Chinook Salmon Spawning Study
Russian River Fall 2005

Sonoma County Water Agency
2150 West College Avenue
Santa Rosa, California 95401

Prepared by
David Cook - Senior Environmental Specialist

March 27, 2006

INTRODUCTION

Chinook salmon native to the Russian River basin were considered nearly extinct in the 1980's but in recent years have been found in increasing numbers. The Sonoma County Water Agency (Agency) began conducting Chinook salmon spawning surveys during fall 2002 to address concerns that reduced water releases from Lake Mendocino may impact migrating and spawning Chinook salmon (Cook 2005). Releases were curtailed from the lake during fall 2002 and 2004 due to below normal rainfall and low levels in the lake. In 2003 and 2005 water releases from Lake Mendocino were normal and were not expected to affect spawning salmon. Water releases from Lake Mendocino provide most of the flows in the upper Russian River during the fall season when adult Chinook salmon migrate upstream to spawn. This report briefly summarizes 2005 findings that were curtailed due to poor conditions for detecting Chinook salmon redds. Background information on the natural history of Chinook salmon and findings from 2002 to 2004 are presented in Cook (2005).

METHODS

This study consisted of Chinook salmon redd investigations in selected reaches of the upper Russian River and 2 tributaries (Figure 1). Surveys were conducted from 9 November to 21 November, 2005. For reasons discussed below, surveys during 2005 were limited to the Ukiah Valley from the Largo Gage Station near Hopland to East and West Forks of the Russian River, Alexander Valley from Alexander Valley Road Bridge to Crocker Road Bridge, and Dry Creek from the Russian River to Warm Springs Dam (Lake Sonoma). In addition, a section of Big Sulphur Creek, a tributary of the Russian River near Cloverdale, was added to the study in 2005. This reach was surveyed from the confluence of an unnamed creek (latitude 38.8180285, longitude 122.9526115) to Frazier Creek (latitude 38.8284731, longitude 122.9111982), a distance of 6.0 river kilometers (rkm).

The study area in 2005 was restricted to 4 reaches totaling approximately 55 river km (34 river miles) due to poor survey conditions. Previous studies included approximately 135 river km (84 river miles) of the upper Russian River and Dry Creek (Cook 2005). Spawner surveys require safe boating conditions and sufficient water visibility to detect redds. Unfortunately, high flows

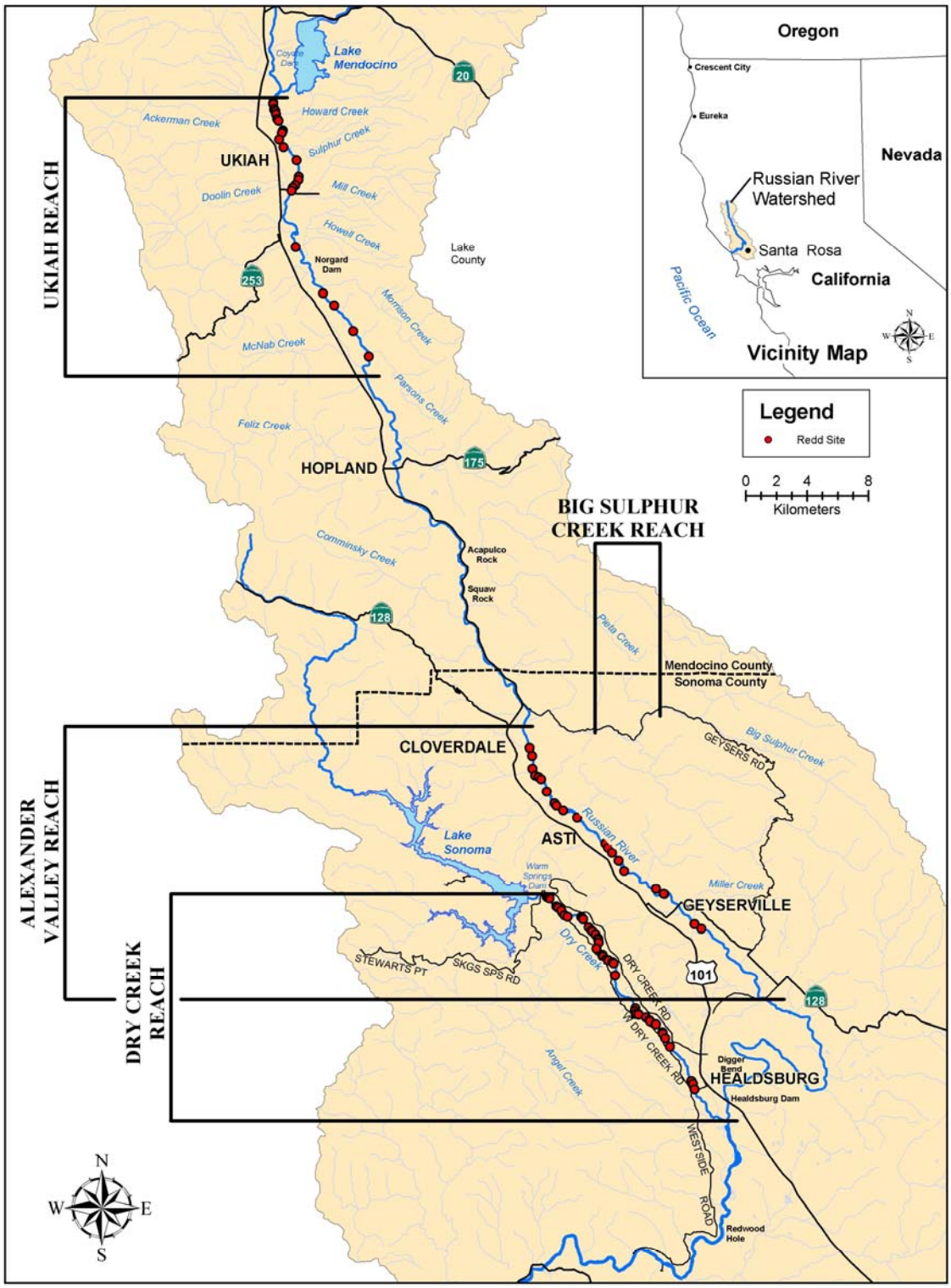

Figure 1: Chinook salmon study reaches and redds locations, Russian River watershed.

at the onset of the Chinook salmon migration period prevented safe boating and increased water turbidity. Also, the fall run of Chinook salmon appeared to be later in the season than in past runs (Shawn Chase, Sonoma County Water Agency, pers. comm.). This shortened our window of opportunity to conduct redd surveys.

Surveys were conducted to assess the distribution and abundance of Chinook salmon redds and spawning habitat. Surveys were initiated after video monitoring at the Agency's inflatable dam indicted that migrating adult Chinook salmon were in the upper Russian River basin (Shawn Chase, Sonoma County Water Agency, unpublished data). A crew of 2 or 3 biologists surveyed study reaches by kayak and visually searched for redds along the streambed. Coordinates of observed redds were recorded using a Garmin GPS III Plus global positioning system. Observations of spawning salmon and carcasses were also recorded.

RESULTS AND DISCUSSION

We conducted repeated preliminary surveys to assess Chinook salmon spawning activity and water conditions. Preliminary surveys detected only a few redds along river reaches where redds were observed in abundance during past fall season surveys (Cook 2005). Early fall rains caused high river flows and poor water visibility that limited our ability to conduct surveys and made the detection of redds difficult or impossible. Chinook salmon monitoring at the Agency's inflatable dam was also affected by these hydrological patterns, but the fall run appeared to be about 2 weeks later than previous years and the number of adults was approximately half the recorded number in fall 2004 (Chase 2005; Shawn Chase, Sonoma County Water Agency, unpublished data).

Redd Distribution and Abundance

Although redd surveys during fall 2005 underestimated redd numbers and surveys were restricted to a few locations in the upper Russian River basin, the pattern of redd abundance and distribution can provide a qualitative description of spawning activity. A few Chinook salmon adults and redds were observed in the lower Ukiah Valley (Largo Gage Station near Hopland to Talmage Road Bridge) and Alexander Valley (Alexander Valley Road Bridge to Crocker Road Bridge), but poor visibility limited our ability to quantify the number of redds. Figure 1 shows the location of redd observations and Figure 2 includes photographs of field sites. Water conditions below dams provided slightly better visibility compared to downstream reaches that were affected by higher levels of turbidity from tributaries. The upper Ukiah Valley and Dry Creek reaches are located below Coyote Dam and Warm Springs Dam, respectively (Figure 1). Redds were observed in reasonable numbers in these 2 reaches and are further discussed below.

In 2005, upper Ukiah Valley and Dry Creek Chinook salmon redd observations were lower than numbers observed during previous years (Figures 3 and 4). However, due to the survey limitations in 2005 this does not necessarily indicate a decline in spawning Chinook salmon. In the upper Ukiah Valley reach, from Talmage Road Bridge to East and West Forks, 36 redds were observed on 14 November, 2005. Adults were observed holding on riffles, presumably on redds, but the presence or absence of redds could not be visually verified. In the Dry Creek reach 94 redds were observed on 16 November, 2005. The geographic distribution of observed redds in

Figure 2: Photographs from Chinook salmon redd surveys on 21 November 2005 along the Russian River, near Cloverdale. A female Chinook salmon carcass (top) was found near a large redd shown in the foreground of the bottom photograph.

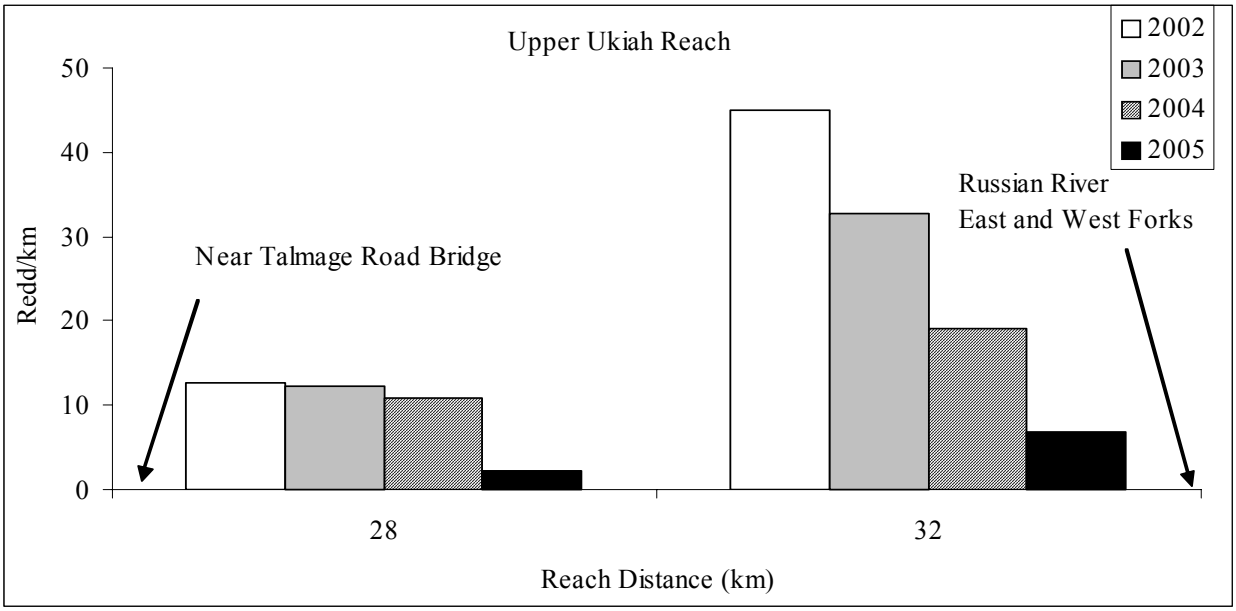

Figure 3: Frequency of Chinook salmon redds along the Russian River in Upper Ukiah Valley. Poor water visibility limited redd detections in 2005. Ukiah Valley river distances are 0 rkm at Highway 101 Bridge (Hopland) in lower Ukiah Valley to 32 rkm at the East and West Forks. Survey distance includes the river from near Talmage Road Bridge (28 rkm) to the East and West Forks (32 rkm).

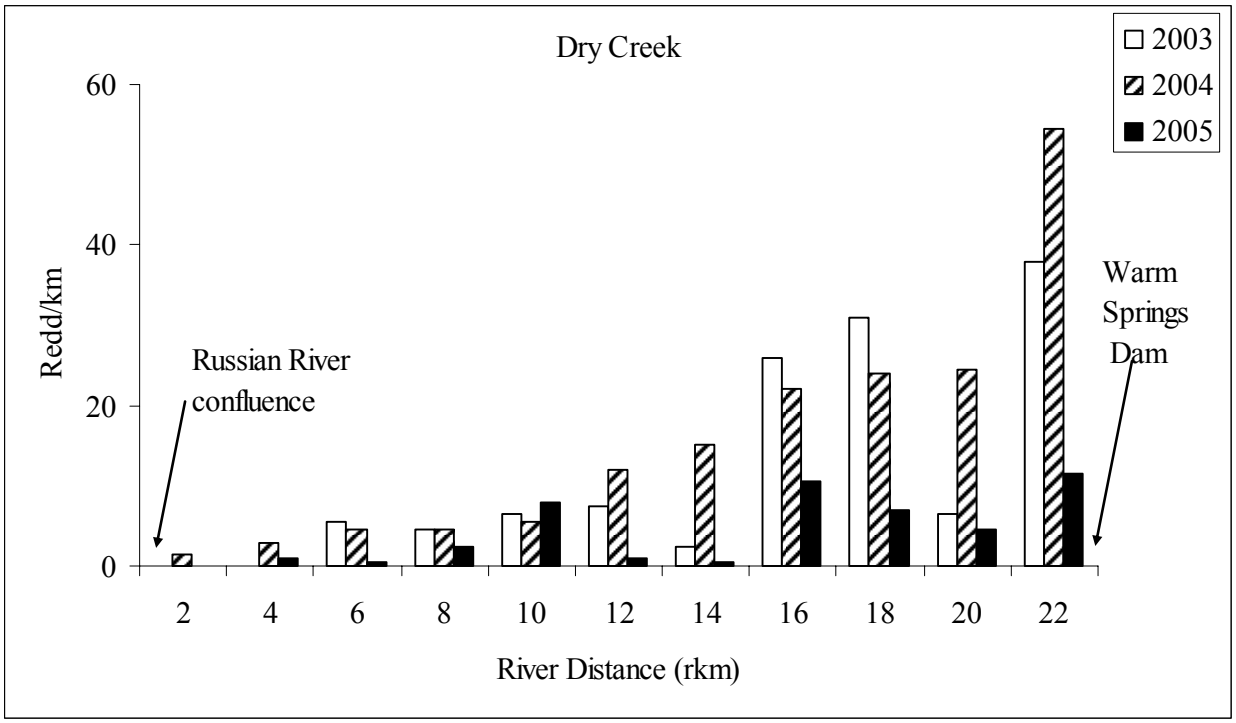

Figure 4: Frequency of Chinook salmon redds along Dry Creek. Poor water visibility limited redd detections in 2005. River distances along Dry Creek extend from the confluence with the Russian River (0 rkm) to Warm Springs Dam at Lake Sonoma (22 rkm).

both the upper Ukiah Valley and Dry Creek reaches were similar to the previous 3 fall seasons (Cook 2005).

A 6.0-rkm reach of Big Sulphur Creek was surveyed on 10 November, 2005 (Figure 1). No Chinook salmon adults or redds were observed in Big Sulphur Creek and the surveyed reach provided marginal spawning habitat. The upper half of the reach is located in a steep canyon with a moderate stream gradient. Riffle habitats had a dominance of cobble and bedrock substrate, and did not provide suitable spawning gravels for Chinook salmon. The lower half of the reach is in a narrow valley with low gradient (Figure 5). Most of the riffles had broad shallow flows and a substrate of fine to medium gravel that probably did not provide suitable spawning habitat for Chinook salmon. Redds in the Russian River mainstem are found almost exclusively in riffle habitats with course gravel to small cobble sized substrate and water depths greater than 20 cm (Cook 2003). A few riffles had larger particle sizes that may provide marginal spawning habitat for Chinook salmon.

REFERENCES

Chase, S., D. Manning, and S. White (Sonoma County Water Agency). 2005. Sonoma County Water Agency's Mirabel Rubber Dam/Wohler pool fish sampling program: year 5 results 2004. Santa Rosa, (CA): Sonoma County Water Agency. Available at www.scwa.ca.gov/naturalresources.html.

Cook, D. (Sonoma County Water Agency). 2003. Chinook salmon spawning study, Russian River, fall 2002. 9 p. Santa Rosa, (CA): Sonoma County Water Agency. Available at www.scwa.ca.gov/naturalresources.html.

Cook, D. (Sonoma County Water Agency). 2005. Chinook salmon spawning study, Russian River, fall 2002-04. 20 p. Santa Rosa, (CA): Sonoma County Water Agency. Available at www.scwa.ca.gov/naturalresources.html.

Figure 5: Big Sulphur Creek near the lower end of the study reach, 10 November, 2005.