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YAKIMA/KLICKITAT FISHERIES PROJECT - KLICKITAT MONITORING AND EVALUATION

2007 Annual Report

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The Yakama Nation

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YAKIMA/KLICKITAT FISHERIES PROJECT - KLICKITAT MONITORING AND EVALUATION

2007 Annual Report

Introduction

This report describes the results of monitoring and evaluation (M&E) activities for salmonid fish populations and habitat in the Klickitat River subbasin in south-central Washington. The M&E activities described here were conducted as a part of the Bonneville Power Administration (BPA)-funded Yakima/Klickitat Fisheries Project (YKFP) and were designed by consensus of the scientists with the Yakama Nation (YN) Fisheries Program. 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, Isadore Honanie, Roger Stahi, Bennie Martinez, and Jason Allen) 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: Fish population surveys were conducted (in conjunction with TFW Habitat surveys) at 5 sites in 2007. Multiple pass removal electrofishing was conducted at 3 sites (Tepee Cr., White Cr., and Huckleberry Cr.). Single pass snorkel surveys were conducted at 2 sites (Diamond Fork Cr. and upper Klickitat River) due to stream width and discharge. All surveys were conducted in 300-ft.-long reaches between reference points established for the TFW Habitat surveys (see Methods section in Task 1.h).

Results: Results from the population surveys at the five sites, along with site locations, are presented in Appendix A (Table A1).

Task 1.b Mobile juvenile monitoring sites

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

Methods: Floating rotary screw traps located just above Lyle Falls (RM 2.8) and at the Klickitat Hatchery (RM 43) were operated on a year-round basis. A rotary trap located above Castile Falls (RM 64.6) was fished seasonally as access and flows allowed.

Trap efficiency studies 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 2007.

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

Results: All three rotary screw-traps were fished during this reporting period. The five-foot trap located above Castile Falls was fished from late June through mid October. Relatively high flows and snowpack delayed the start time for this trap slightly in 2007. The five-foot trap located at the Klickitat Hatchery was fished throughout most of the year. The eight-foot Lyle Falls trap was fished throughout much of the year, except during periods of very high flows and debris loads, and during large releases of hatchery fish. High flows in December through February limited fishing times for the lower two traps during those months. 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. It is possible that other methods employed in conjunction with the screw traps (e.g. hydroacoustic or sonar monitoring) may improve monitoring abilities and estimates.

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 1694 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 3ate September; 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 21 and September 27, 2007, 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. A total of 36 redds, along with 12 live spring Chinook adults and 8 carcasses, were observed above Castile Falls in 2007. This was a substantial increase over the highest redd count previously observed above Castile Falls (six redds in 2006 – see Figure D2 in Appendix D). The remaining 68 redds were located in the 28 river miles between Summit Creek and Castile Falls. Half of the redds (52) were located in the 10.3 river miles between Big Muddy Creek and Castile Falls. The total redd count of 104 is an increase over the low redd counts of 2005 and 2006 (50 and 82 respectively, which were among the lowest on record since 1989). A total of 18 spring Chinook carcasses were counted; one was floy-tagged. Of the carcasses for which adipose fin presence/absence could be determined, 6 out of 16 were adipose-clipped; the rest were hatchery fish (Klickitat Hatchery spring Chinook are 100% adipose fin clipped). See Table D1 in Appendix D for detailed results of 2007 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 1989-2007.

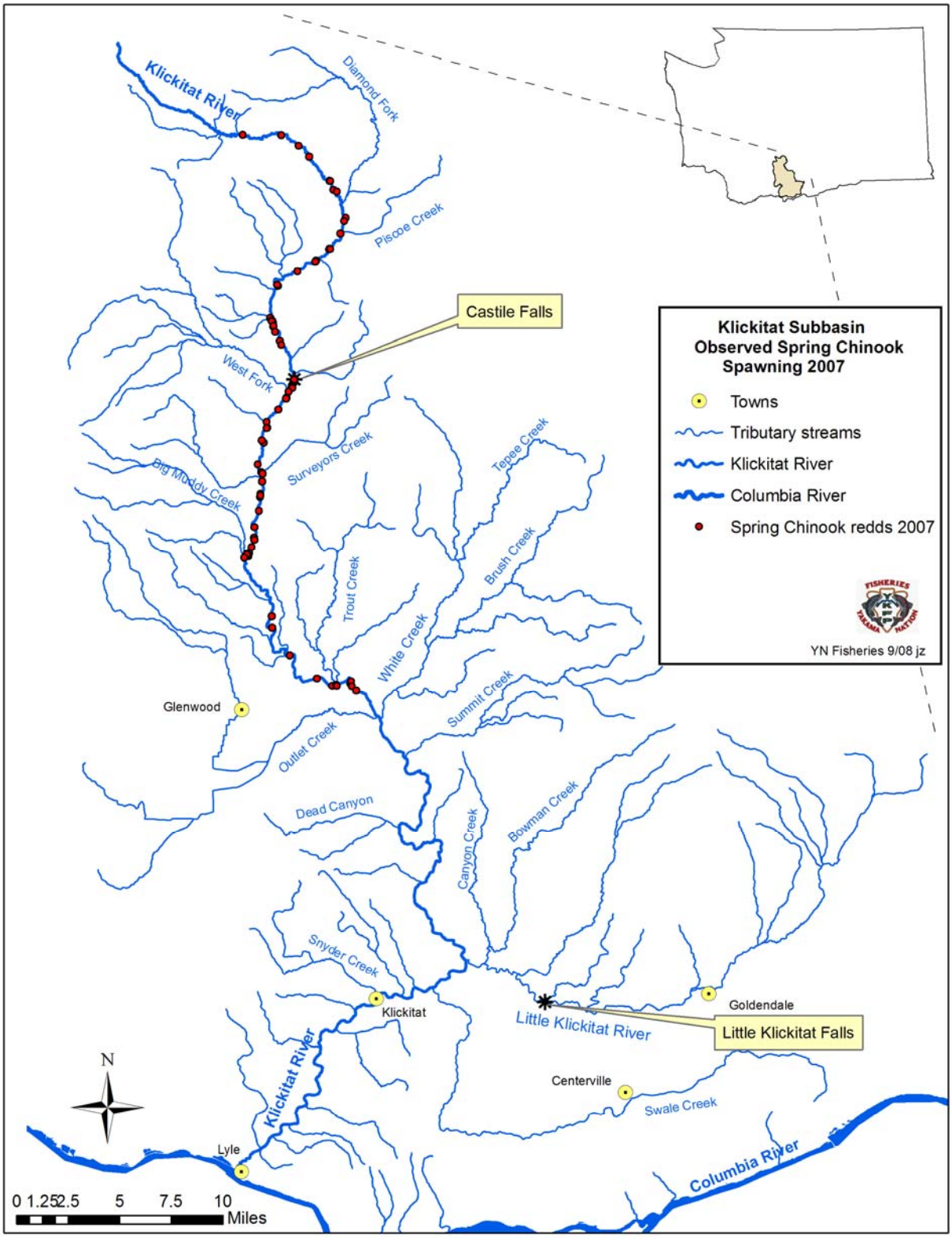

Figure 1. Observed spring Chinook spawning distribution in the Klickitat subbasin in 2007.

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 29 and December 19. High flows and turbidity for about 2 weeks in early December limited survey ability and probably biased redd counts slightly low for 2007. The final redd count was 253, significantly lower than average redd counts of recent years, and reflective of low fall Chinook returns throughout much of the Columbia basin in 2007. The highest redd densities were found in the 5.5 miles from Klickitat Hatchery downstream to Summit Creek. This segment contained 112 redds (44% of the total redd count) with a density of about 20 redds per mile. This segment also contained the largest number of observed live fall Chinook adults. Fall Chinook were found spawning from just above the Klickitat Hatchery downstream to the lower river below Lyle Falls. Average redd densities observed in 2007 were 5.2 redds per mile (lower than average compared to previous years). A total of 62 fall Chinook carcasses were counted (also a much lower count than average); one was floy-tagged. Of the carcasses for which adipose fin presence/absence could be determined, 1 out of 41 was adipose-clipped; the rest were either wild or unmarked hatchery fish. See Table D3 in Appendix D for detailed results of 2007 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 in conjunction with fall Chinook spawner surveys on October 29, 2007 and continued until January 22, 2008. High flows and turbidity for about 2 weeks in early December limited survey ability and may have biased redd counts slightly low, however more redds and live fish were observed above Lyle Falls (RM 2.4) in 2007 than in the previous few years. Most of the redds above Lyle Falls (19) were observed in the reach below the Klickitat Hatchery. Seven redds were also observed in Snyder Creek. As in previous years, large numbers of redds and live fish were observed in the Klickitat River below Lyle Falls and in the lower ¼ mile of Canyon Creek below Lyle Falls. No floy-tagged fish were observed. Of the carcasses for which adipose fin presence/absence could be determined, 61 out of 87 were adipose-clipped; the rest were either wild or unmarked hatchery fish. See Table D4 in Appendix D for detailed results of 2007-8 coho spawner surveys.

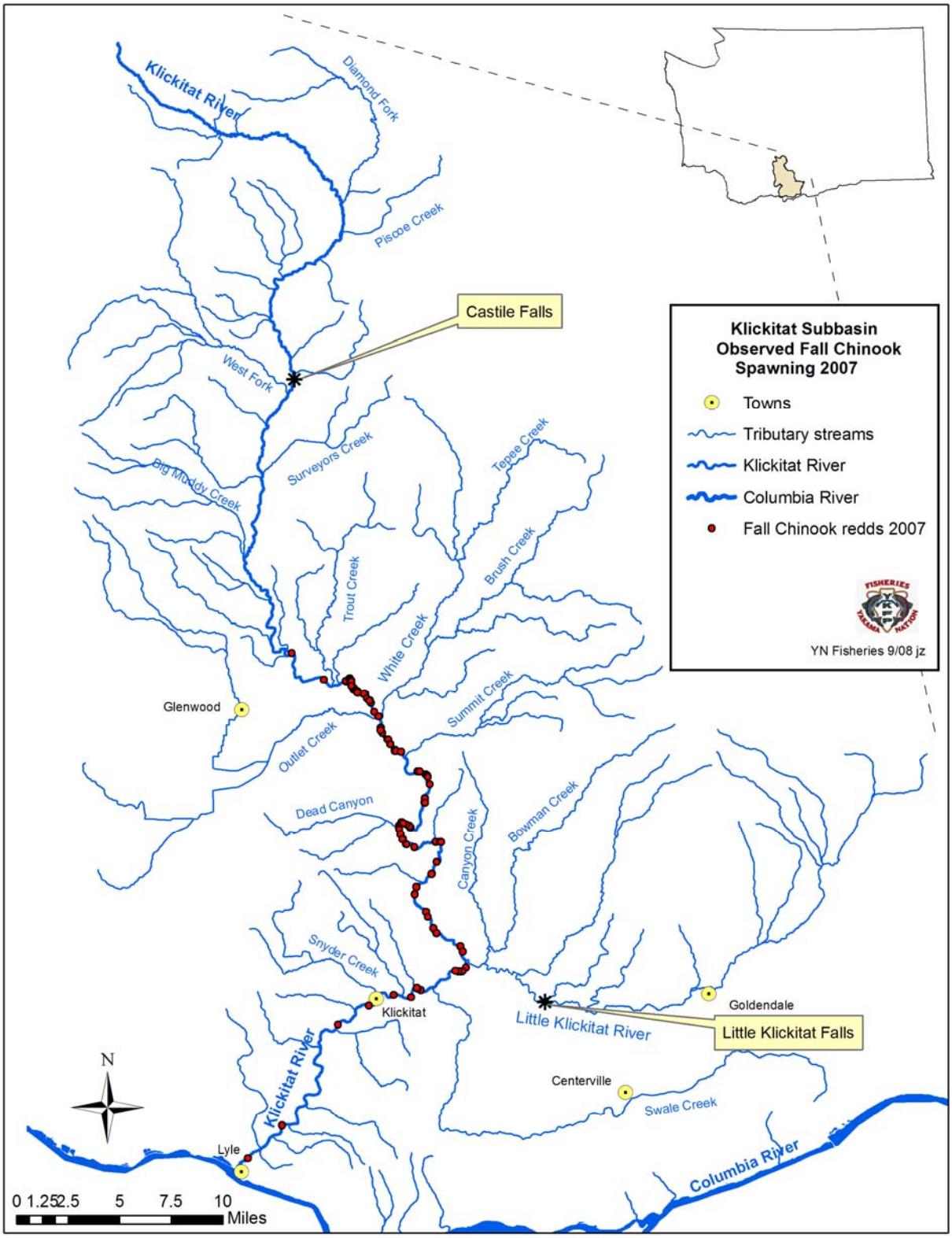

Figure 2. Observed fall Chinook spawning distribution in the Klickitat subbasin in 2007.

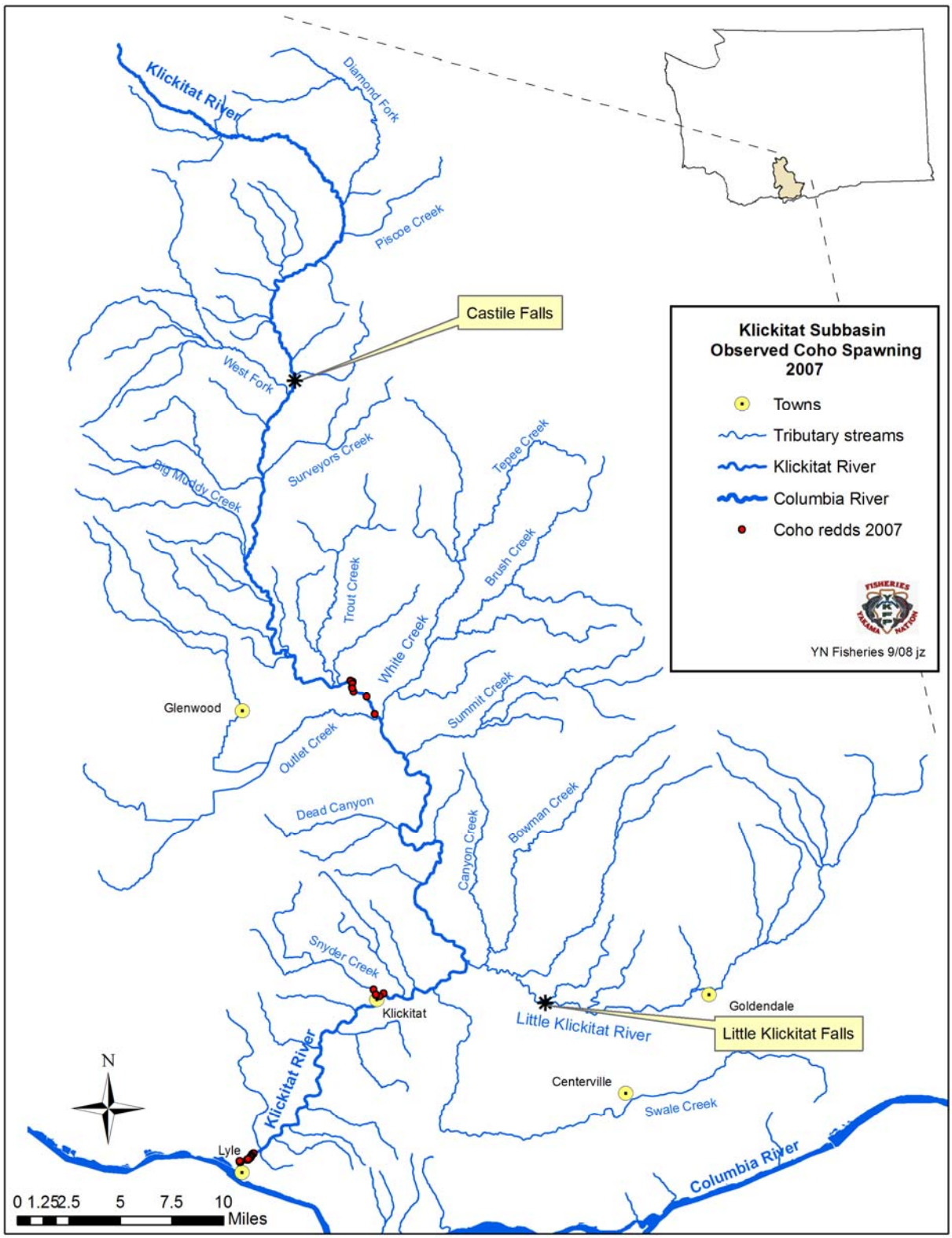

Figure 3. Observed coho spawning distribution in the Klickitat subbasin in 2007.

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 2007 and a progress report for spring 2008. Surveys in 2007 began in mid February and ended in mid June.

In most years, high spring flows and turbidity limit the effectiveness of the mainstem Klickitat steelhead redd surveys, leading to an unavoidable bias toward undercounting of redds in the mainstem. In 2007, high flows in the mainstem above Castile Falls and in the White Creek watershed lasted through May, which limited survey ability in these areas and probably biased the total redd count quite low.

The total redd count was 67, and included 27 in the mainstem Klickitat and 40 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, surveys in the upper Klickitat were limited to late in the spawning season due to the flow conditions described above. The White Creek watershed (including Tepee and Brush creeks) had 23 redds (34% of the total observed redds). Summit Creek, Dead Canyon Creek, Little Klickitat River, Bowman Creek, Swale Creek, Snyder Creek, and Wheeler Creek each had observed redds as well. See Table D5 in Appendix D for detailed results of 2007 steelhead spawner surveys.

The 2007 spawner surveys on the upper Little Klickitat River discovered a probable steelhead redd at about RM 25, in an area above a 12- to 14-foot falls (at RM 6) in which steelhead passage frequency is uncertain and the last documented observation of adult steelhead and redds was by YN Fisheries staff in 1996 and 1997 following high flow events. Subsequent genetic testing on fry observed near the redd indicated a high probability that at least one anadromous steelhead spawned at this site. A more complete description is given in the 2006-7 Klickitat M&E annual report (Zendt and Babcock 2007).

Steelhead spawner surveys for 2008 also began during this reporting period. High flows and turbidity also impacted survey ability in 2008, biasing redd counts low. Final results will be presented in the 2008 annual report.

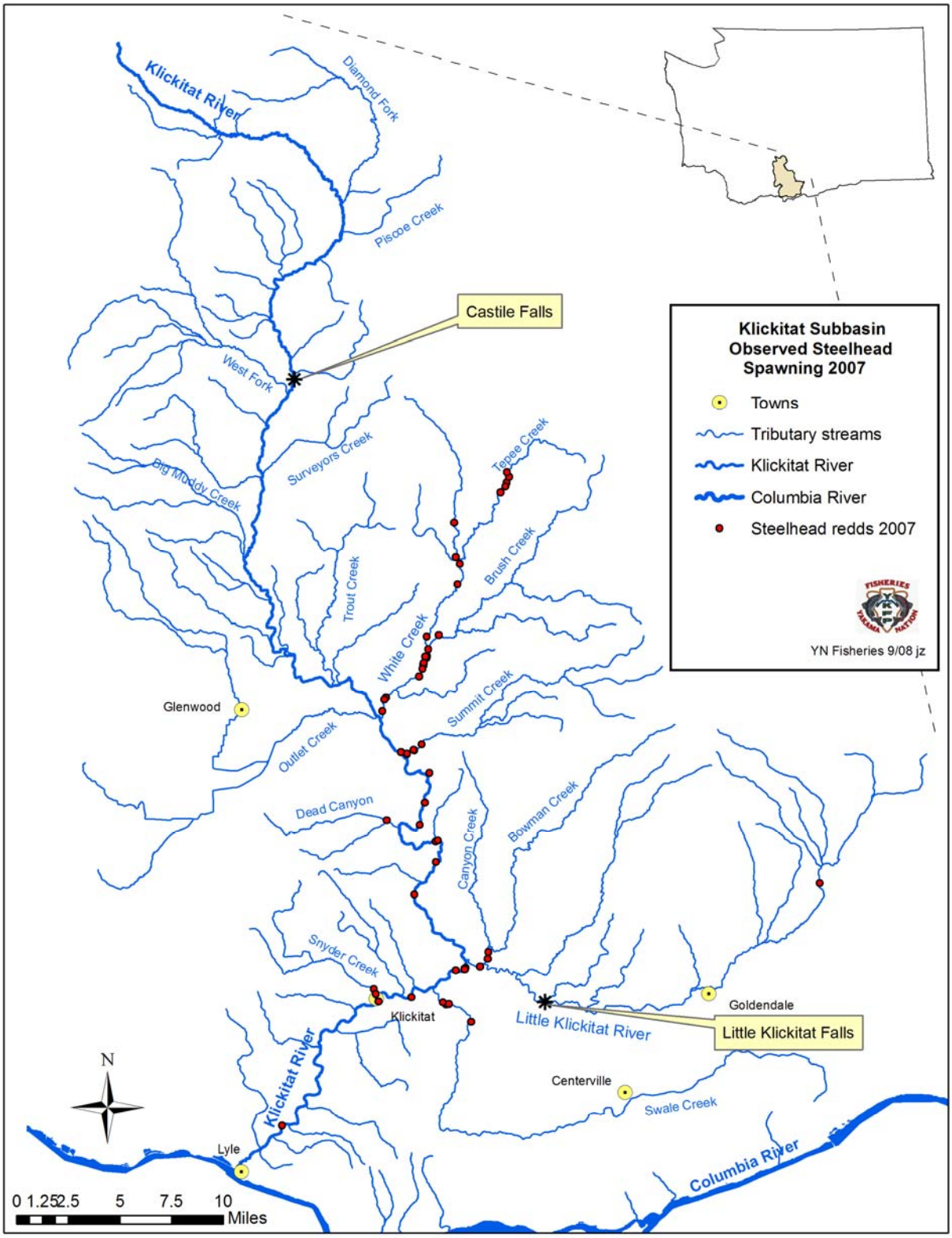

Figure 4. Observed steelhead spawning distribution in the Klickitat subbasin in 2007.

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 forwarded to state and tribal fisheries managers for run reconstruction and forecasting.

Results: Scale samples were obtained from a total of 81 adult spring Chinook, fall Chinook, and coho salmon carcasses during 2007-2008 spawner surveys. A total of 267 adult spring Chinook, fall Chinook, and coho salmon were sampled for scales in the Lyle adult trap in 2007-2008. 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, and results for this stock are presented in Appendix E separately for adipose-clipped fish and adipose-present fish.

Scale samples were obtained from a total of 10 spring Chinook carcasses during 2007 spawner surveys; 3 of these were adipose-clipped. Of scale-sampled fish at Lyle adult trap, 131 out of 169 were adipose-clipped. Five-year-old fish comprised a larger percentage of the total than normal in 2007 (70% of the fish sampled on spawner surveys and 52% of the adult trap fish); in most years 4-year-olds dominate the adult spring Chinook return.

During 2007 spawner surveys fewer fall Chinook carcasses were observed than in most years; 36 carcasses were sampled for scales. Thirty-six fall Chinook were also sampled at the Lyle adult trap in 2007. For spawner survey samples, 61.1% were 4-year-olds and 27.7% were 5-year-olds. At the adult trap, age composition was 55.6% and 15.7% for 4- and 5-year-olds, respectively.

For coho, 35 fish were sampled on spawner surveys and 62 fish were sampled at Lyle adult trap. Nearly all were 3-year-olds (100% of spawner survey fish and 98.3% of adult trap 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: Twelve sites throughout the basin (8 in the mainstem Klickitat, 3 in Diamond Fork Creek, and 1 in White Creek) were sampled in 2007. 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. A total of 144 samples were collected and sieved. Each sample was analyzed to estimate the percentage of fine particles present and determine the particle size distribution. Samples were collected and analyzed using TFW Salmonid Spawning Gravel Composition Survey methodology (Schuett-Hames et al. 1999a). Information gathered was incorporated into the EDT model and used to characterize sediment levels throughout the basin.

Results: Detailed results from sediment monitoring at 9 of the sites sampled in 2007, 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 2007. Changes in channel morphology at several sites led to sampling of different riffles than what had been sampled in previous years; data is not presented for these sites until further assessment can be made regarding validity of lumping sites 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 Diamond Fork near mouth. Fines percentages at most other sites range higher, up to 25-30%. At one site (Klickitat below White Cr.), there is a suggestion of an increasing trend in fines from 1999 to 2007 (from 18 to 25%).

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 35 locations on 23 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: A total of 6 sites on 5 streams were surveyed in 2007: Tepee Creek, Diamond Fork Creek, Huckleberry Creek, upper Klickitat River, and White Creek (2 sites). For the upper Klickitat River, the 2007 visit was the third survey conducted since these surveys began. For all the other sites visited in 2007, it was the second survey conducted. 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 2007 and released from the hatchery into the Klickitat River in March 2008. Approximately 4900 fish were tagged; 4644 fish were released. Higher-than-normal mortality occurred post-tagging due to problems with the tagging trailer outlet pipes. Two PIT tag antennas were placed at the outlet of the hatchery pond from which the fish were released. This provided a better detection rate of tagged fish at release than the single antenna used in the previous year; however, a more reliable estimate 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.

Results: From the March 2008 release, 174 fish were detected in March-May 2008 at

Bonneville juvenile detection sites (moving downstream), and 3 fish were detected in July 2008 at Bonneville adult ladders (moving upstream).

From the March 2007 release (4917 fish released; tagging described in Zendt and Babcock 2007), a total of 3 jacks (3-year-old fish) were detected at Bonneville moving upstream in June 2008. Additional returns of this cohort in subsequent years will yield smolt-to-adult return rates for Klickitat Hatchery spring Chinook.

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 (see Task 1.a. Juvenile and Resident Salmonid Population Surveys and Task 3.a. Genetic Data Collection), and an existing baseline of pathogen samples having been collected in recent years, no pathogen samples were collected during this reporting period. Previously collected samples have been compiled into existing datasets covering 2002-2005. Additional pathogen samples will likely be collected in future reporting periods concurrent with changes in hatchery practices at the Klickitat Hatchery.

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 all Chinook and steelhead were collected. During the May 1, 2007 - April 30, 2008 reporting period, a total of 771 genetic samples (505 from steelhead, 266 from Chinook) were collected. These samples will be analyzed by CRITFC geneticists and information added to existing databases and incorporated into a 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 2007. These samples were also sent to CRITFC for analysis.

Results: Collaboration between CRITFC geneticists and YKFP biologists has resulted in expansion and refinement of knowledge of steelhead genetics in the Klickitat subbasin and publication of some of this information in the peer-reviewed literature. Primarily anadromous *O. mykiss* populations (with higher genetic diversity) were found in the lower elevation, warmer portions of the Klickitat subbasin; primarily resident populations (with lower genetic diversity) were found in higher elevation areas above higher gradient stream reaches and passage obstructions. Intermediate areas also exist with varying levels of mixing of the two life history types (Narum et al. 2008). Analysis of samples from returning adult steelhead has yielded estimates of relative production of different areas within the subbasin, with middle Klickitat tributaries (e.g. White Creek, lower Summit Creek) contributing a high proportion of adults (over 50%) and other significant contributions coming from lower subbasin tributaries such as Dead Canyon, Bowman Creek, lower Little Klickitat River, and Swale Creek (Narum et al. 2007).

4. Appendices

Appendix A. Juvenile & Resident Salmonid Population Surveys.

Table A1. Results of fish population surveys at five TFW habitat surveys sites. Ref. pt. refers to reference points that are part of the habitat survey (see Task 1.h). Multiple pass removal electrofishing was conducted at 3 sites; snorkel surveys were conducted at 2 sites.

Multiple pass removal electrofishing

							O. mykiss Total No. in Pass			*S. fontinalis* Total No. in Pass			*O. tshawytscha* Total No. in Pass			
Stream	Segment	Date	Ref. Pt.	Length (ft.)	Lat	Long	1	2	3	1	2	3	1	2	3	Comments
Tepee Cr.	2	6/19/07	8-10	300	46.18759	-121.02531	8	3	0	0	0	0	0	0	0	Lat/long is upstream end
White Creek	5	7/3/07	8-10	300	46.15894	-121.07763	25	11	3	0	0	0	0	0	0	Lat/long is upstream end
Huckleberry Cr.	1	8/16/07	5-7	300	46.33697	-121.21346	0	7	1	54	21	12	0	1	0	Lat/long is 450' upstream of upper end

Snorkel surveys (single pass)

Stream	Segment	Date	Ref. Pt.	Length (ft.)	Lat	Long	*O. mykiss*	*S. fontinalis*	Unknown	Comments
Diamond Fork Cr.	6	7/23/07	8-10	300	46.40100	-121.19551	66	6	0	Lat/long is upstream end
Klickitat R.	2	8/1/07	6-8	300	46.41479	-121.23579	0	0	2	Lat/long is 300' upstream of upper end

Appendix B. Mobile Juvenile Monitoring Sites (Screw Traps)

Table B1. Catch summary of target species for the Castile Falls screw trap for May 1, 2007 – April 30, 2008.

Month	Days Fished	Wild *O.mykiss*	Wild Chinook	Hatchery Chinook	Brook Trout	***Totals***
May	0					0
June	3					0
July	9	2				2
August	9	3	2			5
September	9	1	1			2
October	2					0
Totals	32	6	3	0	0	9

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

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

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

Table B3. Catch summary of target species for the Hatchery screw trap for May 1, 2007 – April 30, 2008.

Month	Days Fished	Hatchery *O.mykiss*	Wild *O.mykiss*	Chinook	Coho	Brook Trout	***Totals***
May	14		6	66			72
June	12		3	8			11
July	8		4	4			8
August	13		1	19			20
September	9		1	14			15
October	10		1	14			15
November	9		2	9	2	2	15
December	4		1	3			4
January	4						0
February	10						0
March	7						0
April	12		6	4			10
Totals	112	0	25	141	2	2	170

Table B4. Catch summary of target species for the Lyle Falls screw trap for May 1, 2007 – April 30, 2008.

Month	Days Fished	Chinook	Coho	Hatchery *O.mykiss*	Wild *O.mykiss*	***Totals***
May	8	15	2538	859	31	3443
June	6	1080	973	27	14	2094
July	9	3019	14	4	1	3038
August	13	1151	2		4	1157
September	4	46			2	48
October	8	165	5	1	15	186
November	6	16	15	1	9	41
December	5	40	25		32	97
January	6	3			5	8
February	11	5	2		5	12
March	5	2155			1	2156
April	3	1	313		8	322
Totals	84	7696	3887	892	127	12602

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

Date	Species	Flow*	No. of fish marked	No. of fish recaptured	Efficiency (%)	
4/10/2003	Hcoho	2065	283	16	5.7%	
4/11/2003	Hcoho	2100	566	26	4.6%	
4/16/2003	Hcoho	2095	377	29	7.7%	
4/17/2003	Hcoho	2031	300	5	1.7%	
4/28/2003	Hcoho	1970	293	23	7.8%	
4/29/2003	Hcoho	2055	94	3	3.2%	
5/5/2003	Homy	2040	300	14	4.7%	
5/6/2003	Homy	1945	300	6	2.0%	
9/4/2003	chk	721	244	49	20.1%	
3/9/2004	Hschk	1525	300	43	14.3%	
3/10/2004	Hschk	1570	92	12	13.0%	
3/12/2004	Hschk	1535	300	28	9.3%	
4/20/2004	Hcoho	1600	311	38	12.2%	
4/21/2004	Hcoho	1550	299	29	9.7%	
5/12/2004	Homy	1620	289	17	5.9%	
5/13/2004	Homy	1570	300	13	4.3%	
8/10/2004	Hfchk	634	329	39	11.9%	
2/14/2005	Wschk, Wchk, Wcoho	814	238	25	10.5%	**
2/28/2005	Wschk, Wcoho	751	62	12	19.4%	
7/25/2005	Hfchk	576	419	5	1.2%	
8/1/2005	Hfchk	565	196	26	13.3%	
4/25/2006	Hcoho	2530	150	7	4.7%	
4/25/2006	Homy	2530	50	1	2.0%	
6/27/2006	Hfchk	1655	301	8	2.7%	

* Flow values are 2-day averages of mean daily flows starting on test date (USGS gage 14113000 Klickitat River near Pitt).
** This test may slightly underestimate efficiency (by approximately 1-2%) due to a gap in trap operation during test.

Appendix C. Adult salmonid monitoring at Lyle Falls fishway

Table C1. Daily fish counts at the Lyle adult trap by species and mark for May 1, 2007 - April 30, 2008.

Date	Ad Present Chinook	Ad Present Chinook Jack	Clipped Chinook	Clipped Chinook Jack	Ad Present Coho	Ad Present Coho Jack	Clipped Coho	Clipped Coho Jack	Wild Steelhead	Hatchery Steelhead
04-May-07	6	0	10	1	0	0	0	0	2	3
08-May-07	5	0	14	1	0	0	0	0	0	0
09-May-07	7	1	21	1	0	0	0	0	5	9
10-May-07	2	0	7	1	0	0	0	0	3	2
15-May-07	0	0	3	3	0	0	0	0	0	1
16-May-07	3	0	5	3	0	0	0	0	1	10
17-May-07	0	0	5	0	0	0	0	0	1	3
18-May-07	0	0	0	0	0	0	0	0	1	3
22-May-07	2	0	8	1	0	0	0	0	0	0
23-May-07	3	0	10	9	0	0	0	0	2	19
29-May-07	3	0	9	2	0	0	0	0	0	9
30-May-07	2	0	2	1	0	0	0	0	0	5
31-May-07	0	0	4	0	0	0	0	0	1	4
01-Jun-07	0	0	1	0	0	0	0	0	1	1
05-Jun-07	4	0	28	7	0	0	0	0	2	12
06-Jun-07	2	0	7	0	0	0	0	0	3	6
07-Jun-07	0	0	2	3	0	0	0	0	0	5
15-Jun-07	0	0	1	2	0	0	0	0	2	15
18-Jun-07	0	0	0	0	0	0	0	0	0	1
19-Jun-07	0	0	0	0	0	0	0	0	0	0
20-Jun-07	1	0	2	0	0	0	0	0	0	8
21-Jun-07	1	0	2	3	0	0	0	0	2	8
22-Jun-07	0	0	0	1	0	0	0	0	1	5
26-Jun-07	0	0	0	0	0	0	0	0	0	0
27-Jun-07	0	0	0	0	0	0	0	0	0	2
28-Jun-07	0	0	0	0	0	0	0	0	0	9
29-Jun-07	0	0	1	0	0	0	0	0	0	6
02-Jul-07	0	0	0	0	0	0	0	0	0	2
10-Jul-07	2	0	0	0	0	0	0	0	2	5
11-Jul-07	1	0	0	0	0	0	0	0	2	5
12-Jul-07	1	0	1	0	0	0	0	0	1	5
13-Jul-07	2	0	0	0	0	0	0	0	4	2
18-Jul-07	0	0	2	1	0	0	0	0	4	6
19-Jul-07	0	0	1	0	0	0	0	0	1	4
24-Jul-07	0	0	0	0	0	0	0	0	11	5
25-Jul-07	0	0	0	0	0	0	0	0	4	7
27-Jul-07	0	0	0	0	0	0	0	0	0	0
31-Jul-07	0	0	0	0	0	0	0	0	0	0
02-Aug-07	0	0	0	0	0	0	0	0	3	3
07-Aug-07	0	0	0	0	0	0	0	0	5	1
08-Aug-07	1	0	0	0	0	0	0	0	3	0
09-Aug-07	0	0	0	0	0	0	0	0	0	0
14-Aug-07	0	0	0	0	0	0	0	0	2	2
15-Aug-07	0	0	0	0	0	0	0	0	0	0
16-Aug-07	0	0	0	0	0	0	0	0	1	0
21-Aug-07	0	0	0	0	0	0	0	0	0	0
22-Aug-07	0	0	0	0	0	0	0	0	2	0
23-Aug-07	0	0	0	0	0	0	0	0	0	0
24-Aug-07	0	0	0	0	0	0	0	0	0	0
29-Aug-07	1	0	0	0	0	0	0	0	0	0
30-Aug-07	0	0	0	0	0	0	0	0	0	0
31-Aug-07	2	0	1	0	2	0	3	0	0	1
05-Sep-07	1	0	0	0	3	0	0	0	0	2
06-Sep-07	0	0	0	0	0	0	0	0	1	1

Date	Ad Present Chinook	Ad Present Chinook Jack	Clipped Chinook	Clipped Chinook Jack	Ad Present Coho	Ad Present Coho Jack	Clipped Coho	Clipped Coho Jack	Wild Steelhead	Hatchery Steelhead
11-Sep-07	1	0	0	0	5	0	0	0	3	4
12-Sep-07	0	0	0	0	1	0	0	0	0	5
13-Sep-07	2	0	1	0	0	0	0	0	3	2
18-Sep-07	0	0	0	0	0	0	0	0	0	0
19-Sep-07	0	0	0	0	3	1	0	0	0	2
20-Sep-07	1	0	0	0	2	0	0	0	0	1
25-Sep-07	3	1	1	0	3	0	0	0	5	12
02-Oct-07	12	9	3	2	11	0	0	0	12	10
03-Oct-07	4	0	0	0	2	0	0	0	2	0
04-Oct-07	4	2	1	0	5	0	0	0	2	0
09-Oct-07	4	1	0	0	3	0	0	0	4	0
10-Oct-07	2	4	0	1	1	0	1	0	0	0
16-Oct-07	0	2	1	0	32	10	0	0	5	2
17-Oct-07	2	1	0	1	26	0	1	0	0	3
18-Oct-07	0	0	0	0	0	0	0	0	0	0
23-Oct-07	0	0	0	0	472	0	4	12	0	0
30-Oct-07	0	0	0	0	0	0	0	0	0	0
31-Oct-07	0	0	0	0	6	0	4	0	0	0
01-Nov-07	0	0	0	0	0	0	0	0	0	0
06-Nov-07	0	0	0	0	11	0	8	0	5	0
07-Nov-07	0	0	0	0	0	0	0	0	0	0
08-Nov-07	0	0	0	0	0	0	0	0	0	0
20-Nov-07	0	0	0	0	12	0	12	0	0	0
21-Nov-07	0	0	0	0	2	0	3	0	1	0
19-Dec-07	0	0	0	0	0	0	1	0	0	0
20-Dec-07	0	0	0	0	1	0	5	0	0	0
03-Jan-08	0	0	0	0	25	0	117	0	7	0
04-Jan-08	0	0	0	0	0	0	0	0	3	0
07-Jan-08	0	0	0	0	0	0	0	0	4	0
08-Jan-08	0	0	0	0	0	0	0	0	0	0
09-Jan-08	0	0	0	0	5	0	8	0	1	0
27-Jan-08	0	0	0	0	0	0	0	0	0	0
27-Jan-08	0	0	0	0	0	0	0	0	0	0
28-Jan-08	0	0	0	0	0	0	0	0	0	0
29-Jan-08	0	0	0	0	0	0	0	0	0	0
30-Jan-08	0	0	0	0	0	0	0	0	0	0
06-Mar-08	0	0	0	0	0	0	0	0	3	1
07-Mar-08	0	0	0	0	0	0	0	0	3	0
11-Mar-08	0	0	0	0	0	0	0	0	4	2
12-Mar-08	0	0	0	0	0	0	0	0	12	3
13-Mar-08	0	0	0	0	0	0	0	0	3	0
27-Mar-08	0	0	0	0	0	0	0	0	2	1
28-Mar-08	0	0	0	0	0	0	0	0	0	1
31-Mar-08	0	0	0	0	0	0	0	0	4	1
01-Apr-08	0	0	0	0	0	0	0	0	1	1
02-Apr-08	0	0	0	0	0	0	0	0	2	3
03-Apr-08	0	0	0	0	0	0	0	0	6	3
04-Apr-08	0	0	0	0	0	0	0	0	6	6
07-Apr-08	0	0	0	0	0	0	0	0	7	14
08-Apr-08	0	0	0	0	0	0	0	0	6	11
09-Apr-08	0	0	0	0	0	0	0	0	1	5
10-Apr-08	0	0	0	0	0	0	0	0	3	2
11-Apr-08	0	0	0	0	0	0	0	0	6	6
12-Apr-08	0	0	0	0	0	0	0	0	0	0
14-Apr-08	0	0	0	0	0	0	0	0	10	6
21-Apr-08	0	0	0	0	0	0	0	0	1	7
22-Apr-08	0	0	0	0	0	0	0	0	0	0
23-Apr-08	0	0	0	0	0	0	0	0	1	4
24-Apr-08	0	0	0	0	0	0	0	0	1	3
25-Apr-08	0	0	0	0	0	0	0	0	1	0
28-Apr-08	0	0	0	0	0	0	0	0	1	11
30-Apr-08	0	0	0	0	0	0	0	0	7	15
Totals	**87**	**21**	**154**	**44**	**633**	**11**	**167**	**12**	**221**	**344**

Appendix D. Spawning ground surveys (redd counts)

Table D1. Results of 2007 Spring Chinook spawning surveys in the Klickitat subbasin.

				REACH		LIVE OBS.			MORTS OBS.				
			#	REDD	REDDS				Ad-clipped		Unclipped		Unk
STREAM	REACH	MILES	PASSES	TOTALS	/MILE	Floy Tag	No Floy	Unk	Floy Tag	No Floy	Floy Tag	No Floy	
Klickitat R.													
MAINSTEM	Huckleberry Cr. confl - road washout	3.4	2	1	0.29	0	0	0	0	0	0	0	0
	Road washout - outhouse	3.2	2	4	1.25	0	1	0	0	0	0	0	0
	Outhouse - Cow Camp	2.0	2	4	2.00	0	3	0	0	0	0	0	0
	Cow Camp - main road bridge	2.2	2	4	1.80	0	2	0	0	0	0	0	0
	Main road bridge - turnout/turnaround	2.3	2	6	2.59	0	2	0	0	0	0	0	0
	Turnout/turnaround - McCreedy confluence	2.0	2	1	0.49	0	0	0	0	0	0	1	0
	McCreedy confl. - Chaparral confluence	2.7	2	2	0.75	0	0	0	0	0	0	1	0
	Chaparral confluence - old upper trap site	1.7	2	11	6.43	0	0	2	0	0	0	0	0
	Old upper trap site - top of Castile falls complex	1.3	2	3	2.23	0	0	2	1	2	0	2	1
	Extent of Castile Falls complex	0.7	3	3	4.49	0	0	0	0	0	0	0	0
	Bottom of Castile complex - West Fork conflu.	0.8	3	10	13.33	0	7	0	0	1	0	0	0
	West Fork - Signal Peak bridge	2.3	3	8	3.41	0	6	0	0	1	0	0	0
	Signal Peak bridge - Surveyors Cr. confluence	2.4	3	4	1.66	0	3	0	0	1	0	0	0
	Surveyors Cr. confluence - Portage	2.0	3	6	3.00	0	7	1	0	0	0	2	0
	Portage - Big Muddy confluence	2.8	3	24	8.57	0	18	3	0	0	0	2	0
	Big Muddy confluence - old USGS gage site	3.6	3	0	0.00	0	1	0	0	0	0	0	1
	Old USGS gage - Deer Springs	4.1	3	4	0.97	0	1	0	0	0	0	0	0
	Deer Springs - Hatchery	4.2	3	4	0.95	0	4	2	0	0	0	0	0
	Hatchery - White Cr. confluence	2.9	2	4	1.38	0	3	0	0	0	0	1	0
	White Cr. - Summit Cr. confluence	2.5	2	1	0.40	0	1	1	0	0	0	0	0
	Summit Cr. - Gage cable above Leidl	2.5	2	0	0.00	0	0	0	0	0	0	1	0
	Gage cable - Leidl bridge	2.6	2	0	0.00	0	0	0	0	0	0	0	0
	Leidl bridge - Stinson boat landing	2.9	2	0	0.00	0	0	0	0	0	0	0	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**		**104**	**1.7**	**0**	**59**	**11**	**1**	**5**	**0**	**10**	**2**
TRIBUTARIES													
DIAMOND FORK	Butte Meadows Cr. to Cuitin Cr.	2.8	0	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)	**0.0**		**0**	**-**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	KLICKITAT WATERSHED TOTALS	**61.2**		**104**		**0**	**59**	**11**	**1**	**5**	**0**	**10**	**2**
	Above Castile Falls contribution			**35%**		**-**	**14%**	**36%**	**100%**	**40%**	**-**	**40%**	**50%**
	Below Castile Falls contribution			**65%**		**-**	**86%**	**64%**	**0%**	**60%**	**-**	**60%**	**50%**

Unk = Unknown

Total Floy-tagged Morts Observed	1
Total Morts Observed	18
Percentage Floy-tagged	5.6%

Table D2. Spring Chinook spawning surveys (redd counts) in the Klickitat subbasin, 1989-2007.

		Redd Counts																		
REACH	MILES	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Diamond Fork	8.5	ns	0	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	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
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
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
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
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
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
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
Summit Creek - Leidl	5.6	ns	ns	2	ns	ns	ns	ns	8	3	0	1	2	1	0	0	1	3	3	0
Leidl - Stinson Flats	3.2	ns	ns	ns	ns	ns	ns	ns	5	4	ns	ns	ns	ns	ns	ns	0	1	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
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
Twin Bridges - Pitt Bridge	8	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
Turkey Farm - Lyle Falls	2	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**
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**
Totals above Castile (minus releases)		**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**4**	**6**	**36**

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.

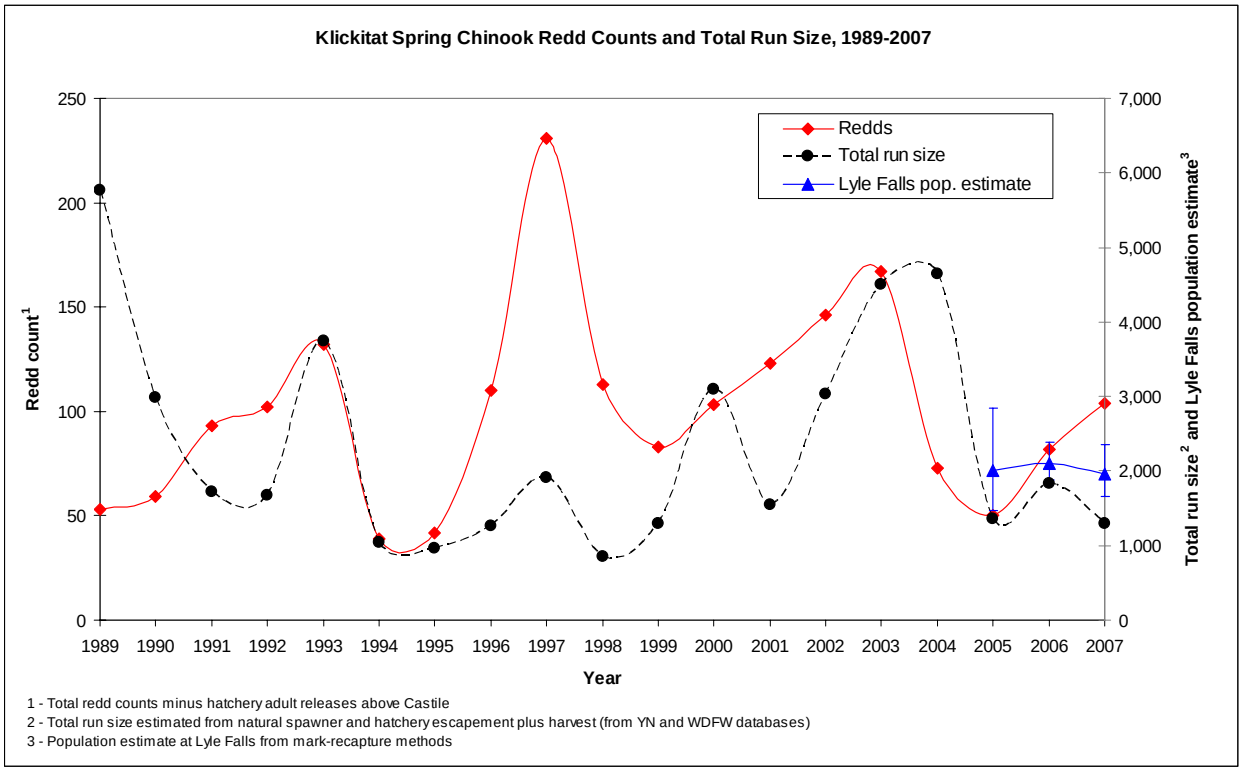

Figure D1. Spring Chinook redd counts, estimated total run size, and mark-recapture population estimates in the Klickitat subbasin, 1989-2007. Error bars on Lyle Falls mark-recapture population estimates represent 95% confidence intervals.

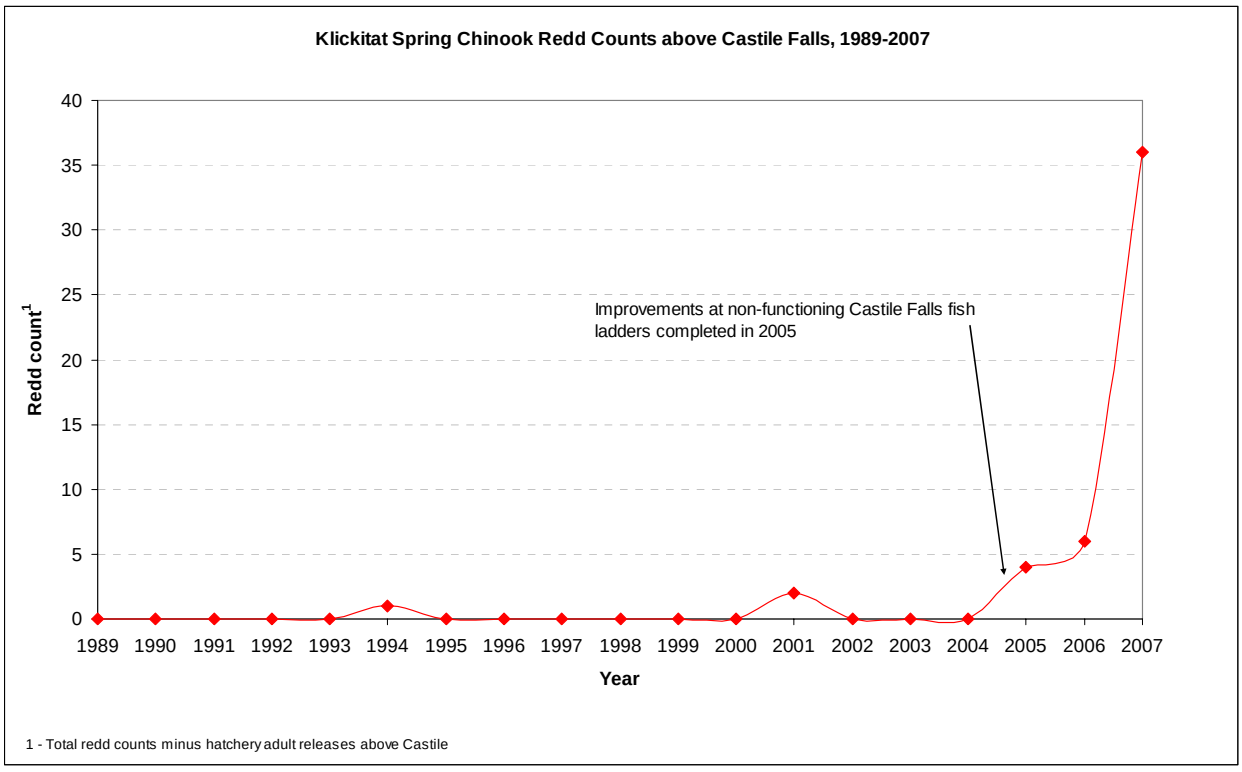

Figure D2. Spring Chinook redd counts above Castile Falls on the upper Klickitat River, 1989-2007.

Table D3. Results of 2007 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	Floy Tag	No Floy
Klickitat														
MAIN STEM														
	Castile Falls #11 - Castile Falls #1	0.6	0	0	0.00	0	0	0	0	0	0	0	0	0
	Castile Falls #1 - Signal Peak Br.	3.3	0	0	0.00	0	0	0	0	0	0	0	0	0
	Signal Peak Br. - old USGS gage	10.5	0	0	0.00	0	0	0	0	0	0	0	0	0
	Old USGS gage - Hatchery	8.2	1	5	0.61	0	0	2	0	0	0	0	0	0
	Hatchery - Summit Cr.	5.5	3	112	20.36	0	0	305	0	0	1	14	0	8
	Summit Cr. - Leidl Br.	5.6	3	23	4.11	0	0	88	0	1	0	11	0	4
	Leidl Br. - Stinson Flats	2.5	3	39	15.60	0	0	51	0	0	0	6	0	2
	Stinson Flats - Beeks Canyon	4.5	2	24	5.33	0	0	35	0	0	0	0	0	0
	Beeks Canyon - Little Klick	4.8	2	21	4.38	0	0	25	0	0	0	3	0	3
	Little Klick - Twin Bridges	1.5	2	11	7.33	0	0	15	0	0	0	1	0	2
	Twin Bridges - Klick Field Office	1.2	2	1	0.83	0	0	14	0	0	0	1	0	0
	Klick Field Office - Klickitat Town	3.6	2	12	3.33	0	0	5	0	0	0	3	0	1
	Klickitat Town - Pitt Bridge	3.4	1	2	0.59	0	0	10	0	0	0	0	0	0
	Pitt Bridge - Turkey Farm CG	5.4	1	0	0.00	0	0	3	0	0	0	0	0	0
	Turkey Farm CG - Lyle Falls trap	2.5	1	2	0.80	0	0	2	0	0	0	0	0	0
	Below Lyle Falls	0.1	1	1	10.00	0	0	2	0	0	0	1	0	0
	Mainstem Totals (surveyed reaches)	**48.8**		**253**	**5.2**	**0**	**0**	**557**	**0**	**1**	**1**	**40**	**0**	**20**
	KLICKITAT WATERSHED TOTALS			**253**	**5.2**	**0**	**0**	**557**	**0**	**1**	**1**	**40**	**0**	**20**

n/s = not surveyed
Unk = Unknown

Total Floy-tagged Morts Observed 1
Total Morts Observed 62
Percentage Floy-tagged 1.6%

Note: High flows and turbidity in early Dec. limited survey ability for ~2 weeks. Total redd count may be biased slightly low as a result, although fall chinook returns appear to be below average this year.

Table D4. Results of 2007-8 Coho spawning surveys in the Klickitat subbasin.

				REACH		LIVE OBS.			MORTS OBS.					
			#	REDD	REDDS				Ad-clipped		Unclipped		Unk	
STREAM	REACH	MILES	PASSES	TOTALS	/MILE	Floy Tag	No Floy	Unk	Floy Tag	No Floy	Floy Tag	No Floy	Floy Tag	No Floy
Klickitat														
MAIN STEM	Castile Falls #10 - Castile Falls #1	0.6	0	0	0.00	0	0	0	0	0	0	0	0	0
	Castile Falls - Signal Peak Br.	3.3	0	0	0.00	0	0	0	0	0	0	0	0	0
	Signal Peak Br. - Big Muddy Cr.	6.9	0	0	0.00	0	0	0	0	0	0	0	0	0
	Big Muddy Cr. - old USGS gage	3.3	0	0	0.00	0	0	0	0	0	0	0	0	0
	Old USGS gage - WDFW Hatchery	8.2	1	0	0.00	0	0	0	0	0	0	0	0	0
	Hatchery - Summit Cr.	5.4	4	19	3.52	0	18	18	0	0	0	2	0	0
	Summit Cr. - Leidl Br.	5.2	3	0	0.00	0	0	0	0	0	0	0	0	0
	Leidl Br. - Stinson Flat	2.9	3	0	0.00	0	0	0	0	0	0	0	0	0
	Stinson Flat - Beeks Canyon	4.5	2	0	0.00	0	0	0	0	0	0	0	0	0
	Beeks Canyon - Little Klickitat	4.8	2	0	0.00	0	0	0	0	0	0	0	0	0
	Little Klickitat - Twin br.	1.5	2	0	0.00	0	0	0	0	0	0	0	0	0
	Twin Br. - Field Office	1.3	2	0	0.00	0	0	0	0	0	0	0	0	0
	Field office - Ice house landing	1.5	2	0	0.00	0	0	0	0	0	0	0	0	0
	Ice house landing - Klickitat Town	2.1	2	1	0.48	0	0	0	0	0	0	0	0	0
	Klickitat Town - Pitt Bridge	3.4	1	0	0.00	0	0	0	0	0	0	0	0	0
	Pitt - bus turn around	2	1	0	0.00	0	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	0	0
	Turkey Farm - Lyle Falls scew trap	2.5	1	0	0.00	0	0	0	0	0	0	0	0	0
	Below Lyle Falls (County Park riffle)	0.1	4	145	1450.00	0	1057	0	0	20	0	7	0	5
	Mainstem Totals (surveyed reaches)	**48.7**		**165**	**3.4**	**0**	**1075**	**18**	**0**	**20**	**0**	**9**	**0**	**5**
TRIBUTARIES														
Trib of trib														
OUTLET CREEK		0.3	0	0	0.00	0	0	0	0	0	0	0	0	0
WHITE CREEK	Bottom 1.5 miles	1.5	0	0	0.00	0	0	0	0	0	0	0	0	0
SUMMIT CREEK	Falls - mouth	1.3	0	0	0.00	0	0	0	0	0	0	0	0	0
DEAD CANYON CR	Willis Canyon to Haul Rd. Xing	0.8	2	0	0.00	0	0	0	0	0	0	0	0	0
	Haul Rd. Xing to mouth	0.2	2	0	0.00	0	0	0	0	0	0	0	0	0
BEEKS CANYON		0.5	1	0	0.00	0	0	0	0	0	0	0	0	0
LITTLE KLICKITAT	Bowman Cr. - mouth	1.2	0	0	0.00	0	0	0	0	0	0	0	0	0
Bowman Cr.	Falls - mouth	1.0	0	0	0.00	0	0	0	0	0	0	0	0	0
Canyon Cr.	Right bank trib #3 - left bank trib #1	1.0	0	0	0.00	0	0	0	0	0	0	0	0	0
	Left bank trib #1 - Weeping Wall	1.0	0	0	0.00	0	0	0	0	0	0	0	0	0
	Weeping wall - mouth	1.0	0	0	0.00	0	0	0	0	0	0	0	0	0
SWALE CREEK	2nd RR trestle to school bus/houses	1.2	1	0	0.00	0	0	0	0	0	0	0	0	0
	school bus/houses to 1st RR tresle (on LB trib)	1.2	1	0	0.00	0	0	0	0	0	0	0	0	0
	1st RR trestle (on LB trib) to mouth	1.2	1	0	0.00	0	0	0	0	0	0	0	0	0
SNYDER CREEK	Upper bridge to mouth	0.9	4	7	7.78	0	18	4	0	0	0	1	0	2
LOGGING CAMP CR	Bedrock slide to mouth	1.0	1	0	0.00	0	0	0	0	0	0	0	0	0
WHEELER CREEK	2nd Falls (abv Johnson Cr) to 1st Falls/Cascade	0.6	0	0	0.00	0	0	0	0	0	0	0	0	0
	1st Falls/Cascade to mouth	0.5	0	0	0.00	0	0	0	0	0	0	0	0	0
DILLACORTE CR	Falls - mouth	1.5	0	0	0.00	0	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	0
CANYON CREEK	Bottom 1/4 mile	0.3	3	18	60.00	0	384	0	0	41	0	16	0	39
	Tributary Totals (surveyed reaches)	**7.3**		**25**	**3.4**	**0**	**402**	**4**	**0**	**41**	**0**	**17**	**0**	**41**
	KLICKITAT WATERSHED TOTALS	56.0		**190**		**0**	**1477**	**22**	**0**	**61**	**0**	**26**	**0**	**46**
	Tributary Contribution			**13%**		**-**	**27%**	**18%**	**-**	**67%**	**-**	**65%**	**-**	**89%**
	Mainstem Contribution			**87%**		**-**	**73%**	**82%**	**-**	**33%**	**-**	**35%**	**-**	**11%**

unk = unknown

Total Floy-tagged Morts Observed	0
Total Morts Observed	133
Percentage Floy-tagged	0.0%

Note - High flows and turbidity in early Dec. limited survey ability for ~2 weeks.

Table D5. Results of 2007 Steelhead spawning surveys in the Klickitat subbasin.

				REACH									
			#	REDD	REDDS	LIVE OBS.			MORTS OBS. Ad-clipped		MORTS OBS. 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	0	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	2	0	0.00	0	0	0	0	0	0	0
	Cow Camp - main road bridge	2.2	2	0	0.00	0	0	0	0	0	0	0
	Main road bridge - turnout/turnaround	2.3	1	0	0.00	0	0	0	0	0	0	0
	Turnout/turnaround - McCreedy confluence	2.0	1	0	0.00	0	0	0	0	0	0	0
	McCreedy confl. - Chaparral confluence	2.7	1	0	0.00	0	0	0	0	0	0	0
	Chaparral confluence - old upper trap site	1.7	1	0	0.00	0	0	0	0	0	0	0
	Old upper trap site - top of Castile falls complex	1.3	1	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	3	0	0.00	0	0	1	0	0	0	0
	White Cr. - Summit Cr. confluence	2.5	3	1	0.40	0	0	2	0	0	0	0
	Summit Cr. - Gage cable above Leidl	2.5	3	2	0.80	0	3	0	0	0	0	0
	Gage cable - Leidl bridge	2.6	3	6	2.31	0	2	0	0	0	0	0
	Leidl bridge - Stinson boat landing	2.9	3	0	0.00	0	0	0	0	0	0	0
	Stinson landing - Matt's pond	2.0	3	2	1.01	0	0	1	0	0	0	0
	Matt's pond - Beeks Cr. confluence	2.0	3	1	0.49	0	0	2	0	0	0	0
	Beeks Cr. confluence - Cattle Gate	2.0	3	2	1.00	0	0	1	0	0	0	0
	Cattle Gate - Little Klickitat confluence	3.4	3	0	0.00	0	0	3	0	0	0	0
	Little Klick - Swale Cr. (KFO)	2.7	3	8	2.96	0	0	2	0	0	0	0
	Swale Cr. - Ice house boat landing	1.3	3	0	0.00	0	0	0	0	0	0	0
	Ice house landing - Klickitat town boat landing	2.1	3	2	0.94	0	0	0	0	0	0	0
	Klickitat town boat landing - Pitt Bridge boat landing	3.4	3	1	0.29	0	0	5	0	0	0	0
	Pitt bridge - Logging Camp Cr. confluence	1.2	3	0	0.00	0	0	0	0	0	0	0
	Logging Camp Cr. - Bus Turnaround (RM 8)	0.9	3	0	0.00	0	0	0	0	0	0	0
	Bus Turnaround - Dillacort Cr. confluence	3.1	3	0	0.00	0	0	1	0	0	0	0
	Dillacort Cr. - Lyle falls screw trap	2.6	3	2	0.76	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)	**57.7**		**27**	**0.5**	**0**	**5**	**18**	**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	2	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	2	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	2	2	0.83	0	0	1	0	0	0	0
	Cedar Valley Rd. - Brush Cr.	4.6	2	2	0.43	0	1	0	0	0	0	0
	Brush Cr. - Washed out xing	1.8	2	11	6.11	0	1	0	0	0	0	2
	Washed out Xing. - mouth	3.1	2	3	0.97	0	0	0	0	0	0	4
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	3	0	0.00	0	0	0	0	0	0	0
	IXL Rd.- Tepee Cr. Rd.	2.5	3	3	1.20	0	5	1	0	0	0	0
	Tepee Cr. Rd. - mouth	3.4	3	0	0.00	0	1	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	2	0	0.00	0	0	0	0	0	0	0
	Blue Creek - mouth	2.2	2	1	0.45	0	0	0	0	0	0	0
SUMMIT CREEK	Falls - Confluence	1.3	4	5	3.85	0	6	1	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	4	1	1.25	0	0	0	0	0	0	0
	Haul Rd. Xing to mouth	0.2	4	0	0.00	0	0	0	0	0	0	0
BEEKS CANYON	Falls to mouth	0.5	1	0	0.00	0	0	0	0	0	0	0
LITTLE KLICKITAT	3 Creeks Lodge to Woodland Rd.	4.6	2	1	0.22	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	1	0	0.00	0	0	0	0	0	0	0
	Mill Cr. to Bowman Cr.	2.5	1	0	0.00	0	0	0	0	0	0	0
	Bowman Cr. - Hwy. 142 Bridge	0.9	1	1	1.11	0	0	0	0	0	0	0
	Hwy. 142 Bridge to mouth	0.3	1	0	0.00	0	0	0	0	0	0	0
Bowman Cr.	Falls - Hwy. 142	0.6	2	1	1.67	0	0	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	4	1	0.83	0	2	1	0	0	0	1
	school bus/houses to 1st RR tresle (on LB trib)	1.2	4	3	2.50	0	0	0	0	0	0	0
	1st RR trestle (on LB trib) to mouth	1.2	4	0	0.00	0	0	3	0	0	0	1
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	2	0	0.00	0	0	0	0	0	0	0
	Upper bridge - mouth	0.9	4	2	2.22	0	3	1	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	1	0	0.00	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
DILLACORTE 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)	**77.6**		**40**	**0.5**	**0**	**19**	**8**	**0**	**0**	**0**	**8**
	KLICKITAT WATERSHED TOTALS	**135.3**		**67**		**0**	**24**	**26**	**0**	**0**	**0**	**8**
	Tributary Contribution			**60%**		**-**	**79%**	**31%**	**-**	**-**	**-**	**100%**
	Mainstem Contribution			**40%**		**-**	**21%**	**69%**	**-**	**-**	**-**	**0%**

Unk = Unknown

Note - High flows in White Cr. watershed in April and May and above Castile Falls through May and early June limited survey ability.

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 2007.

2007 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	Female	1	780	780	780	696	696	696	33.3%	33.3%
5	Female	2	857	857	857	732	725	739	66.7%	66.7%
Total Males		0								
Total Females		3								
Grand Total		3								

2007 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	Male	2	732	699	765	598	543	653	66.7%	28.6%
5	Female	4	830	787	880	702	682	740	100.0%	57.1%
5	Male	1	897	897	897	709	709	709	33.3%	14.3%
Total Males		3								
Total Females		4								
Grand Total		7								

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 2007.

2007 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	4	540	460	693	427	350	557	30.8%	11.1%
4	Female	16	845	803	935	706	665	768	69.6%	44.4%
4	Male	6	844	797	899	676	641	713	46.2%	16.7%
5	Female	7	901	834	960	760	703	800	30.4%	19.4%
5	Male	3	964	940	994	774	761	797	23.1%	8.3%
Total Males		13								
Total Females		23								
Grand Total		36								

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 2007-8.

2007-8 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	11	723	635	797	592	542	646	100.0%	31.4%
3	Male	24	677	510	792	539	418	627	100.0%	68.6%
Total Males		24								
Total Females		11								
Grand Total		35								

Table E4. Average, minimum, and maximum fork length by age and sex for spring Chinook captured in the Lyle Falls adult fish trap in 2007.

2007 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	Male	20	468	416	544	25.3%	15.3%
4	Female	20	713	622	772	38.5%	15.3%
4	Male	30	673	486	761	38.0%	22.9%
5	Female	32	807	607	920	61.5%	24.4%
5	Male	29	805	690	990	36.7%	22.1%
Total Males		79					
Total Females		52					
Grand Total		131					

2007 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	Male	2	448	423	472	8.3%	5.3%
4	Female	3	709	616	777	21.4%	7.9%
4	Male	6	637	454	742	25.0%	15.8%
5	Female	11	778	713	860	78.6%	28.9%
5	Male	16	844	709	970	66.7%	42.1%
Total Males		24					
Total Females		14					
Grand Total		38					

Table E5. Average, minimum, and maximum fork length by age and sex for fall Chinook captured in the Lyle Falls adult fish trap in 2007.

2007 Fall Chinook Adult Fish Trap Scale Age Data

			Fork Length (mm)				
Age	Sex	Count	Mean	Min	Max	% of sex	% of total
3	Male	10	468	403	596	58.8%	27.8%
4	Female	14	746	584	900	73.7%	38.9%
4	Male	6	757	503	895	35.3%	16.7%
5	Female	5	870	837	912	26.3%	13.9%
5	Male	1	810	810	810	5.9%	2.8%
Total Males		17					
Total Females		19					
Grand Total		36					

Table E6. Average, minimum, and maximum fork length by age and sex for coho captured in the Lyle Falls adult fish trap in 2007-8.

2007-8 Coho Adult Fish Trap Scale Age Data

			Fork Length (mm)				
Age	Sex	Count	Mean	Min	Max	% of sex	% of total
2	Female	1	496	496	496	3.6%	1.6%
3	Female	27	623	500	731	96.4%	43.5%
3	Male	34	634	440	811	100.0%	54.8%
Total Males		34					
Total Females		28					
Grand Total		62					

Appendix F. Sediment data

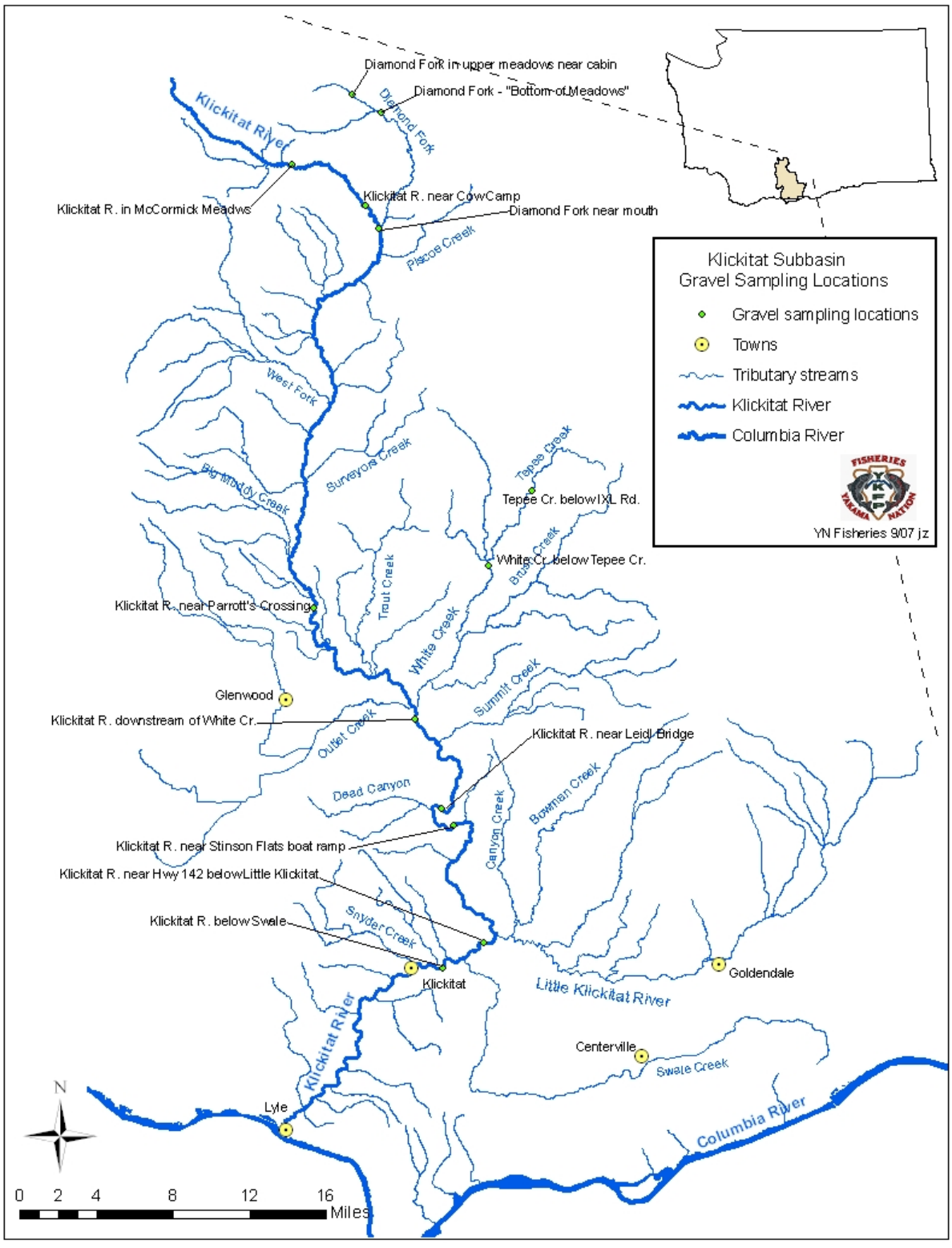

Figure F1. Locations of Klickitat subbasin sediment sampling sites.

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	90.4	57.4	41.5	35.8	30.5	21.9	14.5	10.2	9.2	6.7	4.9
2002	100.0	76.6	56.3	48.7	41.3	29.6	20.3	14.3	12.9	8.3	5.0
2003	96.0	61.7	47.2	42.0	37.1	30.1	24.8	20.8	19.3	11.6	6.9
2004	99.0	66.3	47.9	41.6	35.6	26.6	19.1	14.1	12.4	7.7	4.7
2005	98.6	72.1	52.0	45.1	38.3	27.7	19.4	14.7	13.2	8.6	5.5
2006	100.0	65.8	48.2	41.6	35.5	26.6	20.6	15.3	13.5	7.7	4.4
2007	96.9	63.4	44.0	37.3	30.9	22.8	17.1	12.9	11.4	6.9	3.7

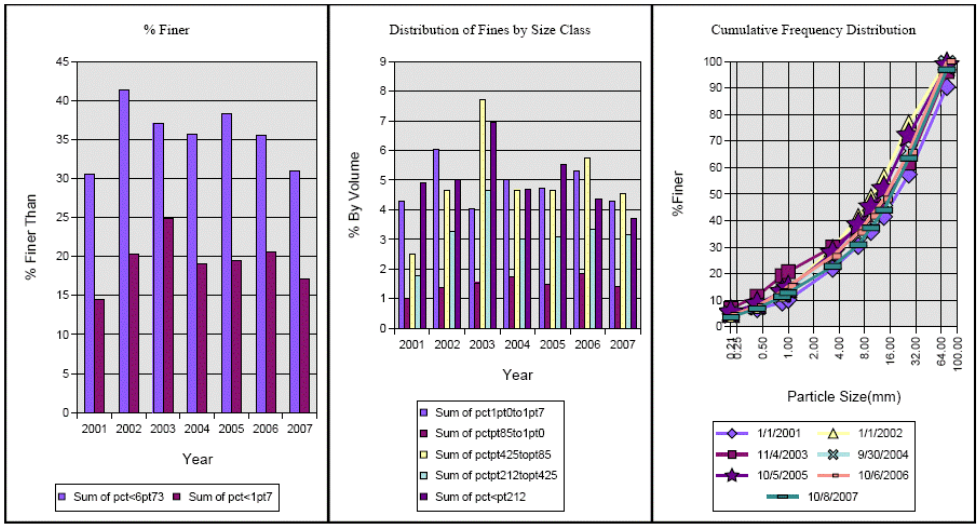

Figure F2. Sediment sampling data from Diamond Fork Bottom of Meadows 2001-2007.

Site Name: Diamond Fork near mouth

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
1999	97.3	64.9	47.0	40.1	35.0	26.7	19.0	14.3	13.1	9.8	7.8
2000	86.1	44.9	32.8	28.6	25.3	19.7	13.9	8.7	7.3	4.2	3.0
2003	93.8	62.2	43.5	36.3	29.7	19.7	12.5	8.9	8.0	5.8	4.2
2004	93.4	67.2	49.5	42.9	36.5	26.5	18.1	12.9	11.5	7.8	5.4
2005	89.6	62.4	44.9	38.8	33.0	24.0	17.7	13.3	12.0	8.3	5.8
2006	93.8	63.3	46.1	39.2	31.9	22.3	15.0	11.0	9.9	7.3	5.0
2007	97.0	60.0	43.6	37.6	31.4	21.9	15.6	12.1	11.0	7.6	5.4

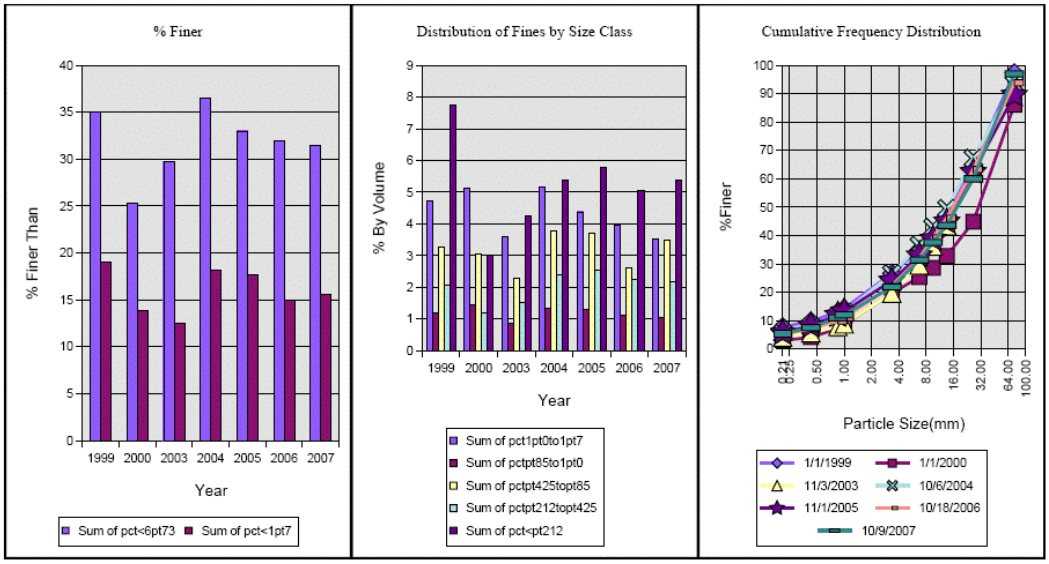

Figure F3. Sediment sampling data from Diamond Fork near mouth 1999-2007.

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	78.7	60.1	52.9	45.6	35.1	27.2	22.2	20.6	13.8	8.4
2001	98.2	73.1	55.4	48.9	42.5	32.4	24.5	19.9	18.6	13.4	8.7
2002	95.0	52.4	35.6	30.1	25.1	17.7	11.5	8.6	7.8	5.8	4.6
2003	100.0	72.0	46.4	38.3	31.1	21.7	15.2	11.7	10.9	6.5	3.7
2004	100.0	66.4	43.7	37.5	31.4	22.3	15.5	11.3	10.3	6.4	3.9
2005	100.0	72.8	53.8	47.0	40.1	28.8	20.7	15.7	14.5	8.8	5.1
2006	98.6	77.0	56.4	48.6	41.2	30.3	21.6	16.0	14.4	9.4	5.8
2007	98.7	66.8	45.1	37.9	30.7	20.9	14.6	11.3	10.2	7.0	4.1

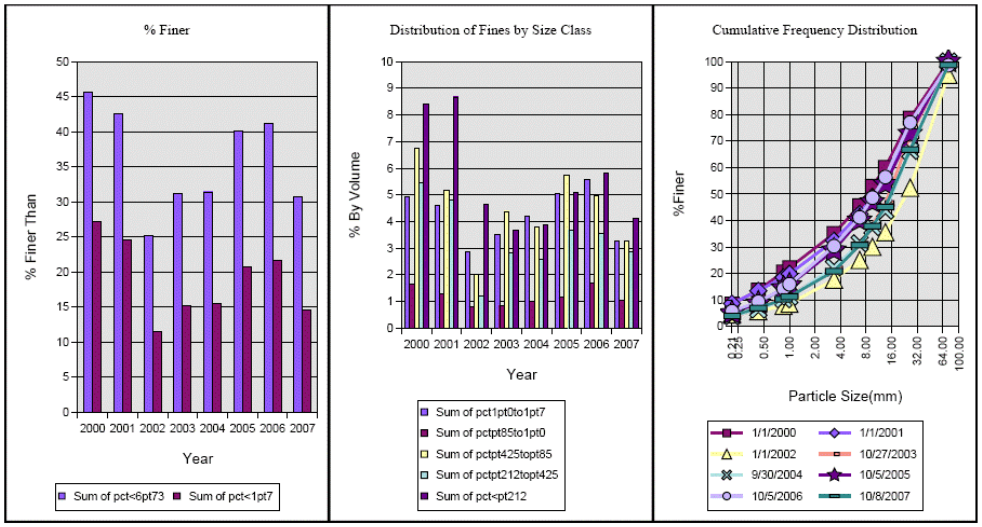

Figure F4. Sediment sampling data from Diamond Fork in upper meadows 2000-2007.

Site Name: Klickitat R. downstream of White Cr.

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
1999	94.2	53.6	37.9	33.2	29.5	23.8	18.2	13.1	11.5	7.0	4.9
2000	83.8	42.4	29.3	24.4	20.4	15.4	12.3	9.9	9.0	5.5	3.7
2001	92.0	49.1	34.0	29.8	26.2	21.6	16.7	11.2	9.5	5.2	3.2
2002	92.4	49.5	36.9	32.6	29.5	25.9	21.8	15.6	13.6	7.2	5.2
2003	94.9	61.5	43.8	38.2	33.6	27.2	21.1	14.9	12.8	7.6	5.4
2004	91.2	60.5	45.1	40.1	35.8	29.6	23.4	16.3	13.7	7.7	4.7
2005	85.2	55.2	39.9	34.4	29.9	23.4	18.1	13.3	11.7	7.6	4.3
2006	93.4	63.6	47.5	41.8	37.1	30.7	23.3	14.9	12.6	6.6	4.3
2007	93.8	65.4	50.2	45.0	40.0	32.5	25.1	17.8	15.2	7.4	3.8

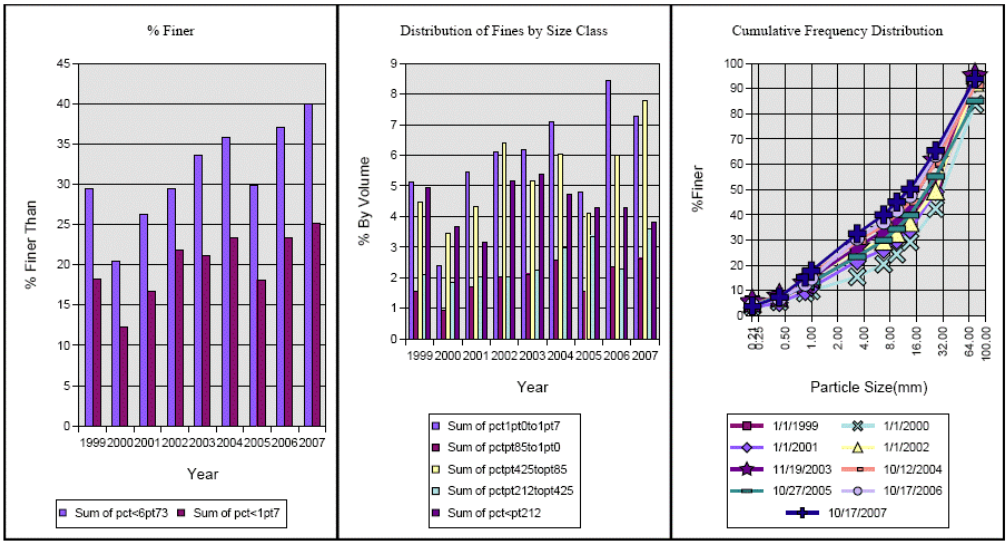

Figure F5. Sediment sampling data from Klickitat R. downstream of White Cr. 1999-2007.

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	95.6	49.0	31.2	25.2	20.2	13.6	9.2	6.8	6.1	4.1	2.8
2004	99.2	60.3	39.9	33.2	27.0	18.8	13.0	9.4	8.2	5.1	3.5
2005	99.0	63.9	42.0	34.4	28.0	19.4	13.5	9.9	8.8	5.8	4.0
2006	99.1	63.3	44.9	38.4	31.9	22.6	15.4	10.8	9.5	5.3	3.7
2007	100.0	54.4	33.2	27.4	22.5	15.7	11.3	8.8	8.2	5.4	3.8

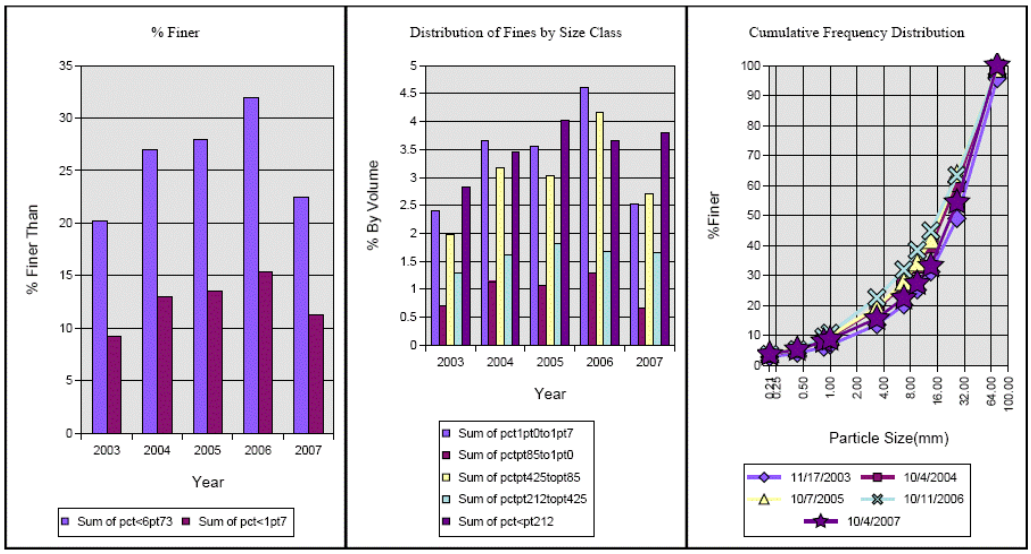

Figure F6. Sediment sampling data from Klickitat R. in McCormick Meadows 1998-2007.

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	88.1	60.1	47.6	42.6	38.3	32.8	28.2	24.3	22.7	15.8	11.6
2000	91.9	42.7	28.4	24.0	21.2	17.6	14.1	10.6	9.6	6.2	4.2
2001	88.7	56.4	40.2	34.5	29.7	23.9	20.0	17.0	15.6	11.5	8.5
2002	87.5	49.4	34.7	30.3	26.9	22.7	18.7	11.9	9.8	5.2	3.5
2003	82.9	49.3	32.8	28.0	24.2	19.3	15.9	13.6	12.4	8.8	5.8
2004	83.7	46.5	33.9	29.6	25.5	20.0	16.1	12.1	10.5	5.7	3.4
2005	86.5	54.6	39.8	34.6	29.5	23.4	19.0	15.5	14.1	8.1	4.9
2006	98.3	55.7	40.5	35.4	30.6	25.0	21.3	17.4	15.4	8.9	4.9
2007	92.2	59.4	44.2	38.7	33.8	27.5	23.1	18.5	17.0	9.8	5.5

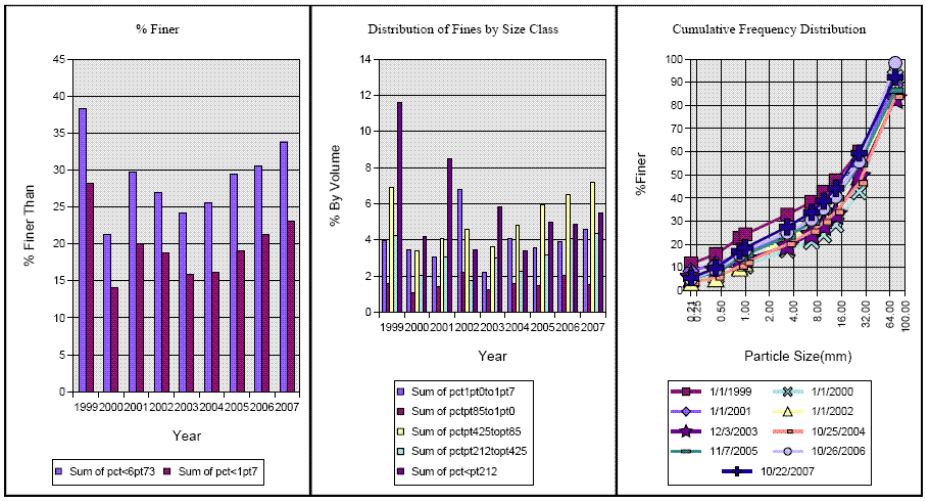

Figure F7. Sediment data from Klickitat R. below Little Klickitat R. 1999-2007.

Site Name: Klickitat R. near Cow Camp

Year:	%<75.0mm	%<26.5mm	%<13.5mm	%<9.5mm	%<6.73mm	%<3.35mm	%<1.7mm	%<1.0mm	%<0.85mm	%<0.425mm	%<0.212mm
1998	97.8	47.4	23.6	16.3	11.8	8.8	6.4	5.5	5.2	4.6	4.0
1999	98.1	57.7	38.8	32.3	27.0	20.5	16.3	13.9	13.1	10.9	8.7
2000	93.1	67.0	49.8	43.7	38.8	30.9	24.8	21.1	20.0	17.1	15.2
2001	97.1	62.6	42.3	35.5	30.0	22.4	16.8	13.9	13.1	10.7	8.7
2002	91.7	55.2	34.6	27.8	22.3	15.2	10.7	8.5	7.8	6.3	5.2
2003	90.4	45.0	26.4	20.6	16.2	10.8	7.6	5.9	5.4	4.0	3.1
2004	88.4	56.2	39.3	32.8	27.3	19.3	13.3	9.7	8.6	5.6	4.1
2005	87.0	58.3	41.7	35.3	29.4	20.8	14.2	10.3	9.4	6.2	4.3
2006	95.3	66.4	47.8	40.8	33.8	24.0	16.7	12.1	10.9	6.3	4.2
2007	96.2	59.5	43.8	37.8	31.3	22.4	15.2	11.3	9.9	6.2	4.3

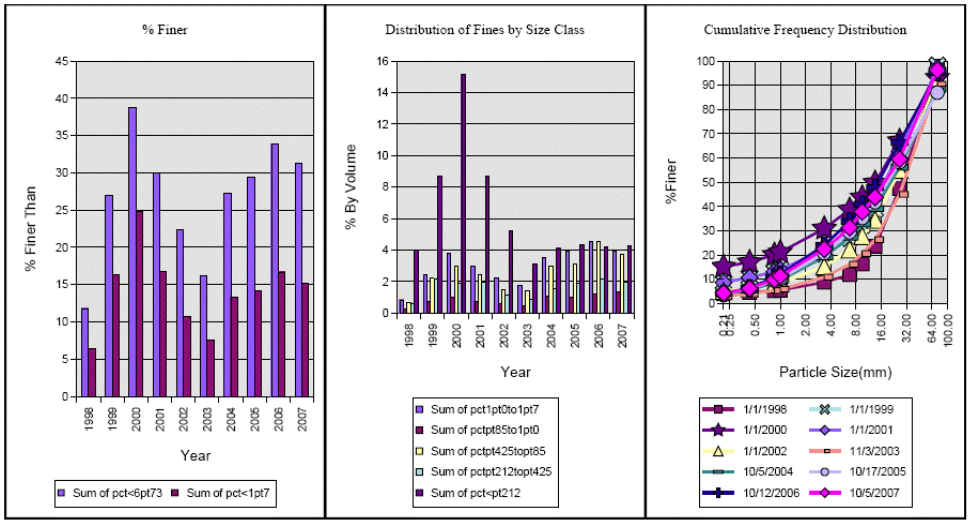

Figure F8. Sediment sampling data from Klickitat R. near Cow Camp 1998-2007.

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	30.8	27.6	25.6	22.9	20.6	17.6	15.8	8.3	5.4
2000	92.2	34.8	23.7	21.2	19.1	16.9	14.2	10.7	9.3	5.0	3.1
2003	95.0	38.3	23.1	22.5	21.9	18.8	14.2	8.0	6.4	3.4	2.3
2004	93.3	51.4	37.8	34.3	31.1	25.7	20.7	14.8	11.5	5.9	3.6
2005	87.6	41.8	29.3	27.0	24.9	21.5	17.8	12.8	10.9	5.7	3.9
2006	99.3	44.1	29.2	26.3	23.9	21.0	17.3	12.3	10.9	6.4	4.1
2007	94.0	54.3	42.5	39.2	36.2	32.0	26.4	16.7	12.9	5.0	2.6

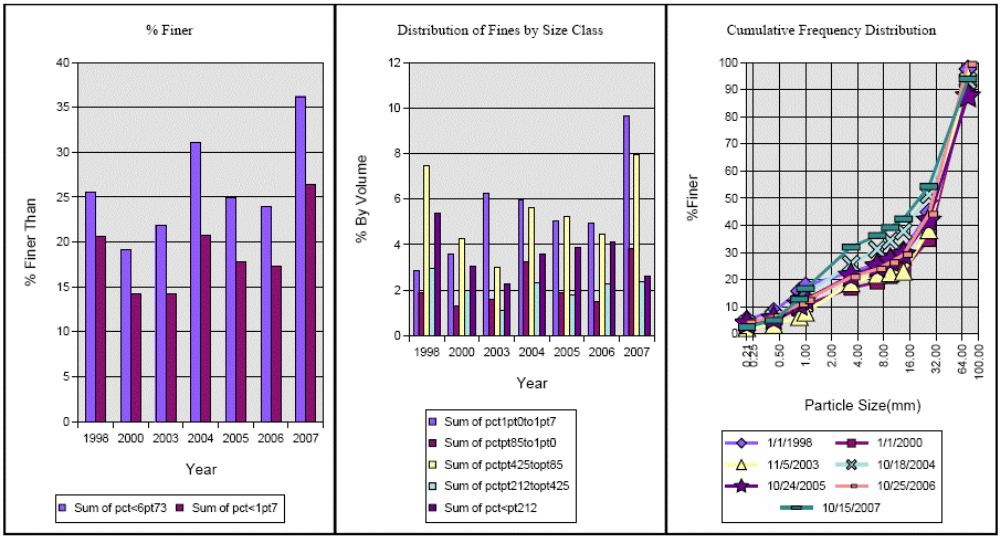

Figure F9. Sediment sampling data from Klickitat R. near Leidl Bridge 1998-2007.

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	62.4	50.7	46.5	42.4	35.3	28.7	23.3	21.5	14.2	8.4
2000	79.8	43.8	32.2	28.0	24.8	19.2	13.4	8.6	7.2	4.2	3.0
2002	92.6	45.7	30.3	25.6	22.3	18.2	14.8	10.7	9.2	5.1	3.0
2003	81.8	44.2	33.2	29.0	25.6	20.4	16.0	12.3	11.1	6.8	4.4
2004	96.6	56.3	42.0	36.3	30.8	22.5	15.5	11.0	9.7	5.8	4.1
2005	93.1	63.2	48.3	43.0	38.4	31.4	26.1	22.0	20.6	14.2	9.2
2006	87.6	61.5	48.0	43.2	38.6	31.2	24.1	17.7	15.5	8.4	5.6
2007	81.3	54.2	42.1	37.4	33.0	26.6	21.4	17.8	16.3	10.3	6.0

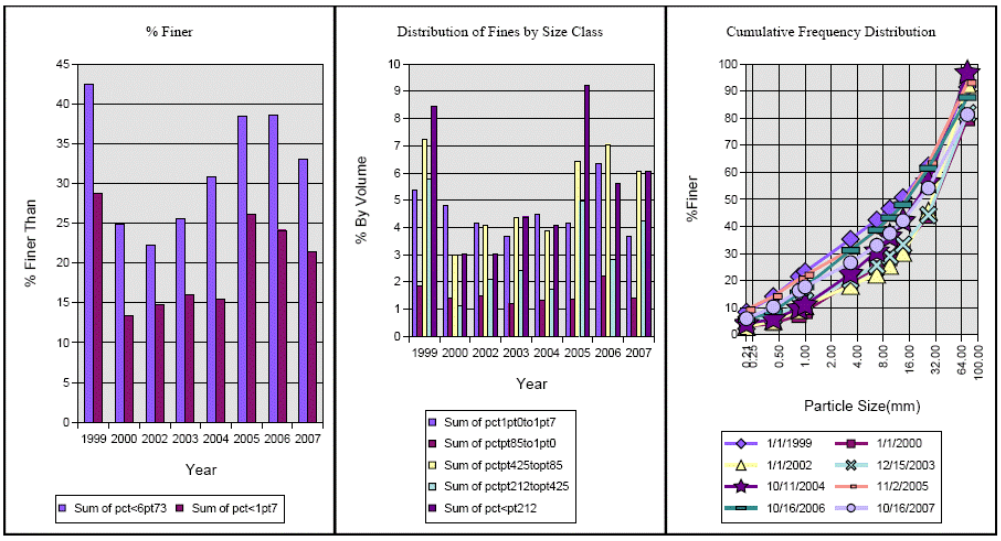

Figure F10. Sediment sampling data from Klickitat R. near Parrott's Crossing 1999-2007.

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

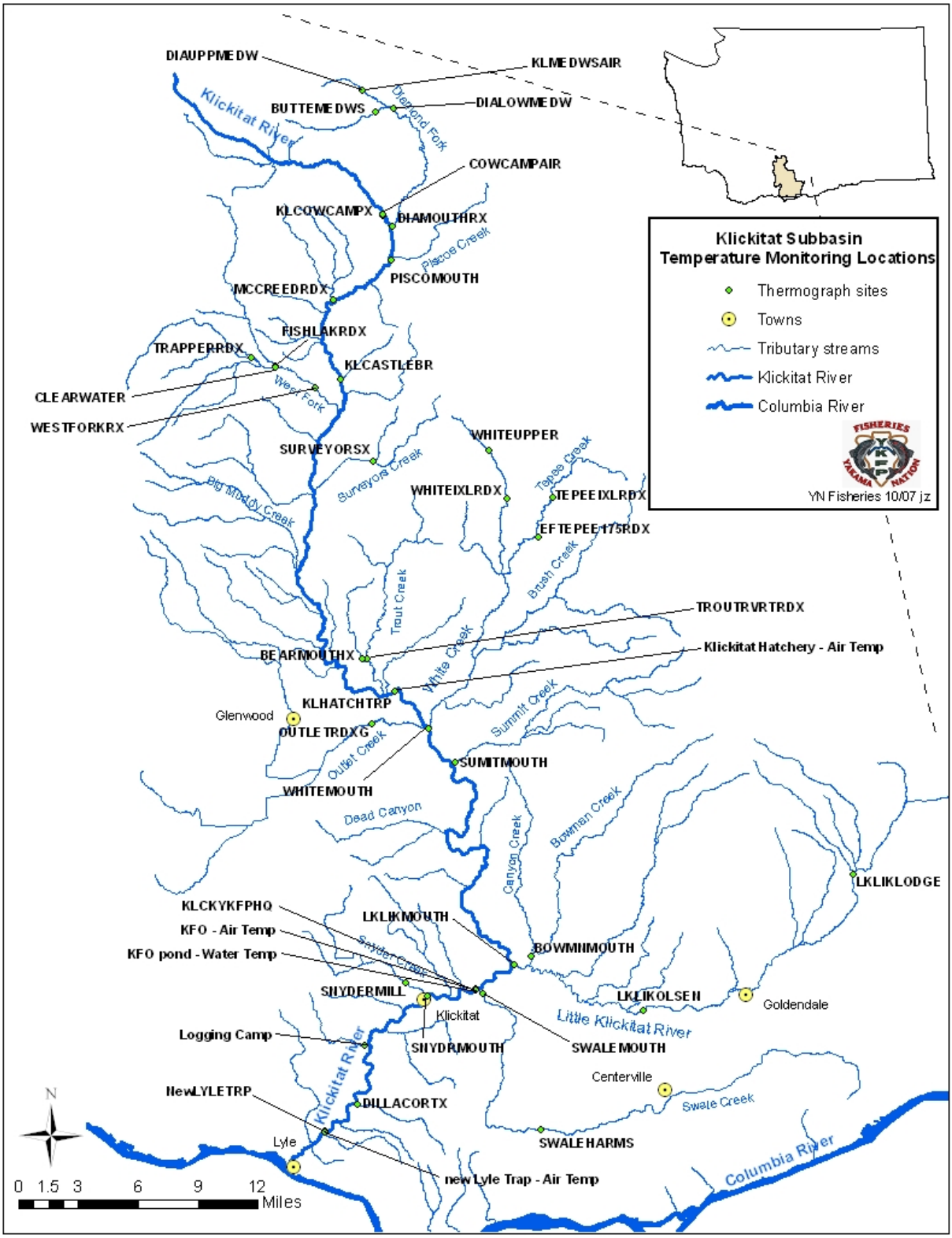

Figure G1. Locations of Klickitat subbasin temperature and water quality monitoring sites

Table G2. Monthly temperature summaries from 31 sites in the Klickitat subbasin. 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.

BEARMOUTHX

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	18	0	0	0	0	0	0	1	0	0	0	0	12.5	5.0	3.5
June	30	0	0	0	0	0	0	3	0	0	0	0	13.1	4.5	3.2
July	31	0	0	0	0	0	0	15	0	0	0	0	13.1	3.4	2.7
August	31	0	0	0	0	0	0	0	0	0	0	0	12.2	3.0	2.1
September	30	0	0	0	0	0	0	0	0	0	0	0	10.9	2.3	1.7
October	28	0	3	0	1	0	0	0	0	0	0	0	8.3	1.7	1.1
November	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
December	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
2008															
January	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
February	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
March	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
April	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--

BOWMNMOUTH

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	19	0	0	0	0	0	0	17	0	0	0	0	16.1	5.3	3.4
June	30	0	0	0	0	0	0	30	3	0	0	0	18.0	4.2	2.6
July	31	0	0	0	0	0	0	31	30	11	0	0	18.8	4.0	3.0
August	31	0	0	0	0	0	0	31	12	0	0	0	17.8	4.7	3.0
September	30	0	0	0	0	0	0	20	0	0	0	0	16.2	3.4	2.4
October	31	0	3	0	0	0	0	0	0	0	0	0	11.9	2.6	1.9
November	30	0	13	0	10	0	0	0	0	0	0	0	9.1	3.7	1.5
December	31	0	29	0	27	0	0	0	0	0	0	0	5.4	2.2	1.1
2008															
January	31	0	31	0	31	0	0	0	0	0	0	0	4.4	1.9	1.0
February	29	0	28	0	21	0	0	0	0	0	0	0	6.9	3.0	1.9
March	31	0	19	0	3	0	0	0	0	0	0	0	8.5	4.4	2.7
April	30	0	9	0	0	0	0	0	0	0	0	0	12.0	5.9	3.9

BUTTEMEDWS

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	31	0	31	0	21	0	0	0	0	0	0	0	10.9	7.1	4.7
June	30	0	12	0	0	0	0	0	0	0	0	0	12.6	7.9	5.4
July	31	0	0	0	0	0	0	31	0	0	0	0	16.8	8.7	6.7
August	31	0	0	0	0	0	0	20	0	0	0	0	15.7	7.9	5.9
September	30	0	17	0	7	0	0	2	0	0	0	0	12.3	6.7	4.7
October	31	10	31	5	28	0	0	0	0	0	0	0	5.8	3.2	1.9
November	30	24	30	21	30	0	0	0	0	0	0	0	3.9	3.3	0.8
December	31	31	31	31	31	0	0	0	0	0	0	0	0.1	0.2	0.1
2008															
January	31	31	31	31	31	0	0	0	0	0	0	0	0.1	0.2	0.1
February	29	19	29	17	29	0	0	0	0	0	0	0	1.5	0.8	0.4
March	31	24	31	12	31	0	0	0	0	0	0	0	1.8	1.3	0.7
April	30	14	30	5	30	0	0	0	0	0	0	0	2.8	2.5	1.3

CLEARWATER

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	14	0	3	0	0	0	0	0	0	0	0	0	8.5	3.3	2.3
June	30	0	0	0	0	0	0	0	0	0	0	0	9.4	3.4	2.2
July	31	0	0	0	0	0	0	0	0	0	0	0	10.5	4.0	2.8
August	31	0	0	0	0	0	0	0	0	0	0	0	10.3	3.9	2.7
September	30	0	4	0	0	0	0	0	0	0	0	0	8.9	3.3	2.0
October	31	0	17	0	9	0	0	0	0	0	0	0	6.4	1.7	1.2
November	30	0	26	0	21	0	0	0	0	0	0	0	6.1	1.9	1.1
December	31	1	31	0	31	0	0	0	0	0	0	0	3.5	2.1	0.8
2008															
January	31	2	31	0	31	0	0	0	0	0	0	0	3.8	2.7	0.9
February	29	0	29	0	29	0	0	0	0	0	0	0	4.7	1.9	0.8
March	31	0	31	0	31	0	0	0	0	0	0	0	4.9	2.2	1.3
April	30	0	30	0	27	0	0	0	0	0	0	0	5.8	3.1	1.8

COWCAMPAIR

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	14	2	6	0	0	7	6	14	14	14	14	8	35.3	27.8	18.2
June	30	0	7	0	0	17	15	30	30	30	30	22	34.0	26.1	17.4
July	31	0	0	0	0	30	30	31	31	31	31	31	38.3	27.8	21.1
August	31	0	3	0	0	27	26	31	31	31	31	31	35.7	27.1	20.2
September	30	6	17	0	0	15	13	30	28	26	26	16	29.5	24.6	18.8
October	30	12	25	2	9	0	0	12	0	0	0	0	16.8	15.6	10.4
November	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
December	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
2008															
January	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
February	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
March	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
April	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--

DIALOWMEDW

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	31	0	31	0	9	0	0	0	0	0	0	0	12.4	8.5	6.1
June	16	0	7	0	0	0	0	0	0	0	0	0	13.0	11.2	6.6
July	14	0	0	0	0	0	0	14	12	10	8	0	20.2	11.5	9.2
August	14	0	0	0	0	0	0	14	10	6	5	0	20.1	11.3	9.1
September	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
October	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
November	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
December	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
2008															
January	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
February	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
March	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
April	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--

DIAMOUTHRX

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	15	0	7	0	0	0	0	0	0	0	0	0	12.1	6.4	4.5
June	30	0	0	0	0	0	0	9	0	0	0	0	13.8	6.2	4.3
July	31	0	0	0	0	0	0	31	8	0	0	0	17.6	6.2	5.0
August	31	0	0	0	0	0	0	31	0	0	0	0	16.0	5.8	4.5
September	30	0	10	0	1	0	0	12	0	0	0	0	13.8	6.7	4.8
October	31	4	25	0	15	0	0	0	0	0	0	0	10.2	7.2	3.3
November	30	18	30	12	30	0	0	0	0	0	0	0	8.4	7.5	2.6
December	31	29	31	28	31	0	0	0	0	0	0	0	1.5	1.3	0.3
2008															
January	31	29	31	29	31	0	0	0	0	0	0	0	1.2	0.8	0.2
February	29	13	29	10	29	0	0	0	0	0	0	0	2.3	1.0	0.5
March	31	11	31	5	31	0	0	0	0	0	0	0	3.2	1.9	1.2
April	30	7	30	2	30	0	0	0	0	0	0	0	5.3	4.3	2.3

DIAUPPMEDW

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	31	0	28	0	22	0	0	0	0	0	0	0	7.1	3.9	2.0
June	30	0	0	0	0	0	0	0	0	0	0	0	8.7	2.3	1.3
July	31	0	0	0	0	0	0	21	8	0	0	0	18.0	9.2	4.1
August	14	0	0	0	0	0	0	14	4	0	0	0	17.6	9.0	7.5
September	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
October	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
November	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
December	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
2008															
January	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
February	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
March	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
April	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--

DILLACORTX

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	17	0	0	0	0	0	0	17	0	0	0	0	15.3	1.7	1.2
June	30	0	0	0	0	0	0	30	18	6	4	0	19.6	5.0	1.7
July	31	0	0	0	0	27	26	31	31	31	31	29	32.3	14.3	9.9
August	31	0	0	0	0	29	29	31	31	31	31	31	31.6	14.7	11.3
September	30	0	0	0	0	15	12	30	29	26	26	15	29.3	14.2	9.5
October	31	0	0	0	0	0	0	28	0	0	0	0	15.6	5.0	1.7
November	30	0	0	0	0	0	0	0	0	0	0	0	11.7	1.7	0.7
December	31	0	23	0	13	0	0	0	0	0	0	0	7.7	2.5	0.9
2008															
January	31	7	31	5	30	0	0	0	0	0	0	0	5.3	2.6	0.9
February	29	0	25	0	19	0	0	0	0	0	0	0	7.4	3.0	1.8
March	31	0	13	0	2	0	0	0	0	0	0	0	9.1	4.4	2.6
April	30	0	3	0	0	0	0	5	0	0	0	0	14.3	5.7	4.1

EFTEPEE175RDX

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	18	0	0	0	0	0	0	5	0	0	0	0	13.8	4.5	3.0
June	30	0	0	0	0	0	0	22	0	0	0	0	14.9	4.3	3.2
July	31	0	0	0	0	0	0	31	21	1	0	0	18.4	4.9	3.8
August	31	0	0	0	0	0	0	31	0	0	0	0	16.8	4.7	3.5
September	30	0	3	0	0	0	0	6	0	0	0	0	13.6	4.2	2.7
October	31	0	16	0	11	0	0	0	0	0	0	0	8.2	2.8	1.5
November	30	11	29	10	29	0	0	0	0	0	0	0	5.7	3.8	0.8
December	31	27	31	24	31	0	0	0	0	0	0	0	1.2	0.8	0.3
2008															
January	31	22	31	21	31	0	0	0	0	0	0	0	1.2	0.5	0.2
February	29	10	29	6	29	0	0	0	0	0	0	0	1.5	0.6	0.4
March	31	0	31	0	31	0	0	0	0	0	0	0	3.2	2.5	1.2
April	30	0	30	0	25	0	0	0	0	0	0	0	7.3	4.7	2.8

FISHLAKRDX

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	14	0	0	0	0	0	0	1	0	0	0	0	12.6	3.7	2.5
June	30	0	0	0	0	0	0	5	0	0	0	0	14.1	3.6	2.1
July	31	0	0	0	0	0	0	0	0	0	0	0	12.3	3.2	2.5
August	31	0	0	0	0	0	0	0	0	0	0	0	10.4	2.8	2.1
September	30	0	2	0	0	0	0	0	0	0	0	0	9.0	2.2	1.5
October	31	0	17	0	12	0	0	0	0	0	0	0	6.2	1.4	1.0
November	30	0	28	0	25	0	0	0	0	0	0	0	5.3	1.9	0.8
December	31	5	31	1	31	0	0	0	0	0	0	0	2.5	1.6	0.7
2008															
January	31	10	31	7	31	0	0	0	0	0	0	0	2.6	1.9	0.7
February	29	1	29	0	29	0	0	0	0	0	0	0	3.9	1.9	1.0
March	31	1	31	0	31	0	0	0	0	0	0	0	4.1	2.7	1.6
April	30	1	30	0	30	0	0	0	0	0	0	0	5.6	3.8	2.3

HATCAIRTEM

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	14	7	12	0	0	6	5	14	14	10	10	5	34.9	33.3	20.7
June	30	10	22	0	0	16	13	30	30	28	28	18	34.0	30.4	19.9
July	31	0	7	0	0	28	27	31	31	31	31	31	42.5	35.0	25.2
August	31	1	18	0	0	25	24	31	31	31	31	30	40.1	37.2	24.1
September	30	18	28	0	2	22	21	30	28	28	27	24	42.0	42.6	28.0
October	30	23	28	4	18	1	1	12	0	0	0	0	24.0	26.5	13.1
November	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
December	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
2008															
January	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
February	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
March	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
April	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--

KLCKYKFPHQ

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	18	0	0	0	0	0	0	16	1	0	0	0	16.6	5.2	3.6
June	30	0	0	0	0	0	0	30	10	0	0	0	17.6	5.8	4.1
July	31	0	0	0	0	0	0	31	31	28	24	0	20.2	6.2	4.6
August	31	0	0	0	0	0	0	31	31	15	8	0	19.4	6.0	5.1
September	30	0	0	0	0	0	0	26	6	0	0	0	17.1	5.2	4.1
October	31	0	0	0	0	0	0	0	0	0	0	0	11.9	3.3	2.2
November	30	0	11	0	9	0	0	0	0	0	0	0	8.7	2.8	1.3
December	31	0	23	0	20	0	0	0	0	0	0	0	6.5	1.4	0.6
2008															
January	31	0	31	0	31	0	0	0	0	0	0	0	4.2	1.3	0.6
February	29	0	20	0	17	0	0	0	0	0	0	0	7.4	1.7	1.2
March	31	0	6	0	0	0	0	0	0	0	0	0	8.1	2.7	1.5
April	30	0	1	0	0	0	0	0	0	0	0	0	10.5	3.4	2.2

KLCOWCAMPX

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	15	0	8	0	0	0	0	0	0	0	0	0	10.4	5.9	4.4
June	30	0	2	0	0	0	0	10	0	0	0	0	13.8	8.8	5.0
July	31	0	0	0	0	0	0	31	26	18	15	0	22.0	14.3	8.8
August	31	0	1	0	0	4	0	31	31	31	28	3	23.5	15.6	12.7
September	30	0	14	0	0	0	0	26	16	15	14	0	22.5	16.3	11.8
October	31	6	26	1	13	0	0	0	0	0	0	0	9.6	6.0	3.3
November	30	17	30	11	29	0	0	0	0	0	0	0	5.3	3.8	1.7
December	31	24	31	21	31	0	0	0	0	0	0	0	3.1	1.4	0.3
2008															
January	31	28	31	28	31	0	0	0	0	0	0	0	0.6	0.3	0.0
February	29	12	29	11	29	0	0	0	0	0	0	0	0.9	0.2	0.0
March	31	0	31	0	31	0	0	0	0	0	0	0	1.8	0.3	0.1
April	30	0	30	0	30	0	0	0	0	0	0	0	3.9	2.9	0.8

KLHATCHTRP

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	14	0	0	0	0	0	0	3	0	0	0	0	13.3	3.7	2.7
June	30	0	0	0	0	0	0	26	0	0	0	0	14.6	4.5	3.3
July	31	0	0	0	0	0	0	31	18	0	0	0	17.9	4.8	3.9
August	31	0	0	0	0	0	0	31	1	0	0	0	16.8	4.8	4.0
September	30	0	0	0	0	0	0	15	0	0	0	0	14.7	4.2	3.1
October	31	0	6	0	4	0	0	0	0	0	0	0	9.3	2.5	1.6
November	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
December	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
2008															
January	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
February	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
March	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
April	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--

KLnewLYLETRP

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	11	0	0	0	0	0	0	11	2	0	0	0	17.1	4.8	3.8
June	30	0	0	0	0	0	0	30	13	0	0	0	18.1	4.7	2.9
July	31	0	0	0	0	0	0	31	31	30	29	0	20.3	3.0	2.1
August	31	0	0	0	0	0	0	31	31	17	7	0	19.2	2.5	1.6
September	30	0	0	0	0	0	0	26	7	0	0	0	17.6	2.1	1.4
October	31	0	0	0	0	0	0	0	0	0	0	0	11.6	1.9	1.0
November	2	0	0	0	0	0	0	0	0	0	0	0	6.8	1.1	0.9
December	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
2008															
January	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
February	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
March	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
April	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--

KYKFPHQAIR

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	2	0	0	0	0	2	2	2	2	2	2	2	32.8	24.9	21.2
June	30	0	5	0	0	19	16	30	30	30	30	25	33.6	27.8	16.7
July	31	0	0	0	0	31	30	31	31	31	31	31	37.4	26.2	19.4
August	31	0	0	0	0	29	28	31	31	31	31	31	37.4	29.1	19.8
September	30	2	11	0	0	22	20	30	30	30	30	26	34.9	30.7	20.3
October	31	9	22	0	4	4	1	31	28	21	19	0	25.6	22.7	16.2
November	11	11	11	0	4	0	0	11	8	7	1	0	21.3	22.4	18.8
December	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
2008															
January	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
February	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
March	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
April	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--

LKLIKLODGE

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	17	0	0	0	0	1	1	17	5	1	0	0	30.4	19.9	7.2
June	30	0	0	0	0	0	0	30	23	9	2	0	20.5	9.1	6.7
July	31	0	0	0	0	8	0	31	31	31	31	18	24.0	10.5	8.4
August	31	0	0	0	0	0	0	31	31	31	31	0	22.9	10.7	8.6
September	30	0	1	0	0	0	0	27	14	8	7	0	20.6	9.2	7.0
October	31	0	6	0	3	0	0	0	0	0	0	0	12.2	5.4	3.3
November	30	6	28	4	22	0	0	0	0	0	0	0	7.3	3.6	1.9
December	31	6	31	4	31	0	0	0	0	0	0	0	4.6	2.8	1.2
2008															
January	31	19	31	12	31	0	0	0	0	0	0	0	2.9	1.9	0.9
February	29	5	29	0	29	0	0	0	0	0	0	0	5.4	2.7	1.7
March	31	0	31	0	29	0	0	0	0	0	0	0	6.5	4.9	2.6
April	30	0	30	0	14	0	0	0	0	0	0	0	10.2	6.5	4.3

LKLIKMOUTH

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	19	0	0	0	0	0	0	19	6	3	2	0	19.4	4.9	3.2
June	30	0	0	0	0	0	0	30	30	22	17	0	22.2	5.8	3.9
July	31	0	0	0	0	8	3	31	31	31	31	18	24.2	5.7	4.2
August	31	0	0	0	0	0	0	31	31	31	31	0	22.0	5.0	3.5
September	30	0	0	0	0	0	0	25	9	6	5	0	19.3	3.3	2.5
October	31	0	4	0	0	0	0	0	0	0	0	0	12.2	2.3	1.6
November	30	0	16	0	12	0	0	0	0	0	0	0	9.1	3.1	1.2
December	31	0	31	0	27	0	0	0	0	0	0	0	5.2	2.0	1.0
2008															
January	31	9	31	7	31	0	0	0	0	0	0	0	4.1	2.6	0.9
February	29	0	22	0	19	0	0	0	0	0	0	0	7.2	2.5	1.7
March	31	0	13	0	0	0	0	0	0	0	0	0	8.4	3.3	2.0
April	30	0	3	0	0	0	0	0	0	0	0	0	12.2	4.2	2.9

LKLIKOLSEN

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	17	0	0	0	0	0	0	17	13	7	7	1	22.7	8.0	5.4
June	30	0	0	0	0	7	2	30	30	30	30	7	25.1	9.5	6.8
July	31	0	0	0	0	26	24	31	31	31	31	31	28.8	10.5	7.6
August	31	0	0	0	0	22	9	31	31	31	31	27	25.9	9.0	6.9
September	30	0	0	0	0	0	0	30	20	16	15	4	22.5	7.6	5.6
October	31	0	3	0	0	0	0	14	0	0	0	0	14.3	4.3	3.1
November	30	0	16	0	11	0	0	0	0	0	0	0	9.2	4.0	2.1
December	31	1	31	0	31	0	0	0	0	0	0	0	4.7	3.0	1.2
2008															
January	31	14	31	7	31	0	0	0	0	0	0	0	3.6	2.2	1.2
February	29	1	29	0	22	0	0	0	0	0	0	0	6.9	3.3	2.4
March	31	0	27	0	10	0	0	0	0	0	0	0	8.1	4.1	2.8
April	30	0	10	0	0	0	0	0	0	0	0	0	12.3	5.1	3.9

LOGGCAMPCR

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	19	0	0	0	0	0	0	17	0	0	0	0	15.4	3.0	1.9
June	30	0	0	0	0	0	0	30	3	1	0	0	17.3	2.7	1.8
July	31	0	0	0	0	24	20	31	31	31	31	26	29.7	14.8	8.4
August	31	0	0	0	0	27	22	31	31	31	31	31	29.9	14.4	10.4
September	30	0	0	0	0	11	8	30	28	25	24	14	26.6	13.7	9.7
October	31	0	0	0	0	0	0	15	0	0	0	0	14.9	7.0	2.7
November	30	0	3	0	1	0	0	0	0	0	0	0	9.5	1.9	0.4
December	31	0	17	0	7	0	0	0	0	0	0	0	8.4	2.0	0.7
2008															
January	31	0	27	0	21	0	0	0	0	0	0	0	5.6	1.6	0.8
February	29	0	18	0	9	0	0	0	0	0	0	0	6.9	1.7	1.1
March	31	0	11	0	1	0	0	0	0	0	0	0	8.0	2.8	1.8
April	30	0	4	0	0	0	0	0	0	0	0	0	10.6	3.4	2.3

MCCREEDRDX

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	15	0	7	0	0	0	0	0	0	0	0	0	9.9	4.5	3.1
June	30	0	1	0	0	0	0	0	0	0	0	0	10.8	4.0	2.4
July	31	0	0	0	0	0	0	0	0	0	0	0	11.6	3.3	2.3
August	31	0	0	0	0	0	0	0	0	0	0	0	10.4	2.6	2.0
September	30	0	2	0	0	0	0	0	0	0	0	0	9.1	2.5	1.8
October	31	0	14	0	8	0	0	0	0	0	0	0	6.7	1.7	1.2
November	30	0	24	0	20	0	0	0	0	0	0	0	6.0	1.9	1.0
December	31	0	31	0	31	0	0	0	0	0	0	0	3.2	1.9	0.9
2008															
January	31	28	31	26	31	0	0	0	0	0	0	0	3.1	3.3	1.3
February	29	29	29	29	29	0	0	0	0	0	0	0	0.0	2.3	0.6
March	31	31	31	25	31	0	0	0	0	0	0	0	6.0	6.0	1.2
April	30	22	30	4	25	0	0	1	0	0	0	0	18.9	19.2	7.6

OUTLETRDXG

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	16	0	0	0	0	0	0	16	4	1	0	0	18.3	6.4	4.9
June	30	0	0	0	0	0	0	30	30	30	26	0	22.7	8.1	4.6
July	31	0	0	0	0	25	22	31	31	31	31	31	27.5	6.4	3.8
August	31	0	0	0	0	8	4	31	31	31	31	14	25.1	5.4	3.7
September	30	0	0	0	0	0	0	29	17	15	14	0	20.7	4.5	2.5
October	31	0	0	0	0	0	0	0	0	0	0	0	10.9	2.0	1.2
November	30	9	26	8	16	0	0	0	0	0	0	0	7.3	3.3	1.3
December	31	28	31	23	31	0	0	0	0	0	0	0	1.5	1.1	0.5
2008															
January	31	31	31	31	31	0	0	0	0	0	0	0	0.9	0.7	0.1
February	29	19	29	18	28	0	0	0	0	0	0	0	6.2	2.8	0.9
March	31	0	13	0	6	0	0	0	0	0	0	0	10.4	4.1	2.7
April	30	0	2	0	0	0	0	10	0	0	0	0	15.6	6.7	4.1

PISCOMOUTH

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	15	0	0	0	0	0	0	1	0	0	0	0	12.5	4.5	3.4
June	30	0	0	0	0	0	0	8	0	0	0	0	13.8	5.0	3.4
July	31	0	0	0	0	0	0	31	1	0	0	0	16.6	5.1	4.1
August	31	0	0	0	0	0	0	31	0	0	0	0	15.5	4.7	3.5
September	30	0	1	0	0	0	0	4	0	0	0	0	12.5	3.6	2.7
October	31	0	14	0	10	0	0	0	0	0	0	0	7.9	2.3	1.5
November	30	3	30	0	27	0	0	0	0	0	0	0	5.1	2.4	1.0
December	31	17	31	12	31	0	0	0	0	0	0	0	2.4	1.8	0.5
2008															
January	31	20	31	15	31	0	0	0	0	0	0	0	1.6	1.0	0.4
February	29	1	29	0	29	0	0	0	0	0	0	0	2.9	1.0	0.5
March	31	4	31	0	31	0	0	0	0	0	0	0	3.2	1.6	1.0
April	30	3	30	0	30	0	0	0	0	0	0	0	4.6	2.7	1.7

SNYDRMOUTH

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	17	0	0	0	0	0	0	17	12	6	5	0	20.8	6.9	5.2
June	30	0	0	0	0	6	1	30	30	30	30	5	24.3	12.3	5.1
July	31	0	0	0	0	31	31	31	31	31	31	31	32.1	14.7	10.9
August	31	0	0	0	0	25	17	31	31	31	31	31	28.4	12.5	9.4
September	30	0	0	0	0	6	3	30	28	25	22	13	26.4	12.5	9.4
October	31	1	7	0	3	0	0	17	0	0	0	0	16.6	8.1	5.3
November	30	0	9	0	6	0	0	0	0	0	0	0	9.9	5.3	1.7
December	31	0	28	0	27	0	0	0	0	0	0	0	5.6	1.6	0.7
2008															
January	31	8	31	5	31	0	0	0	0	0	0	0	4.1	1.9	0.9
February	29	0	29	0	23	0	0	0	0	0	0	0	6.0	1.9	1.2
March	31	0	25	0	8	0	0	0	0	0	0	0	7.1	3.1	2.0
April	30	0	7	0	2	0	0	0	0	0	0	0	11.4	4.3	2.8

SURVEYORSX

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	14	0	0	0	0	0	0	0	0	0	0	0	11.8	3.9	2.9
June	30	0	0	0	0	0	0	0	0	0	0	0	13.3	4.3	2.9
July	31	0	0	0	0	0	0	30	0	0	0	0	15.0	3.9	3.0
August	31	0	0	0	0	0	0	14	0	0	0	0	13.9	3.4	2.6
September	30	0	0	0	0	0	0	0	0	0	0	0	12.1	2.9	2.2
October	31	0	11	0	6	0	0	0	0	0	0	0	8.2	2.0	1.5
November	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
December	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
2008															
January	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
February	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
March	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
April	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--

TEPEEIXLRDX

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	16	0	0	0	0	0	0	8	0	0	0	0	15.5	7.6	5.6
June	30	0	0	0	0	0	0	28	0	0	0	0	17.1	7.8	5.6
July	31	0	0	0	0	0	0	31	23	9	2	0	19.2	7.9	6.1
August	31	0	0	0	0	0	0	15	3	0	0	0	17.1	7.2	4.0
September	30	0	4	0	0	0	0	0	0	0	0	0	10.2	3.1	1.7
October	31	0	17	0	10	0	0	0	0	0	0	0	7.6	3.0	1.8
November	30	14	29	11	27	0	0	0	0	0	0	0	5.9	4.0	1.3
December	31	24	31	22	31	0	0	0	0	0	0	0	2.3	1.4	0.6
2008															
January	31	28	31	27	31	0	0	0	0	0	0	0	1.3	1.0	0.2
February	29	18	29	15	29	0	0	0	0	0	0	0	2.5	1.1	0.5
March	31	0	31	0	31	0	0	0	0	0	0	0	3.4	2.4	1.0
April	30	2	30	0	28	0	0	0	0	0	0	0	6.2	3.9	2.0

TROUTRVRTRDX

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	18	0	0	0	0	0	0	13	2	0	0	0	16.9	5.8	3.9
June	30	0	0	0	0	0	0	30	7	1	0	0	19.8	5.6	4.3
July	31	0	0	0	0	0	0	31	31	30	30	0	22.8	6.4	5.1
August	31	0	0	0	0	0	0	31	31	16	9	0	20.9	6.4	5.2
September	30	0	0	0	0	0	0	17	6	0	0	0	17.5	5.5	4.2
October	31	1	10	0	6	0	0	0	0	0	0	0	10.0	3.1	2.3
November	30	13	29	10	27	0	0	0	0	0	0	0	6.4	4.6	1.4
December	31	27	31	26	31	0	0	0	0	0	0	0	1.5	1.1	0.4
2008															
January	31	29	31	25	31	0	0	0	0	0	0	0	1.7	1.1	0.3
February	29	16	29	13	29	0	0	0	0	0	0	0	3.1	1.1	0.6
March	31	0	31	0	31	0	0	0	0	0	0	0	5.1	2.4	1.6
April	30	0	27	0	12	0	0	0	0	0	0	0	7.5	3.8	2.4

WESTFORKRX

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	14	0	0	0	0	0	0	0	0	0	0	0	11.1	3.7	2.5
June	30	0	0	0	0	0	0	0	0	0	0	0	12.7	4.0	2.5
July	31	0	0	0	0	0	0	0	0	0	0	0	11.9	4.0	3.1
August	31	0	0	0	0	0	0	0	0	0	0	0	11.0	3.9	2.9
September	30	0	6	0	0	0	0	0	0	0	0	0	9.3	3.3	2.3
October	30	0	19	0	11	0	0	0	0	0	0	0	6.6	2.0	1.4
November	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
December	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
2008															
January	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
February	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
March	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--
April	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--

WHITEIXLRDX

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	16	0	0	0	0	0	0	5	0	0	0	0	14.3	6.8	5.0
June	30	0	0	0	0	0	0	24	0	0	0	0	15.5	7.8	5.6
July	31	0	0	0	0	0	0	31	30	24	22	2	22.5	15.4	8.5
August	31	0	4	0	0	14	9	31	31	31	31	17	28.6	20.6	15.3
September	30	4	19	0	1	1	0	27	16	15	15	2	23.2	19.3	13.8
October	31	10	26	5	15	0	0	0	0	0	0	0	11.3	9.4	6.6
November	30	25	30	15	28	0	0	0	0	0	0	0	7.8	8.1	3.6
December	31	29	31	28	31	0	0	0	0	0	0	0	1.2	1.1	0.4
2008															
January	31	28	31	28	31	0	0	0	0	0	0	0	0.9	2.0	0.4
February	29	20	29	17	29	0	0	0	0	0	0	0	1.5	1.0	0.4
March	31	1	31	0	31	0	0	0	0	0	0	0	3.4	1.7	1.0
April	30	0	30	0	30	0	0	0	0	0	0	0	5.4	2.8	1.7

WHITEMOUTH

2007	# Days	# 1Day Min		# 1Day Avg		# 1Day Max		#7Day Avg Daily Max					Monthly 1	Monthly 1 Day	Monthly Avg
	Recorded	< 0.5	< 4.4	<0.5	<4.4	>23	>24	>12	>16	>17.5	>18	>22	Day Max	Max Range	Daily Range
May	18	0	0	0	0	0	0	16	3	0	0	0	17.4	5.2	3.3
June	30	0	0	0	0	0	0	30	27	15	4	0	19.9	6.4	4.6
July	31	0	0	0	0	1	0	31	31	31	31	9	23.2	8.3	6.4
August	31	0	0	0	0	2	2	31	31	31	31	4	24.6	11.4	7.5
September	30	0	7	0	0	1	0	30	18	17	16	2	23.9	14.6	9.9
October	31	8	19	2	8	0	0	0	0	0	0	0	13.5	9.8	5.5
November	30	13	29	3	27	0	0	0	0	0	0	0	6.8	5.5	3.1
December	31	7	31	0	31	0	0	0	0	0	0	0	2.8	1.8	0.8
2008															
January	31	16	31	12	31	0	0	0	0	0	0	0	2.8	1.5	0.6
February	29	0	29	0	29	0	0	0	0	0	0	0	3.9	1.4	1.0
March	31	0	31	0	31	0	0	0	0	0	0	0	5.0	2.7	1.6
April	30	0	26	0	12	0	0	0	0	0	0	0	8.5	4.2	2.6

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