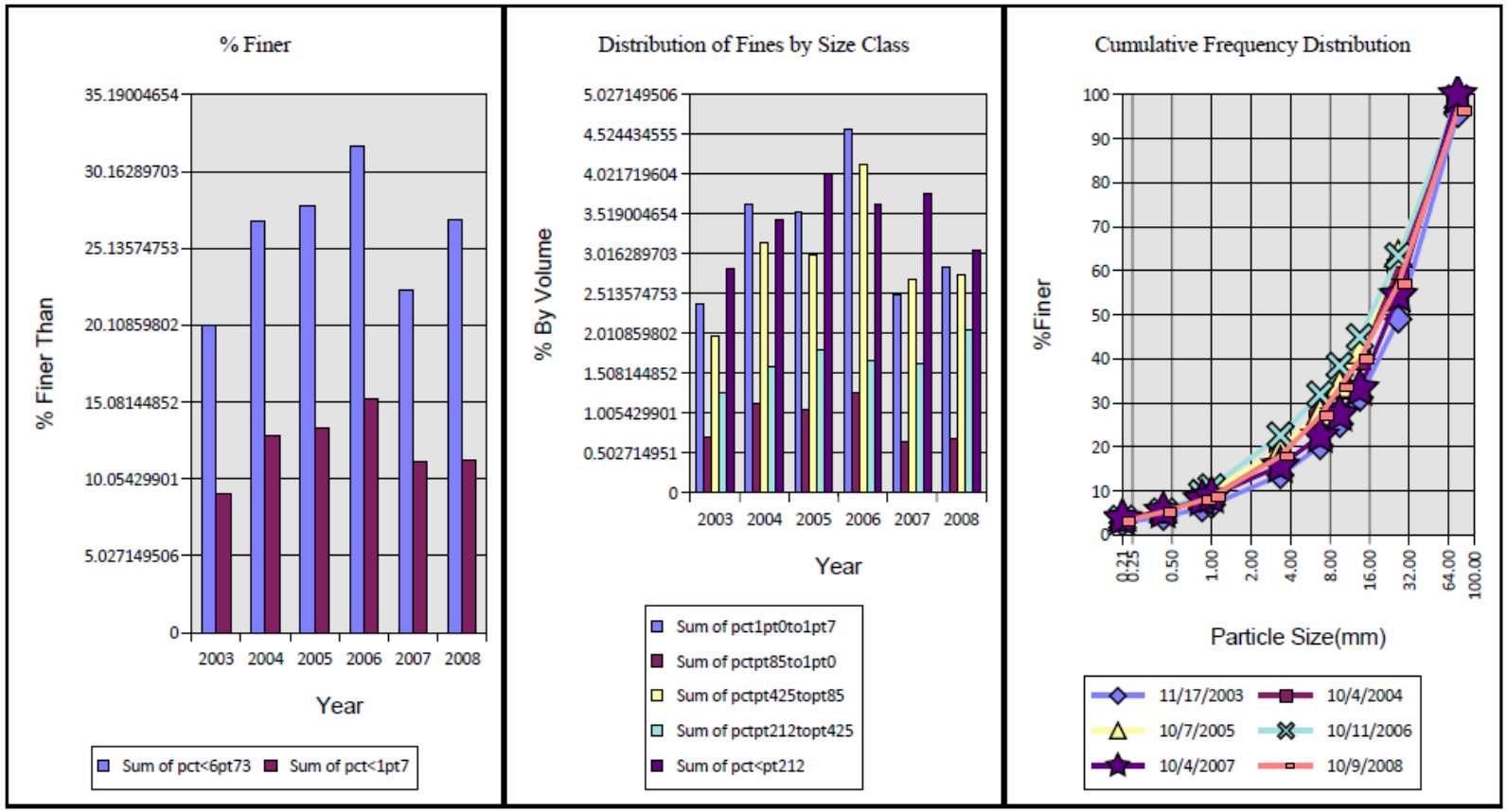

Figure F6. Sediment sampling data from Klickitat R. in McCormick Meadows 1998-2008.

Site Name: Klickitat R. near Hwy 142 below 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	88.0	60.0	47.5	42.5	38.3	32.7	28.2	24.2	22.6	15.8	11.6
2000	91.9	42.6	28.4	23.9	21.1	17.5	14.0	10.6	9.6	6.2	4.2
2001	88.7	56.3	40.2	34.5	29.6	23.8	20.0	16.9	15.5	11.5	8.4
2002	87.5	49.4	34.7	30.3	26.9	22.7	18.7	11.9	9.7	5.1	3.4
2003	82.8	49.2	32.7	28.0	24.1	19.2	15.8	13.6	12.4	8.8	5.8
2004	83.6	46.5	33.9	29.6	25.5	19.9	16.0	12.0	10.4	5.6	3.4
2005	86.5	54.6	39.7	34.6	29.4	23.4	19.0	15.5	14.0	8.1	4.9
2006	98.3	55.7	40.4	35.3	30.6	25.0	21.3	17.4	15.4	8.9	4.8
2007	92.2	59.3	44.1	38.6	33.8	27.5	23.0	18.4	16.9	9.7	5.4
2008	92.4	56.1	41.2	35.7	30.7	24.8	20.8	17.0	15.5	9.9	6.0

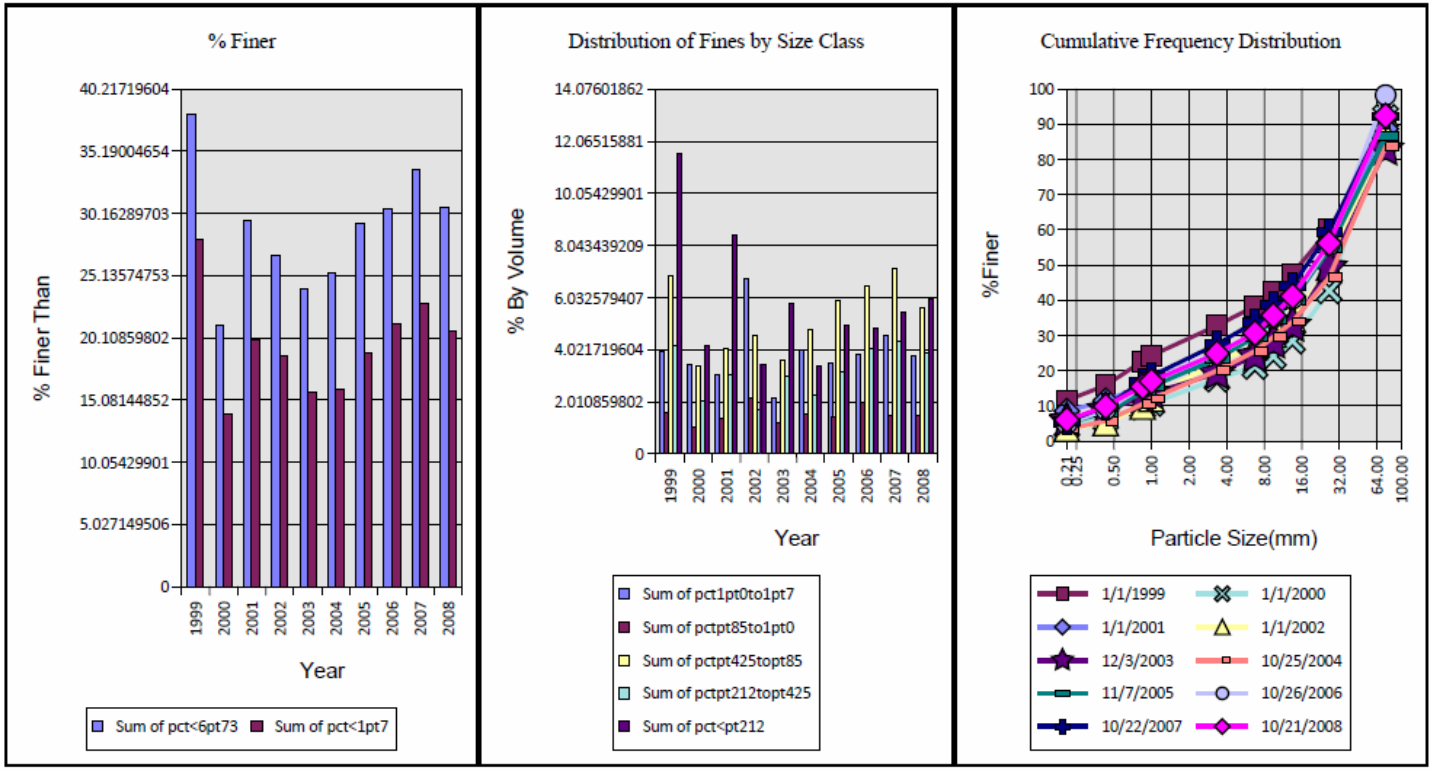

Figure F7. Sediment data from Klickitat R. below Little Klickitat R. 1999-2008.

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	23.5	16.2	11.8	8.8	6.3	5.5	5.2	4.5	3.9
1999	98.0	57.6	38.8	32.2	27.0	20.5	16.3	13.8	13.1	10.9	8.7
2000	93.0	66.9	49.7	43.7	38.7	30.9	24.8	21.0	20.0	17.0	15.1
2001	97.1	62.5	42.2	35.5	30.0	22.3	16.8	13.8	13.1	10.6	8.6
2002	91.6	55.1	34.6	27.8	22.2	15.2	10.6	8.4	7.8	6.3	5.1
2003	90.3	44.9	26.3	20.5	16.1	10.8	7.6	5.8	5.3	4.0	3.0
2004	88.3	56.1	39.2	32.8	27.3	19.2	13.2	9.7	8.6	5.6	4.0
2005	86.9	58.2	41.7	35.3	29.4	20.8	14.2	10.3	9.3	6.2	4.3
2006	95.3	66.3	47.7	40.8	33.8	24.0	16.6	12.1	10.8	6.3	4.2
2007	96.1	59.5	43.7	37.7	31.2	22.3	15.2	11.3	9.9	6.2	4.2
2008	94.2	59.2	41.1	35.2	29.3	20.8	15.3	11.3	10.0	5.9	4.1

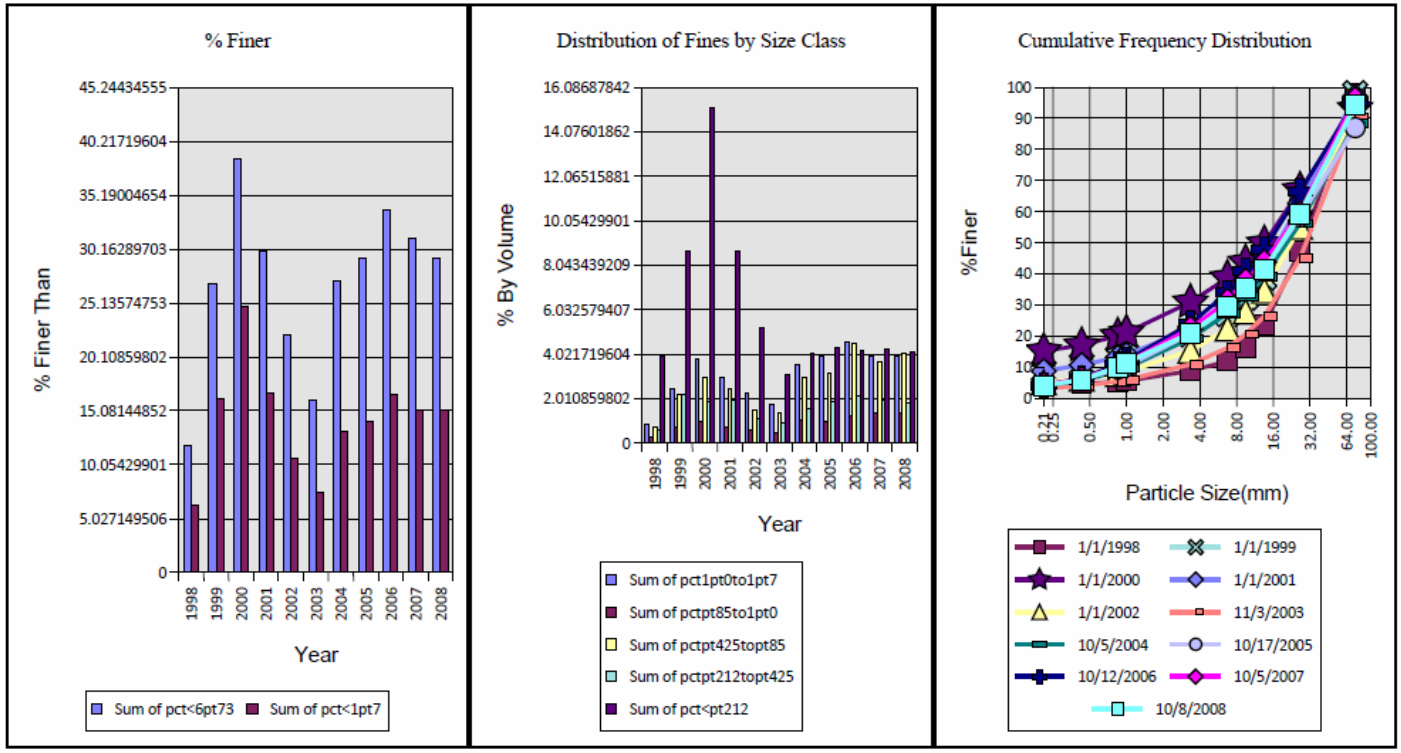

Figure F8. Sediment sampling data from Klickitat R. near Cow Camp 1998-2008.

Site Name: Klickitat R. 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	30.7	27.6	25.6	22.8	20.5	17.6	15.7	8.3	5.3
2000	92.2	34.8	23.6	21.1	19.1	16.9	14.2	10.6	9.3	5.0	3.0
2003	95.0	38.2	23.0	22.4	21.8	18.8	14.1	7.9	6.3	3.3	2.2
2004	93.3	51.3	37.7	34.3	31.0	25.6	20.7	14.7	11.5	5.9	3.5
2005	87.6	41.7	29.2	26.9	24.9	21.5	17.8	12.8	10.9	5.6	3.8
2006	99.3	44.0	29.1	26.2	23.8	21.0	17.2	12.3	10.8	6.4	4.1
2007	93.9	54.2	42.4	39.1	36.1	31.9	26.3	16.7	12.9	4.9	2.6
2008	89.0	53.2	41.4	37.5	33.9	28.8	22.8	16.5	13.5	5.7	3.3

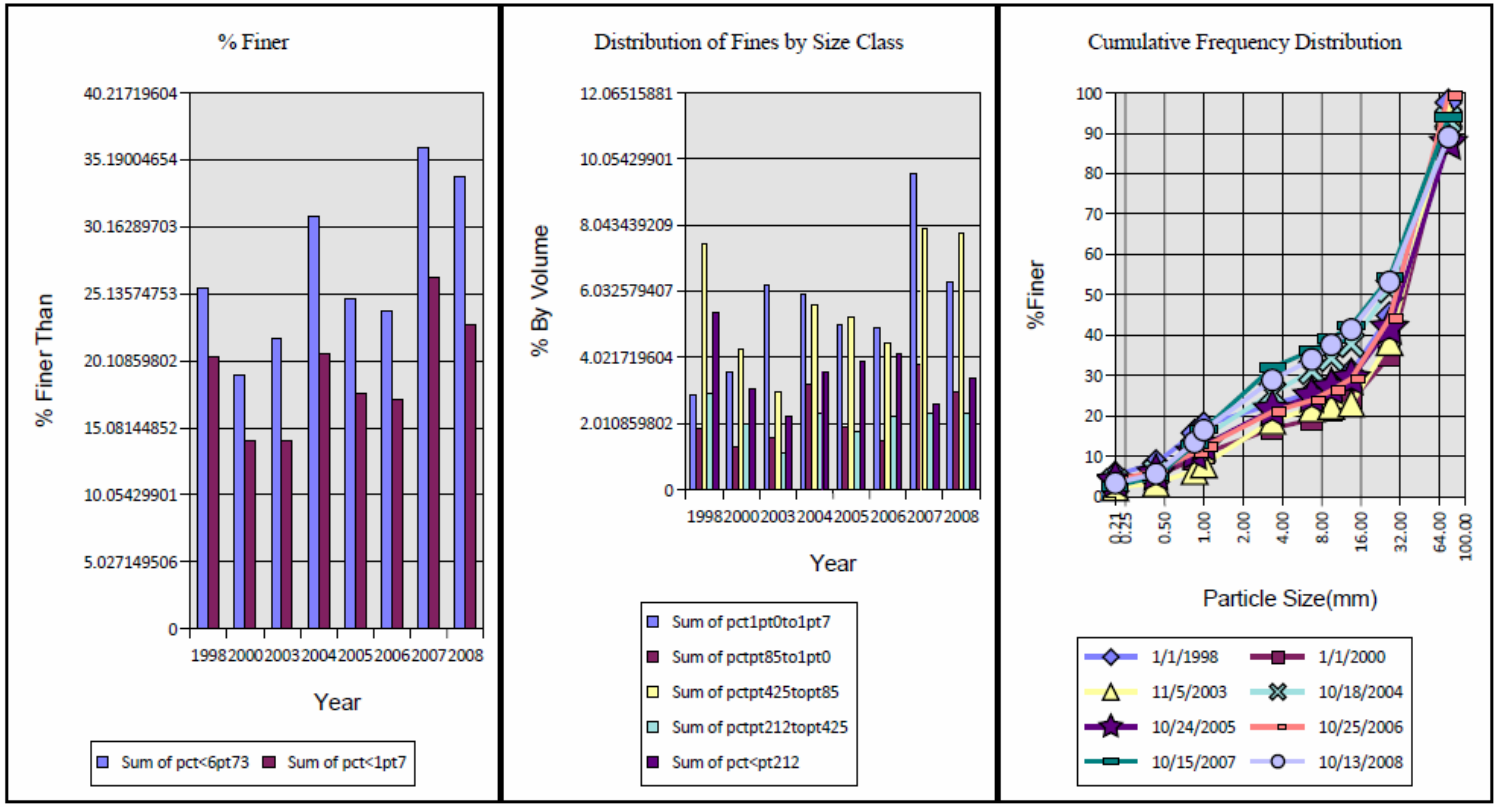

Figure F9. Sediment sampling data from Klickitat R. near Leidl Bridge 1998-2008.

Site Name: Klickitat R. 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	62.3	50.6	46.4	42.3	35.2	28.6	23.2	21.4	14.1	8.3
2000	79.7	43.7	32.1	27.9	24.6	19.1	13.3	8.5	7.1	4.1	2.9
2002	92.5	45.6	30.2	25.5	22.3	18.1	14.7	10.6	9.1	5.0	2.9
2003	81.7	44.1	33.2	28.9	25.5	20.3	15.9	12.2	11.0	6.7	4.3
2004	96.6	56.2	41.9	36.2	30.7	22.5	15.4	10.9	9.6	5.7	4.0
2005	93.0	63.1	48.2	42.9	38.3	31.3	26.0	21.9	20.5	14.1	9.1
2006	87.5	61.4	47.9	43.1	38.6	31.1	24.0	17.6	15.4	8.4	5.5
2007	81.2	54.1	42.0	37.3	32.9	26.5	21.3	17.6	16.2	10.2	5.9
2008	91.0	57.5	44.3	39.2	34.4	27.4	21.4	17.2	15.7	11.0	7.0

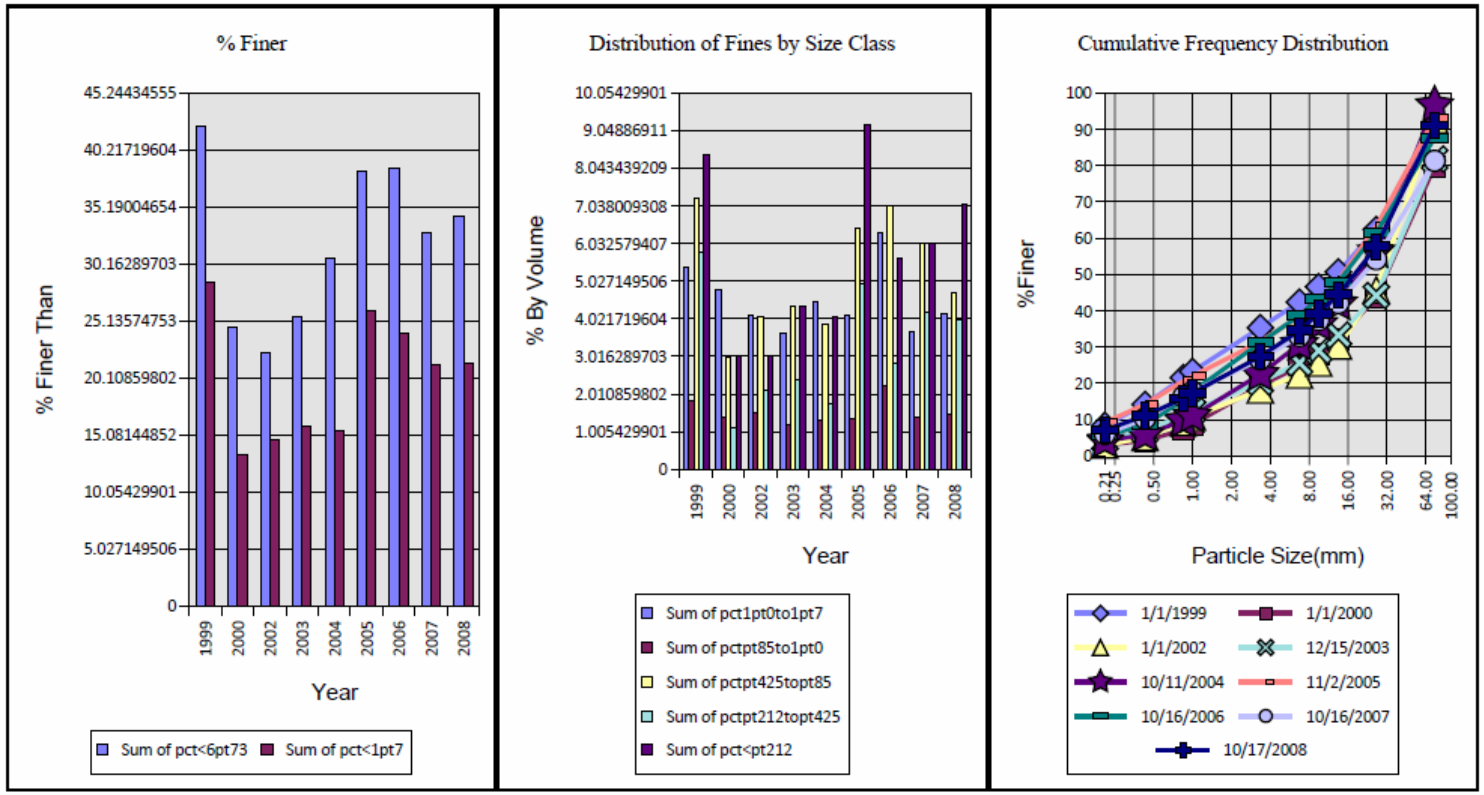

Figure F10. Sediment sampling data from Klickitat R. near Parrott's Crossing 1999-2008.

Site Name: Klickitat R. near Stinson Flats boat ramp (RIGHT)

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
2008	89.7	47.0	33.9	31.0	28.2	22.7	17.4	15.1	14.6	9.1	3.9

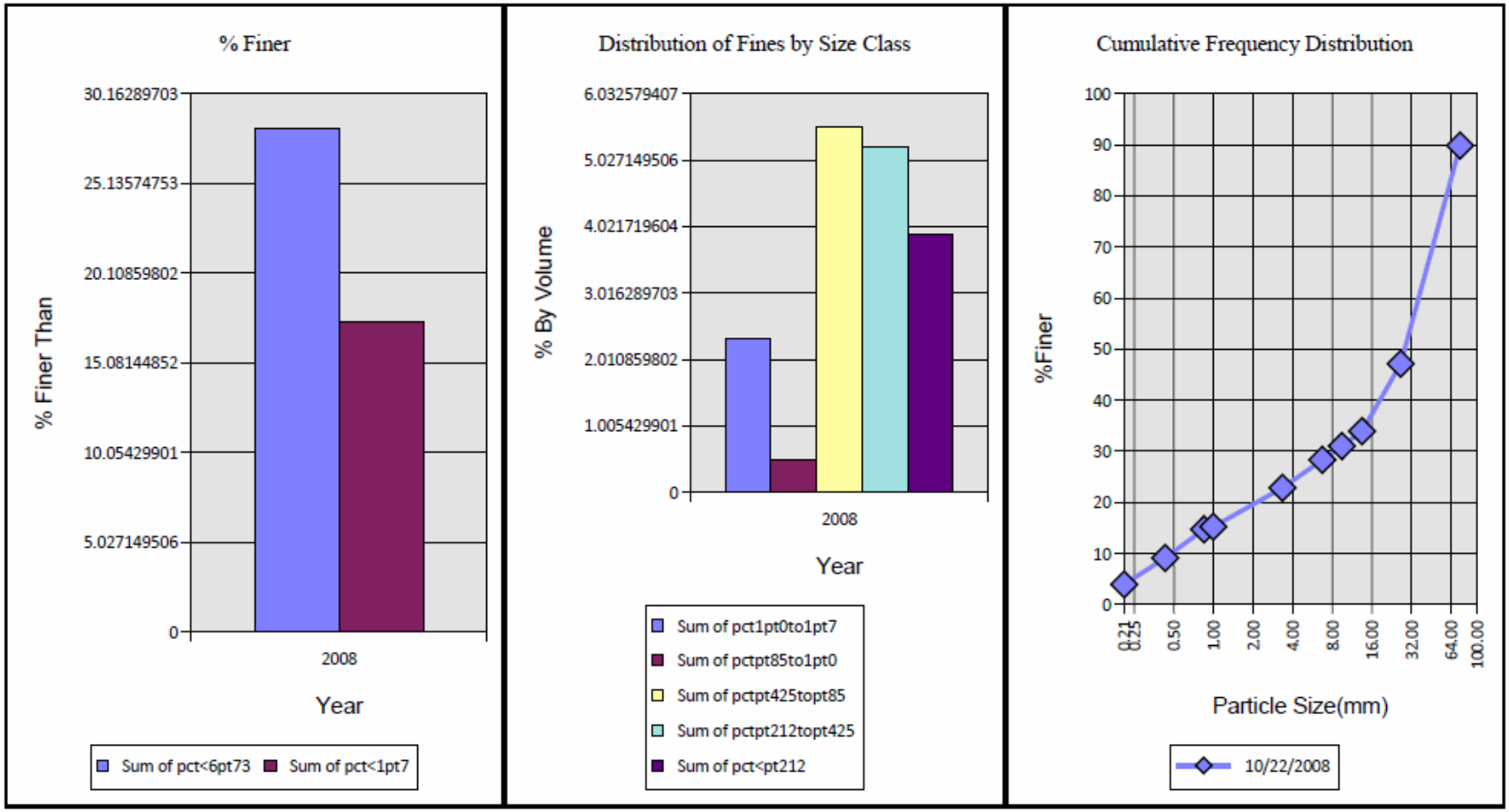

Figure F11. Sediment sampling data from Klickitat R. near Stinson Flats in 2008.

Site Name: Klickitat River at Ice House Park

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
2007	97.6	76.3	62.0	58.3	55.2	50.9	38.6	16.4	12.9	5.6	2.7
2008	99.1	69.6	53.3	48.5	44.9	40.4	32.0	15.0	11.1	4.8	2.9

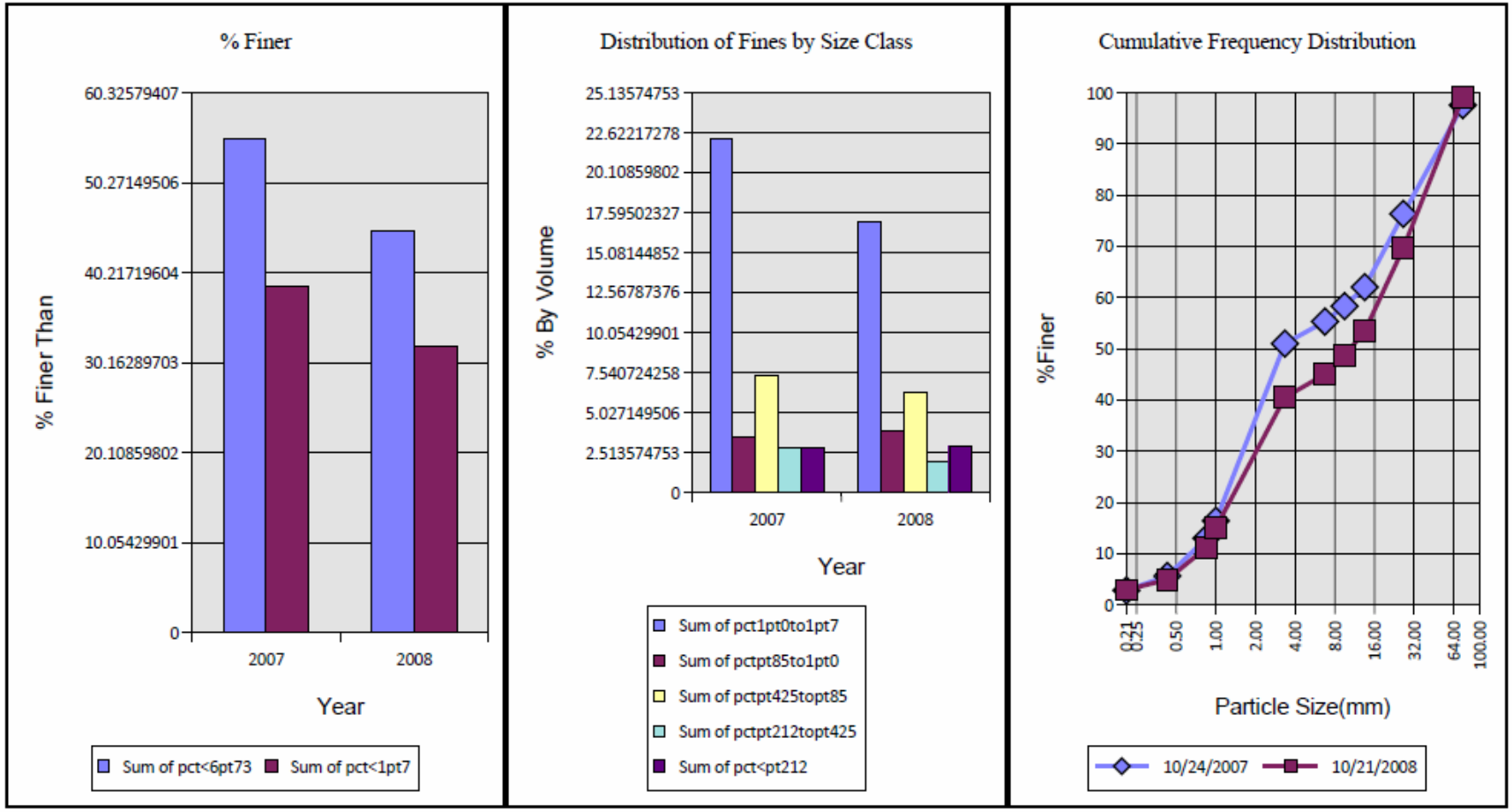

Figure F12. Sediment sampling data from Klickitat R. at Ice House Park 2007-2008.

Appendix G. Temperature and Water Quality Monitoring

Table G1. 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
KLCASTLEBR	Klickitat
KLCKYKFPHQ	Klickitat
KLCOWCAMPX	Klickitat
KLHATCHTRP	Klickitat
KLnewLYLETRP	Klickitat
LKLIKLODGE	Little Klickitat
LKLIKMOUTH	Little Klickitat
LKLIKOLSEN	Little Klickitat
LOGGCAMPCR	Logging Camp
MCCREEDRDX	McCreedy
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

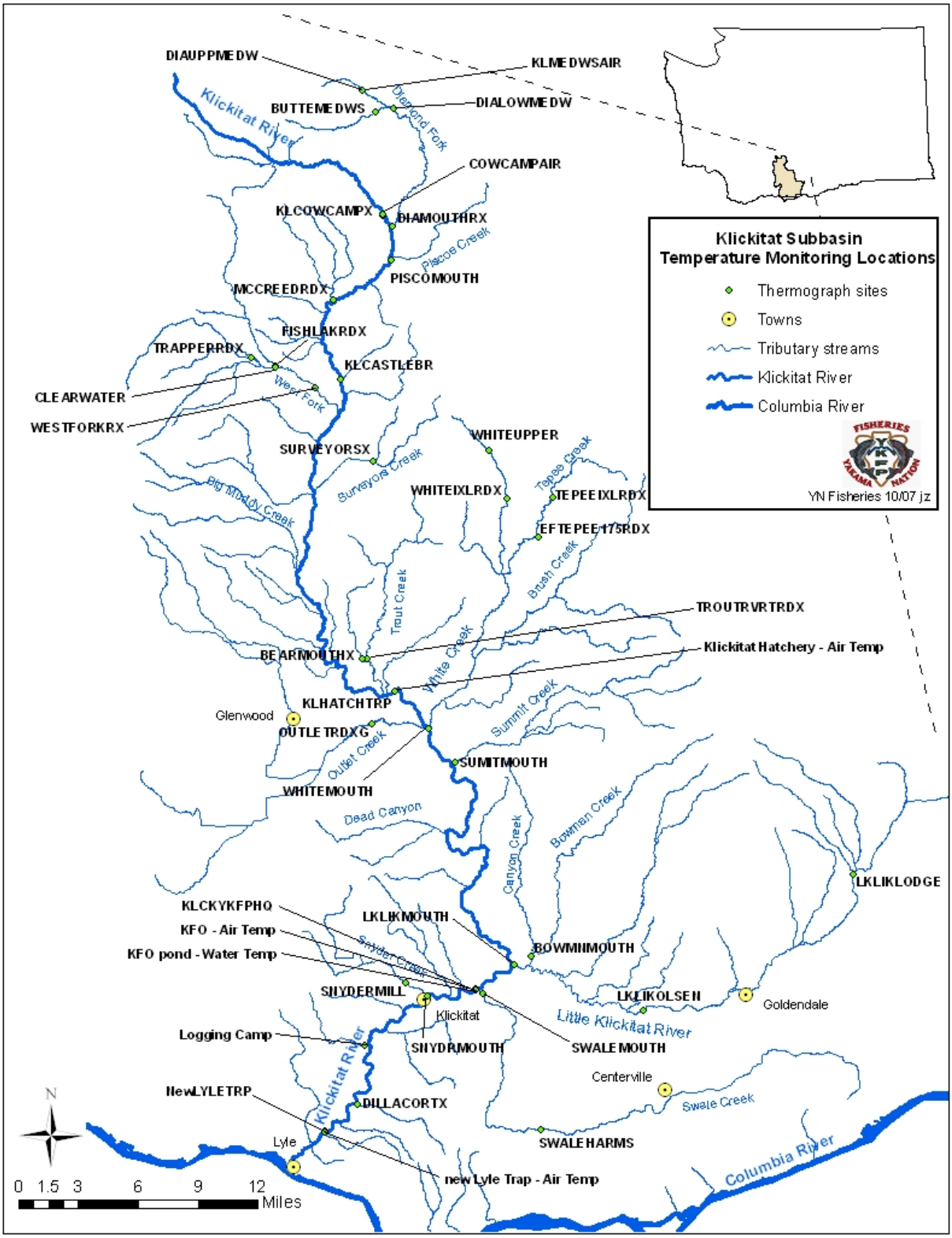

Figure G1. Locations of Klickitat subbasin temperature and water quality monitoring sites

Table G2. Monthly temperature summaries from 36 sites in the Klickitat subbasin for the reporting period 5/1/2008 – 4/30/2009. Site names correspond to those in Table G1. All temperatures and ranges in degrees Celsius. "--" indicates no data. See description under Task 1.g. in the narrative for an explanation of metrics used. Data not collected at several sites shown on above map due to lost thermographs.

BOWMNMOUTH

2008	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	31	0	0	0	0	0	0	13	0	0	0	0	14.2	5.9	3.6
June	30	0	0	0	0	0	0	23	4	2	1	0	19.2	5.4	3.8
July	31	0	0	0	0	0	0	31	28	6	3	0	18.9	5.7	4.1
August	31	0	0	0	0	0	0	31	17	3	0	0	18.4	4.8	3.1
September	30	0	0	0	0	0	0	26	0	0	0	0	14.6	3.5	2.5
October	31	0	0	0	0	0	0	5	0	0	0	0	13.1	2.7	1.8
November	30	0	2	0	2	0	0	0	0	0	0	0	11.4	3.0	1.2
December	31	5	22	1	19	0	0	0	0	0	0	0	8.1	2.5	1.1

2009	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
January	31	0	31	0	28	0	0	0	0	0	0	0	5.8	2.7	1.1
February	28	0	24	0	15	0	0	0	0	0	0	0	6.3	2.8	1.4
March	31	0	20	0	9	0	0	0	0	0	0	0	8.4	4.3	2.4
April	30	0	3	0	0	0	0	0	0	0	0	0	13.5	5.8	3.8

BUTTEMEDWS

2008	# 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	31	0	31	0	0	0	0	0	0	0	7.2	5.8	2.2
June	30	1	25	0	8	0	0	2	0	0	0	0	12.9	7.5	5.8
July	31	0	1	0	0	0	0	28	0	0	0	0	13.8	7.7	6.4
August	31	0	2	0	0	0	0	16	0	0	0	0	15.7	7.4	5.3
September	30	0	19	0	1	0	0	0	0	0	0	0	10.4	5.8	4.5
October	31	13	26	4	23	0	0	0	0	0	0	0	8.6	4.0	2.2
November	30	14	30	9	30	0	0	0	0	0	0	0	5.0	3.1	1.2
December	31	29	31	26	31	0	0	0	0	0	0	0	2.4	1.6	0.3

2009	# 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	30	31	26	31	0	0	0	0	0	0	0	1.2	0.9	0.3
February	28	22	28	16	28	0	0	0	0	0	0	0	1.5	1.2	0.7
March	31	26	31	21	31	0	0	0	0	0	0	0	1.9	1.8	0.7
April	30	18	30	4	30	0	0	0	0	0	0	0	2.8	2.7	1.7

CLEARWATER

2008	# 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	25	0	4	0	0	0	0	0	0	0	7.0	3.3	2.0
June	30	0	10	0	0	0	0	0	0	0	0	0	9.3	3.4	2.4
July	31	0	0	0	0	0	0	0	0	0	0	0	9.1	3.3	2.5
August	29	0	0	0	0	0	0	0	0	0	0	0	9.7	3.1	2.2

COWCAMPAIR

2008	# 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
October	24	22	24	1	16	0	0	20	3	0	0	0	20.0	22.8	16.0
November	30	23	29	11	25	0	0	0	0	0	0	0	11.9	12.5	7.6
December	31	31	31	27	30	0	0	0	0	0	0	0	12.5	15.5	8.0

2009	# 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	30	31	27	31	0	0	0	0	0	0	0	7.4	16.7	10.5
February	28	28	28	23	28	0	0	0	0	0	0	0	12.3	21.0	11.8
March	31	31	31	20	31	0	0	0	0	0	0	0	13.4	29.0	11.9
April	30	29	30	6	25	1	0	13	4	2	1	0	23.7	25.7	15.1

DIALOWMEDW

2008	# 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	1	31	0	29	0	0	0	0	0	0	0	9.2	7.5	4.1
June	30	0	24	0	4	0	0	5	0	0	0	0	15.1	8.8	6.9
July	31	0	0	0	0	0	0	31	12	0	0	0	16.8	10.2	8.4
August	31	0	0	0	0	0	0	31	15	4	3	0	19.4	10.4	7.9
September	30	0	13	0	0	0	0	19	0	0	0	0	14.8	9.6	7.7
October	31	14	26	0	20	0	0	0	0	0	0	0	11.7	6.9	4.3
November	30	15	30	10	29	0	0	0	0	0	0	0	5.9	3.3	1.5
December	31	30	31	26	31	0	0	0	0	0	0	0	2.5	2.0	0.4

2009	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
January	31	31	31	31	31	0	0	0	0	0	0	0	0.0	0.0	0.0
February	28	28	28	23	28	0	0	0	0	0	0	0	1.8	1.5	0.5
March	31	31	31	27	31	0	0	0	0	0	0	0	3.0	3.0	0.5
April	30	21	30	3	30	0	0	0	0	0	0	0	4.6	4.3	2.7

DIAMOUTHRX

2008	# 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	21	0	0	0	0	0	0	0	8.8	5.8	3.4
June	30	0	10	0	0	4	4	15	7	6	6	3	32.3	27.5	5.9
July	31	0	0	0	0	0	0	31	0	0	0	0	15.3	6.3	5.1
August	31	0	0	0	0	0	0	27	0	0	0	0	16.1	5.9	4.2
September	30	0	1	0	0	0	0	0	0	0	0	0	12.1	4.7	3.8
October	31	0	22	0	17	0	0	0	0	0	0	0	9.9	3.5	2.6
November	30	6	28	4	25	0	0	0	0	0	0	0	6.8	3.4	1.3
December	31	25	31	22	31	0	0	0	0	0	0	0	3.4	3.0	0.7

2009	# 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	28	31	27	31	0	0	0	0	0	0	0	2.0	1.4	0.3
February	28	28	28	28	28	0	0	0	0	0	0	0	0.2	2.0	0.3
March	31	31	31	31	31	0	0	0	0	0	0	0	2.0	3.3	0.5
April	30	8	30	3	30	0	0	0	0	0	0	0	6.9	6.9	3.0

DIAUPPMEDW

2008	# 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	7.1	5.2	2.3
June	30	0	24	0	11	0	0	2	0	0	0	0	13.3	6.8	4.2
July	31	0	0	0	0	0	0	31	0	0	0	0	15.7	8.7	6.9
August	31	0	1	0	0	0	0	31	3	0	0	0	17.9	8.5	6.6
September	30	0	11	0	0	0	0	14	0	0	0	0	13.8	8.0	6.4
October	31	8	26	0	20	0	0	0	0	0	0	0	11.3	6.0	3.6
November	30	11	30	6	30	0	0	0	0	0	0	0	5.2	2.9	1.4
December	31	26	31	23	31	0	0	0	0	0	0	0	3.2	2.0	0.4

2009	# 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	13	31	0	0	0	0	0	0	0	1.8	1.2	0.5
February	28	17	28	6	28	0	0	0	0	0	0	0	2.1	1.5	0.9
March	31	25	31	15	31	0	0	0	0	0	0	0	2.6	2.4	0.9
April	30	9	30	2	30	0	0	0	0	0	0	0	4.1	3.2	2.0

DILLACORTX

2008	# 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	1	1	31	14	6	2	0	24.6	13.6	4.4
June	30	0	0	0	0	0	0	30	7	4	4	0	22.3	4.9	2.0
July	31	0	0	0	0	27	25	31	31	31	31	31	35.6	20.3	12.3
August	31	0	0	0	0	15	6	31	31	31	31	21	25.5	7.3	5.1
September	30	0	0	0	0	0	0	30	21	17	12	0	20.1	5.4	3.7
October	31	0	0	0	0	0	0	31	0	0	0	0	16.0	2.8	1.3
November	30	0	0	0	0	0	0	12	0	0	0	0	13.0	1.3	0.7
December	31	0	4	0	3	0	0	0	0	0	0	0	9.8	3.3	0.7

2009	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
January	31	2	27	0	26	0	0	0	0	0	0	0	6.9	3.0	1.2
February	28	0	27	0	25	0	0	0	0	0	0	0	5.9	2.8	1.3
March	31	0	16	0	8	0	0	0	0	0	0	0	8.8	4.5	2.2
April	30	0	1	0	0	0	0	14	7	2	0	0	18.7	13.0	5.8

EFTEPEE175RDX

2008	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	19	0	3	0	0	0	0	4	0	0	0	0	14.4	5.7	3.9

FISHLAKRDX

2008	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	19	0	19	0	19	0	0	0	0	0	0	0	6.2	3.6	2.3

HATCAIRTEM

2008	# 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
October	24	16	23	1	14	0	0	10	0	0	0	0	17.5	17.0	12.3
November	30	16	25	6	17	0	0	0	0	0	0	0	15.0	11.2	6.0
December	31	30	31	22	30	0	0	0	0	0	0	0	9.4	11.7	5.8

2009	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
January	31	29	31	26	30	0	0	0	0	0	0	0	7.5	17.0	6.0
February	28	27	28	16	28	0	0	0	0	0	0	0	8.5	13.0	7.3
March	31	25	31	6	25	0	0	4	0	0	0	0	15.2	18.7	11.1
April	30	18	30	0	5	5	3	29	21	14	14	5	31.4	30.1	18.2

KLCASTLEBR

2008	# 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	12	0	3	0	0	0	0	0	0	0	0	0	9.4	5.1	2.9
June	30	0	3	0	0	0	0	4	0	0	0	0	13.2	6.0	4.3
July	31	0	0	0	0	0	0	31	0	0	0	0	15.4	5.6	4.6
August	31	0	0	0	0	0	0	31	6	0	0	0	17.4	5.4	4.0
September	30	0	0	0	0	0	0	18	0	0	0	0	13.9	4.4	3.6
October	31	0	14	0	9	0	0	0	0	0	0	0	11.0	3.4	2.1
November	30	1	23	0	18	0	0	0	0	0	0	0	7.9	2.9	1.3
December	31	19	31	17	30	0	0	0	0	0	0	0	4.9	1.8	0.6

2009	# 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	26	31	18	31	0	0	0	0	0	0	0	3.1	1.9	0.7
February	28	7	28	1	28	0	0	0	0	0	0	0	3.6	1.9	1.3
March	31	10	31	1	31	0	0	0	0	0	0	0	5.7	3.3	2.0
April	30	0	30	0	18	0	0	0	0	0	0	0	7.7	4.8	3.1

KLCKYKFPHQ

2008	# 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	10.5	2.5	0.8
June	30	0	0	0	0	0	0	26	5	0	0	0	20.5	10.5	3.8
July	3	0	0	0	0	0	0	3	3	0	0	0	18.0	3.9	3.4
August	13	0	0	0	0	0	0	13	13	5	0	0	22.2	8.0	4.9
September	30	0	0	0	0	0	0	30	0	0	0	0	16.7	5.5	4.2
October	31	0	0	0	0	0	0	4	0	0	0	0	12.9	3.4	2.1
November	30	0	0	0	0	0	0	0	0	0	0	0	10.3	2.5	0.8
December	31	0	19	0	18	0	0	0	0	0	0	0	7.1	1.6	0.5

2009	# 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	1	28	0	25	0	0	0	0	0	0	0	7.4	3.2	0.9
February	28	0	25	0	16	0	0	0	0	0	0	0	6.6	2.6	1.5
March	31	0	10	0	6	0	0	0	0	0	0	0	9.8	3.8	2.3
April	30	0	0	0	0	0	0	0	0	0	0	0	13.3	5.2	3.4

KLCOWCAMPX

2008	# 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	16	0	0	0	0	0	0	0	7.3	5.0	3.0
June	30	0	15	0	0	0	0	0	0	0	0	0	10.2	5.7	3.6
July	31	0	0	0	0	0	0	20	0	0	0	0	14.3	6.7	4.9
August	31	0	0	0	0	0	0	26	0	0	0	0	15.7	5.9	4.2
September	30	0	4	0	0	0	0	9	0	0	0	0	12.8	7.0	5.2
October	31	0	24	0	17	0	0	0	0	0	0	0	10.1	4.4	2.5
November	30	8	29	7	24	0	0	0	0	0	0	0	6.7	2.4	1.1
December	31	29	31	25	31	0	0	0	0	0	0	0	3.2	2.5	0.4

2009	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
January	31	16	31	13	31	0	0	0	0	0	0	0	2.2	1.3	0.3
February	28	0	28	0	28	0	0	0	0	0	0	0	1.3	0.5	0.1
March	31	0	31	0	31	0	0	0	0	0	0	0	1.5	0.3	0.1
April	30	0	30	0	30	0	0	0	0	0	0	0	5.5	3.4	1.2

KLHATCHTRP

2008	# 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	9.8	4.1	2.7
June	30	0	0	0	0	0	0	7	0	0	0	0	14.3	4.3	3.1
July	31	0	0	0	0	0	0	31	0	0	0	0	15.6	4.4	3.6
August	31	0	0	0	0	0	0	31	0	0	0	0	16.1	4.7	3.5
September	30	0	0	0	0	0	0	10	0	0	0	0	13.3	4.1	2.7
October	31	0	8	0	0	0	0	0	0	0	0	0	10.4	2.7	1.6
November	30	0	10	0	6	0	0	0	0	0	0	0	8.7	2.8	1.0
December	31	14	28	11	28	0	0	0	0	0	0	0	5.4	1.9	0.7

2009	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
January	31	6	31	3	31	0	0	0	0	0	0	0	3.8	2.2	0.9
February	28	0	28	0	28	0	0	0	0	0	0	0	4.8	1.7	1.0
March	31	0	29	0	20	0	0	0	0	0	0	0	6.7	3.0	1.7
April	30	0	11	0	1	0	0	0	0	0	0	0	8.5	3.3	2.4

KLMEDWSAIR

2008	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
July	10	1	7	0	0	2	2	10	10	7	6	4	44.7	22.0	16.8
August	31	5	17	0	0	8	8	31	23	19	19	6	30.3	22.7	15.1
September	30	13	27	0	2	6	3	29	22	19	18	5	27.6	26.7	17.7
October	31	21	30	5	18	1	0	13	5	1	0	0	23.5	26.2	13.5
November	30	25	30	12	25	0	0	4	0	0	0	0	16.1	18.1	10.0
December	31	31	31	27	31	0	0	0	0	0	0	0	12.3	19.0	9.1

2009	# 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	30	31	27	31	0	0	1	0	0	0	0	15.7	25.0	13.9
February	28	28	28	27	28	0	0	0	0	0	0	0	10.5	20.3	12.4
March	31	31	31	29	31	0	0	0	0	0	0	0	7.8	23.6	10.9
April	30	30	30	14	27	0	0	0	0	0	0	0	17.2	20.1	11.4

KLnewLYLETRP

2008	# 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	16	0	0	0	0	0	0	0	0	0	0	0	11.9	2.5	1.5
June	30	0	0	0	0	0	0	21	3	0	0	0	17.4	3.2	2.4
July	31	0	0	0	0	0	0	31	31	0	0	0	17.6	2.3	1.5
August	31	0	0	0	0	0	0	31	25	6	0	0	18.1	1.3	0.9
September	30	0	0	0	0	0	0	30	0	0	0	0	15.6	1.2	0.8
October	31	0	0	0	0	0	0	6	0	0	0	0	12.8	1.4	0.7
November	30	0	0	0	0	0	0	0	0	0	0	0	9.9	2.3	0.6
December	31	0	18	0	18	0	0	0	0	0	0	0	7.3	1.4	0.4

2009	# 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	1	31	0	28	0	0	0	0	0	0	0	5.7	2.2	0.8
February	28	0	19	0	14	0	0	0	0	0	0	0	6.3	1.9	0.9
March	31	0	9	0	5	0	0	0	0	0	0	0	8.5	2.6	1.7
April	30	0	0	0	0	0	0	0	0	0	0	0	12.6	3.9	2.5

KYKFPHQAIR

2008	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
August	18	0	1	0	0	12	12	18	18	18	18	18	54.3	34.9	16.9
September	30	1	9	0	0	22	21	30	30	30	30	26	33.3	27.8	20.2
October	31	16	22	0	1	1	1	31	29	27	22	2	27.4	23.3	16.7
November	30	15	23	3	14	0	0	15	0	0	0	0	20.1	15.8	10.1
December	31	28	30	14	27	0	0	2	0	0	0	0	15.3	13.4	9.0

2009	# 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	27	30	16	26	0	0	0	0	0	0	0	13.6	18.5	7.6
February	28	22	28	3	23	0	0	0	0	0	0	0	14.2	17.0	10.1
March	31	15	30	1	9	0	0	16	0	0	0	0	20.4	19.6	12.6
April	30	13	23	0	0	5	4	30	27	17	15	5	30.1	26.9	17.1

LKLIKLODGE

2008	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	31	0	7	0	0	0	0	0	0	0	0	0	12.6	6.8	4.3
June	30	0	0	0	0	0	0	21	4	2	1	0	19.4	7.9	5.9
July	31	0	0	0	0	0	0	31	31	31	30	0	20.1	8.7	7.0
August	31	0	0	0	0	0	0	31	28	21	19	0	22.5	8.6	6.3
September	30	0	0	0	0	0	0	30	6	0	0	0	17.2	8.1	6.4
October	31	0	17	0	5	0	0	4	0	0	0	0	13.9	5.5	3.5
November	30	0	17	0	12	0	0	0	0	0	0	0	10.0	4.6	2.0
December	31	21	30	17	29	0	0	0	0	0	0	0	6.5	3.0	0.9

2009	# 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	11	31	6	31	0	0	0	0	0	0	0	4.8	2.3	1.1
February	28	10	28	1	28	0	0	0	0	0	0	0	3.6	3.6	2.0
March	31	5	31	0	30	0	0	0	0	0	0	0	6.8	4.2	2.5
April	30	0	23	0	4	0	0	0	0	0	0	0	11.0	6.4	4.3

LKLIKMOUTH

2008	# 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	15.4	4.3	2.8
June	30	0	0	0	0	0	0	30	17	6	6	0	22.4	5.0	3.5
July	31	0	0	0	0	0	0	31	31	31	31	0	22.5	5.4	4.0
August	31	0	0	0	0	0	0	31	31	25	22	0	22.2	4.9	3.4
September	30	0	0	0	0	0	0	30	5	0	0	0	17.2	3.6	2.7
October	31	0	0	0	0	0	0	6	0	0	0	0	14.0	2.8	1.7
November	30	0	6	0	6	0	0	0	0	0	0	0	11.6	2.9	1.3
December	31	16	28	14	27	0	0	0	0	0	0	0	7.6	3.1	0.7

2009	# 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	25	2	23	0	21	0	0	0	0	0	0	0	6.2	3.3	1.1
February	8	0	7	0	6	0	0	0	0	0	0	0	5.8	2.6	1.7
March	31	0	11	0	8	0	0	0	0	0	0	0	9.0	3.0	1.8
April	30	0	0	0	0	0	0	0	0	0	0	0	13.1	4.3	2.8

LKLIKOLSEN

2008	# 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	15.6	6.3	4.2
June	30	0	0	0	0	3	2	30	18	14	9	3	25.0	6.8	4.7
July	31	0	0	0	0	22	15	31	31	31	31	30	25.7	9.7	7.1
August	31	0	0	0	0	10	6	31	31	31	31	19	26.4	10.4	6.8
September	30	0	0	0	0	0	0	30	20	19	18	0	20.7	12.6	7.8
October	31	0	2	0	0	0	0	8	0	0	0	0	15.9	5.4	3.4
November	30	0	7	0	6	0	0	0	0	0	0	0	12.0	3.4	1.9
December	31	16	28	14	27	0	0	0	0	0	0	0	8.0	2.8	1.0

2009	# 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	9	31	5	29	0	0	0	0	0	0	0	5.9	3.2	1.3
February	28	0	28	0	25	0	0	0	0	0	0	0	6.2	3.0	1.8
March	31	0	25	0	11	0	0	0	0	0	0	0	8.7	3.8	2.6
April	30	0	6	0	0	0	0	0	0	0	0	0	12.7	5.4	3.9

LOGGCAMPCR

2008	# 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	14.6	3.3	1.9
June	30	0	0	0	0	0	0	24	4	2	1	0	19.7	3.2	1.9
July	31	0	0	0	0	8	7	31	31	24	24	10	26.3	11.9	4.9
August	31	0	0	0	0	1	0	31	31	21	17	0	23.2	5.8	2.4
September	30	0	0	0	0	0	0	30	18	0	0	0	18.1	5.3	2.6
October	31	0	0	0	0	0	0	8	0	0	0	0	14.8	2.4	0.5
November	30	0	0	0	0	0	0	0	0	0	0	0	11.3	1.8	0.5
December	31	4	16	1	15	0	0	0	0	0	0	0	8.2	1.8	0.6

2009	# 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	1	24	0	21	0	0	0	0	0	0	0	6.7	2.2	0.9
February	28	0	27	0	22	0	0	0	0	0	0	0	5.6	1.8	0.9
March	31	0	12	0	6	0	0	0	0	0	0	0	8.2	2.8	1.6
April	30	0	1	0	0	0	0	0	0	0	0	0	11.9	3.5	2.3

MCCREEDRDX

2008	# 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	25	0	0	0	0	0	0	0	7.0	3.8	1.7
June	30	0	14	0	1	0	0	0	0	0	0	0	11.2	4.7	3.2
July	31	0	0	0	0	0	0	0	0	0	0	0	11.3	3.6	2.5
August	31	0	0	0	0	0	0	0	0	0	0	0	10.9	3.0	1.8
September	30	0	0	0	0	0	0	0	0	0	0	0	8.6	2.4	1.7
October	31	0	14	0	5	0	0	0	0	0	0	0	8.0	1.9	1.2
November	30	0	22	0	16	0	0	0	0	0	0	0	6.5	2.6	0.9
December	31	4	30	1	29	0	0	0	0	0	0	0	5.2	1.5	0.8

2009	# 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	1	31	0	31	0	0	0	0	0	0	0	3.6	1.9	0.9
February	28	0	28	0	28	0	0	0	0	0	0	0	3.9	1.6	0.9
March	31	0	31	0	31	0	0	0	0	0	0	0	4.4	1.6	0.9
April	30	0	30	0	30	0	0	0	0	0	0	0	5.3	2.5	1.4

nLyleTrpAIR

2008	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
August	18	0	0	0	0	12	11	18	18	18	18	18	39.4	20.4	11.6
September	30	0	0	0	0	20	19	30	30	30	30	24	31.2	19.2	13.8
October	31	0	13	0	0	1	1	31	14	4	4	1	24.3	14.9	10.0
November	30	3	17	0	6	0	0	5	0	0	0	0	19.2	11.5	5.8
December	31	20	28	15	27	0	0	0	0	0	0	0	13.4	10.0	5.2

2009	# 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	22	29	10	24	0	0	0	0	0	0	0	14.4	12.1	4.6
February	28	16	28	1	24	0	0	0	0	0	0	0	10.4	10.6	5.8
March	31	7	26	0	9	0	0	1	0	0	0	0	14.9	13.4	7.4
April	30	2	13	0	0	3	3	29	15	9	7	0	27.6	19.6	11.1

OUTLETRDXG

2008	# 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	10	5	0	0	19.4	6.4	4.2
June	30	0	0	0	0	2	1	30	23	18	16	0	24.8	8.2	4.6
July	31	0	0	0	0	7	3	31	31	31	31	21	25.1	6.1	3.5
August	31	0	0	0	0	2	2	31	31	31	31	4	24.3	4.5	2.6
September	30	0	0	0	0	0	0	30	16	6	3	0	18.7	4.1	2.2
October	31	0	0	0	0	0	0	5	0	0	0	0	13.2	2.1	1.1
November	30	0	13	0	12	0	0	0	0	0	0	0	8.3	2.3	0.8
December	31	19	30	18	28	0	0	0	0	0	0	0	5.9	1.9	0.5

2009	# 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	18	31	13	31	0	0	0	0	0	0	0	3.1	1.7	0.6
February	28	1	28	0	28	0	0	0	0	0	0	0	5.4	3.0	1.7
March	31	0	17	0	11	0	0	0	0	0	0	0	9.9	4.4	2.7
April	30	0	4	0	0	0	0	19	0	0	0	0	18.7	5.6	3.8

PISCOMOUTH

2008	# 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	18	0	12	0	0	0	0	0	0	0	10.7	5.3	3.2
June	30	0	0	0	0	0	0	5	0	0	0	0	14.8	4.7	3.5
July	31	0	0	0	0	0	0	31	0	0	0	0	15.0	4.4	3.5
August	31	0	0	0	0	0	0	22	0	0	0	0	15.1	4.1	2.9
September	30	0	0	0	0	0	0	0	0	0	0	0	10.9	3.4	2.5
October	31	0	20	0	14	0	0	0	0	0	0	0	9.3	2.3	1.5
November	30	1	25	1	21	0	0	0	0	0	0	0	7.2	2.9	1.1
December	31	17	31	11	31	0	0	0	0	0	0	0	3.8	1.8	0.5

2009	# 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	20	31	16	31	0	0	0	0	0	0	0	2.3	1.1	0.5
February	28	10	28	3	28	0	0	0	0	0	0	0	2.3	1.4	0.6
March	31	9	31	6	31	0	0	0	0	0	0	0	3.0	1.7	0.9
April	30	1	30	0	30	0	0	0	0	0	0	0	5.7	3.6	2.2

SNYDERMILL

2008	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
July	10	0	0	0	0	0	0	10	10	0	0	0	18.1	1.6	0.8
August	31	0	0	0	0	0	0	31	24	1	0	0	18.2	1.4	0.7
September	30	0	0	0	0	0	0	30	0	0	0	0	14.8	1.8	0.9
October	31	0	0	0	0	0	0	7	0	0	0	0	13.5	1.5	0.9
November	30	0	4	0	1	0	0	0	0	0	0	0	11.0	2.5	0.9
December	31	11	27	10	26	0	0	0	0	0	0	0	7.2	2.9	0.8

2009	# 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	30	0	29	0	0	0	0	0	0	0	5.1	2.4	0.7
February	28	0	28	0	28	0	0	0	0	0	0	0	4.1	1.1	0.7
March	31	0	18	0	15	0	0	0	0	0	0	0	6.5	1.5	0.9
April	30	0	0	0	0	0	0	0	0	0	0	0	9.9	2.2	1.1

SNYDRMOUTH

2008	# 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	24	9	0	0	0	19.0	6.2	3.9
June	30	0	0	0	0	4	4	30	23	18	17	5	27.1	8.0	5.3
July	31	0	0	0	0	28	21	31	31	31	31	31	28.8	18.5	8.5
August	31	0	0	0	0	24	23	31	31	31	31	31	32.9	17.4	12.4
September	30	0	1	0	0	13	6	30	30	30	30	15	25.7	15.6	12.0
October	31	3	16	0	0	0	0	21	5	4	4	0	22.6	12.5	9.0
November	30	0	2	0	1	0	0	0	0	0	0	0	12.8	6.0	1.9
December	31	12	26	11	24	0	0	0	0	0	0	0	8.4	2.5	0.9

2009	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
January	31	2	30	2	29	0	0	0	0	0	0	0	5.3	2.1	0.9
February	28	0	28	0	28	0	0	0	0	0	0	0	5.0	2.3	1.3
March	31	0	21	0	14	0	0	0	0	0	0	0	7.5	3.2	1.6
April	30	0	2	0	0	0	0	0	0	0	0	0	13.1	4.4	2.7

SUMITMOUTH

2008	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
December	29	17	29	15	28	0	0	0	0	0	0	0	4.6	2.9	0.6

2009	# 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	11	31	0	0	0	0	0	0	0	4.4	3.0	0.8
February	28	6	28	0	28	0	0	0	0	0	0	0	4.2	2.1	1.2
March	31	2	31	0	25	0	0	0	0	0	0	0	6.2	3.2	1.7
April	30	0	17	0	3	0	0	0	0	0	0	0	10.3	5.0	3.0

SWALEMOUTH

2008	# 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	11	0	0	0	0	0	0	11	5	0	0	0	17.2	5.0	2.8
June	30	0	0	0	0	0	0	30	20	4	3	0	19.0	4.4	3.0
July	31	0	0	0	0	0	0	31	31	31	31	0	19.6	3.0	2.2
August	31	0	0	0	0	0	0	31	31	29	24	0	18.8	1.9	1.3
September	30	0	0	0	0	0	0	30	11	0	0	0	17.0	1.6	1.0
October	31	0	0	0	0	0	0	9	0	0	0	0	14.0	1.2	0.9
November	30	0	0	0	0	0	0	0	0	0	0	0	11.1	1.9	0.9
December	31	4	25	1	18	0	0	0	0	0	0	0	7.8	1.9	0.8

2009	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
January	31	2	27	1	26	0	0	0	0	0	0	0	7.6	2.9	1.2
February	28	0	27	0	23	0	0	0	0	0	0	0	6.5	2.8	1.4
March	31	0	11	0	7	0	0	0	0	0	0	0	9.9	3.6	2.3
April	30	0	0	0	0	0	0	14	0	0	0	0	15.8	5.8	3.8

TEPEEIXLRDX

2008	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	31	0	7	0	0	0	0	0	0	0	0	0	13.2	5.7	3.4
June	30	0	0	0	0	0	0	17	1	0	0	0	16.8	6.7	5.1
July	31	0	0	0	0	0	0	31	8	0	0	0	17.4	7.3	5.7
August	31	0	0	0	0	0	0	29	4	0	0	0	17.3	6.5	4.3
September	30	0	0	0	0	0	0	0	0	0	0	0	12.2	4.3	3.2
October	31	0	18	0	10	0	0	0	0	0	0	0	10.4	3.0	2.1
November	30	2	22	0	19	0	0	0	0	0	0	0	8.9	4.9	1.6
December	30	15	30	13	30	0	0	0	0	0	0	0	4.4	2.1	0.6

2009	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
January	31	31	31	31	31	0	0	0	0	0	0	0	0.4	0.2	0.1
February	28	20	28	7	28	0	0	0	0	0	0	0	1.7	1.2	0.7
March	31	10	31	7	31	0	0	0	0	0	0	0	3.8	2.5	1.4
April	30	0	29	0	19	0	0	0	0	0	0	0	9.2	5.2	2.8

TRAPPERRDX

2008	# 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	12	0	9	0	2	0	0	0	0	0	0	0	7.0	3.0	1.9
June	30	0	9	0	0	0	0	0	0	0	0	0	9.0	3.0	2.2
July	31	0	0	0	0	0	0	0	0	0	0	0	9.0	2.6	1.9
August	31	0	0	0	0	0	0	0	0	0	0	0	8.6	2.4	1.5
September	30	0	2	0	0	0	0	0	0	0	0	0	7.3	1.9	1.5
October	31	0	18	0	12	0	0	0	0	0	0	0	6.9	1.8	1.1
November	30	0	23	0	15	0	0	0	0	0	0	0	6.5	2.3	0.9
December	31	1	30	0	29	0	0	0	0	0	0	0	5.2	1.4	0.7

2009	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
January	31	0	31	0	31	0	0	0	0	0	0	0	4.2	1.8	0.8
February	28	0	28	0	28	0	0	0	0	0	0	0	4.0	1.6	0.9
March	31	0	31	0	31	0	0	0	0	0	0	0	5.0	1.8	1.1
April	30	0	30	0	26	0	0	0	0	0	0	0	6.5	2.9	1.9

TROUTRVRTRDX

2008	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	19	0	2	0	0	0	0	0	0	0	0	0	11.2	3.4	2.2

WESTFORKRX

2008	# 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	13	0	13	0	9	0	0	0	0	0	0	0	6.6	3.1	1.7
June	30	0	11	0	0	0	0	1	0	0	0	0	12.9	3.7	2.6
July	31	0	0	0	0	0	0	3	0	0	0	0	12.7	3.9	2.8
August	31	0	0	0	0	0	0	0	0	0	0	0	10.6	3.6	2.5
September	30	0	1	0	0	0	0	0	0	0	0	0	8.8	3.0	2.4
October	31	0	19	0	14	0	0	0	0	0	0	0	7.9	2.5	1.6
November	30	0	24	0	17	0	0	0	0	0	0	0	6.7	2.2	1.0
December	31	9	31	7	30	0	0	0	0	0	0	0	5.0	1.5	0.8

2009	# 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	5	31	1	31	0	0	0	0	0	0	0	3.2	2.1	0.9
February	28	1	28	0	28	0	0	0	0	0	0	0	3.7	2.3	1.1
March	31	2	31	0	31	0	0	0	0	0	0	0	4.7	2.6	1.5
April	30	0	30	0	29	0	0	0	0	0	0	0	6.4	3.5	2.2

WHITEIXLRDX

2008	# 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	12	0	4	0	0	0	0	0	0	0	11.2	4.2	2.7
June	48	0	0	0	0	0	0	16	0	0	0	0	16.3	6.2	4.7
July	62	0	0	0	0	0	0	62	14	0	0	0	16.7	7.8	6.1
August	62	0	0	0	0	0	0	62	28	12	8	0	20.7	8.9	6.6
September	60	2	20	0	0	0	0	52	20	0	0	0	18.2	13.5	9.5
October	62	18	46	0	32	0	0	6	0	0	0	0	15.0	9.3	5.2
November	60	14	46	10	38	0	0	0	0	0	0	0	9.1	4.2	1.8
December	40	34	40	32	40	0	0	0	0	0	0	0	4.1	3.3	0.9

2009	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
January	31	31	31	31	31	0	0	0	0	0	0	0	0.3	0.7	0.1
February	28	28	28	28	28	0	0	0	0	0	0	0	0.1	0.6	0.2
March	31	19	31	14	31	0	0	0	0	0	0	0	2.6	1.2	0.6
April	30	0	30	0	24	0	0	0	0	0	0	0	6.8	3.4	2.1

WHITEMOUTH

2008	# 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	17	0	0	0	0	15.1	5.3	3.2
June	30	0	0	0	0	0	0	28	6	4	4	0	20.6	5.2	3.7
July	31	0	0	0	0	0	0	31	31	31	31	0	21.4	6.2	4.9
August	31	0	0	0	0	0	0	31	31	31	28	0	22.1	6.7	5.1
September	30	0	0	0	0	0	0	30	17	5	0	0	18.3	6.2	5.0
October	31	0	0	0	0	0	0	6	0	0	0	0	13.6	3.6	2.6
November	30	0	10	0	6	0	0	0	0	0	0	0	9.1	2.1	1.2
December	31	11	29	5	28	0	0	0	0	0	0	0	5.9	2.1	1.0

2009	# 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	12	31	6	31	0	0	0	0	0	0	0	2.9	1.4	0.7
February	28	3	28	0	28	0	0	0	0	0	0	0	3.7	2.2	1.3
March	31	2	31	0	31	0	0	0	0	0	0	0	5.3	2.7	1.5
April	30	0	12	0	3	0	0	0	0	0	0	0	10.5	4.1	2.6

WHITEUPPER

2008	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
June	18	0	0	0	0	0	0	4	0	0	0	0	14.1	4.3	3.5
July	31	0	0	0	0	0	0	25	0	0	0	0	14.3	4.2	3.0
August	31	0	0	0	0	0	0	12	0	0	0	0	14.6	3.5	2.2
September	30	0	0	0	0	0	0	0	0	0	0	0	10.7	2.4	1.9
October	31	0	19	0	15	0	0	0	0	0	0	0	9.3	2.2	1.3
November	30	3	24	1	21	0	0	0	0	0	0	0	7.0	2.6	0.9
December	31	23	31	22	31	0	0	0	0	0	0	0	4.2	3.8	0.4

2009	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
January	31	29	31	28	31	0	0	0	0	0	0	0	0.9	0.4	0.1
February	28	23	28	16	28	0	0	0	0	0	0	0	0.9	0.6	0.3
March	31	16	31	13	31	0	0	0	0	0	0	0	1.5	0.7	0.3
April	30	0	30	0	30	0	0	0	0	0	0	0	4.7	2.6	1.3

Appendix F. References

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