Summary of 2006 Feather River Hatchery Spring-run Chinook Fish Ladder Investigations
(**Draft**)

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Recent genetic studies on Chinook salmon in the Feather River (University of California at Davis, Bodega Marine Laboratory, 2002) indicate that a small, but potentially significant difference exists between spring-run Chinook and fall-run Chinook salmon. Considering Central Valley spring-run Chinook salmon are listed as threatened under both the California Endangered Species Act and the Federal Endangered Species Act, it is exceedingly important to conserve spring-run Chinook life history. Restoring reproductive isolation between spring and fall Chinook would maintain the current genetic differences between runs as well as provide a means for restoring former, ostensibly greater, genetic disparity. Assuming the earliest arriving salmon more closely reflect spring-run genetic characteristics, continually capturing and spawning these fish separate from later arriving salmon could maintain and likely increase genetic differentiation between Feather River spring-run and fall-run salmon.

A program was implemented to mark spring-run Chinook salmon entering the hatchery in May and June of 2004. The marking process involves inserting two Hallprint dart tags, one on either side of the dorsal fin. Once marked, fish are released and allowed to over-summer naturally in deep pools of the lower Feather River. During the hatchery spawning season, the mark enables the FRH to spawn early arriving spring-run separately from fall-run Chinook. Beginning in 2006 some of the salmon were given one "reward tag" instead of two regular Hallprint dart tags. This was done to encourage the public to become involved with our program by calling in the Hallprint tag numbers when they recovered a fish with tags. This gives us an idea of the percentage of spring run salmon that were caught by anglers, whether they were kept or released back into the river, and where in the river they were recovered. This data is then summarized and will be used to prepare a report. The following brief summarizes the preliminary results of this program for 2006.

Between May 15 and July 6, 2006, 17,438 spring-run Chinook salmon were marked. Of the salmon that were marked, 10,179 were marked with individually numbered Hallprint dart tags for identification purposes. The other 7,259 were given a caudal fin clip to aid in later identification. There were a total of 120 mortalities during the marking period (.69% overall mortality during initial handling). During the marking period, 1898 Spring-run were recaptured in the FRH and released again before the marking period concluded on July 6$^{th}$. When spawning commenced in the fall, a total of 3,944 fish were recaptured: 1,768 at the FRH, 1,927 in the river escapement survey and 249 by anglers or recreators. The FRH successfully spawned 1180 (67%) spring-run that returned to the hatchery. Two hundred and ten (33%) of the 640 female salmon recovered in the river escapement survey were classified as spent and are thus assumed to have spawned successfully. The majority of spawned females were recovered between the third week

of September and the first week of October, assuming that these fish spawned one to two weeks prior to recovery, the majority of spring run salmon spawned in September.

Table 1. Recovery and spawning status of female tagged spring run salmon from the escapement survey.

| WEEK | Females | |
|---|---|---|
| | Unspent | Spent |
| 5-Sep | 9 | 2 |
| 12-Sep | 13 | 20 |
| 19-Sep | 20 | 44 |
| 26-Sep | 21 | 53 |
| 3-Oct | 15 | 62 |
| 10-Oct | 3 | 24 |
| 17-Oct | 8 | 5 |
| 24-Oct | 0 | 0 |
| 31-Oct | 0 | 0 |

All Spring-run were spawned (in the FRH) between 9/25 and 10/1 with the majority (67%) spawned by 9/28. The majority of fish recaptured in the river were found in the upper reaches of the low flow channel (Figure 1 and Figure 2). Based on the escapement survey recapture data the sex ratio of the marked spring-run was 1.70:1 females to males. Of the 221 marked salmon caught by anglers 80% were harvested.

**Comment [KL1]:** there is a discrepancy in angler/recreator recaps between the call in data sheets, the database, and the 2006 annual report, I used the database recap #s for the springtagbrief_2006.

Preliminary results suggest that this program was successful at individually marking and recapturing spring-run Chinook in the Feather River with very low rates of handling mortality. Providing a mechanism to count the spring-run and visually distinguish them from fall-run at the FRH is vital to restoring and protecting genetic diversity. Future efforts will focus on marking more spring-run and refining the tagging process to increase tag retention and recovery.

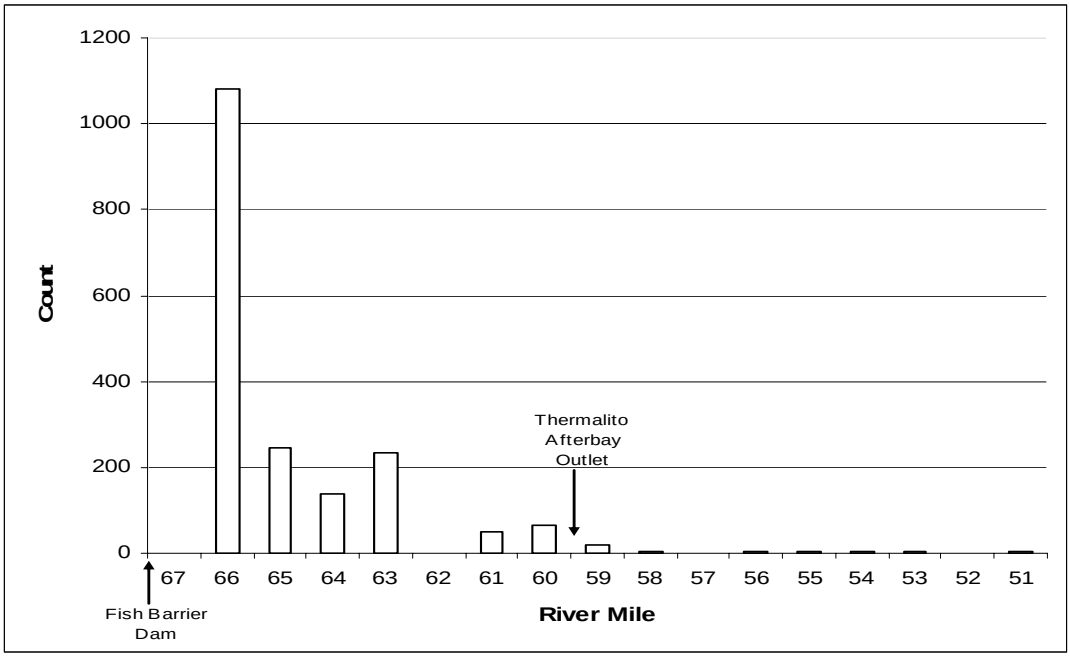


Figure 1. Number of salmon recaptured by River Mile in the escapement survey.

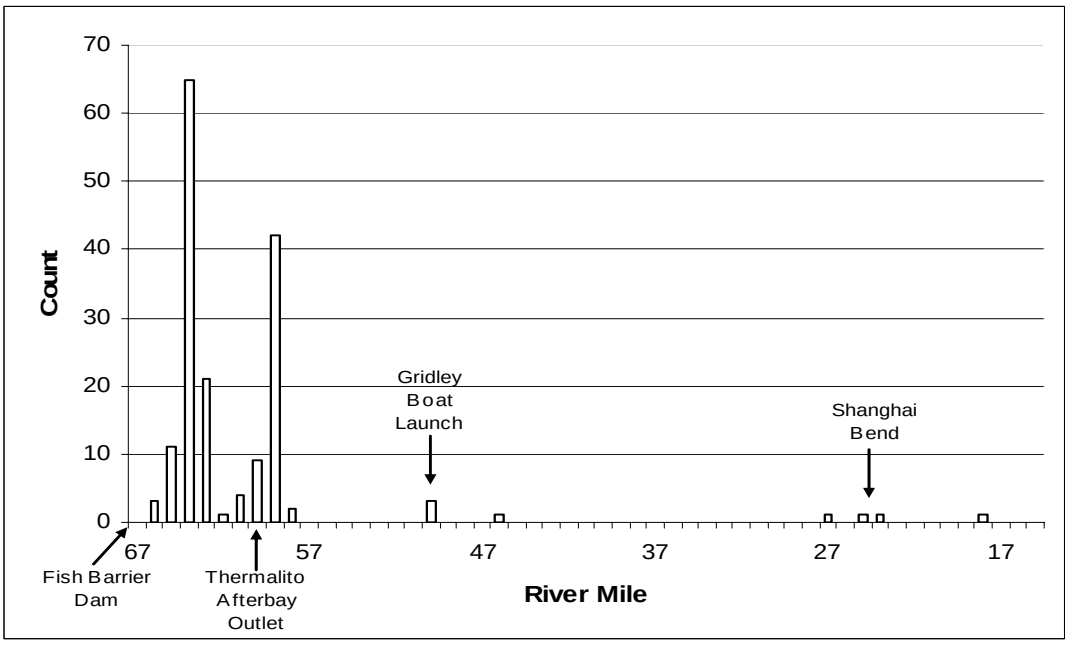


Figure 2. Number of salmon recaptured by anglers per River Mile.