Final Report

Downstream Migrant Trapping, 2004 Season
Mattole River
Agreement # PO210558

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Background

The Mattole River, along the Lost Coast of northern California is over 63 miles long and drains the 304 square mile Mattole watershed. As part of a watershed approach to native salmonid and aquatic habitat enhancement, the Mattole Salmon Group (MSG) has been assessing salmonid populations and their limiting factors for over 24 years. One of the primary goals of the MSG is the recovery of native salmon and steelhead stocks to robust, self-perpetuating population levels. Because of the considerable effort and expense devoted to the rehabilitations and recovery of natural systems, including native salmon and Steelhead and their habitat, an integral component of watershed restoration is appropriate monitoring activities. The MSG has conducted downstream migrant trapping annually since 1985, in cooperation with Humboldt State University (HSU), the Bureau of Land Management (BLM), the US Fish and Wildlife Service (USFWS), and the California Department of Fish and Game (DFG). Due to high levels of natural variability, monitoring population trends among the three resident salmonid species of the Mattole requires a long-term approach. MSG intends to continue to conduct its current monitoring programs in partnership with state and federal agencies.

Introduction

The MSG has conducted annual population monitoring of juvenile salmonids (via downstream migrant trapping in spring and early summer) in the lower mainstem Mattole River since 1985 (fyke trap through 1996, and a 5' screw trap thereafter), in lower Bear Creek since 1997 (pipe trap), and in the middle mainstem Mattole near Ettersburg beginning in 2001 (pipe trap). Data collected provides valuable information and insights on the timing of down-migration, relative abundance, size of emigrating juvenile salmonids, and differences between wild and artificially propagated (marked) juvenile salmonids. Data also serve as an indicator of adult escapement, reproductive conditions, in stream habitat quality, and future recruitment to adult populations. To assess such factors, downstream migrant trapping needs to be conducted over many consecutive years, particularly for trend analysis purposes. Although downstream migrant studies in the Mattole River watershed are primarily directed at juvenile Chinook and Coho salmon, data on juvenile steelhead are gathered and analyzed as well, presenting an opportunity for expansion of this program to include a focus on steelhead.

Techniques and Methods

All traps are operated 3 to 4 days a week, (see Table-1 for target sampling dates and schedules) unless high stream flows or excessive water temperatures pose risk to the

survival of captured fish. After river-mouth closure, the lower mainstem screw trap is operated continuously in order to obtain sufficient juvenile Chinook for the MSG's rescue rearing program. Traps are not operated when water temperatures are high enough to cause significant (>5%) mortalities to trapped fish. During heat spells when water temperatures are consistently over 70°F, traps are not operated and will remain non-operational until safe temperature limits recur. Traps are not operated when high flows may cause water velocities within the live box to exceed the swimming capabilities of the smallest fish, which may result in mortalities greater than 5%. Live boxes are checked and cleared of debris more than once a day during periods of high flow and/or in very windy conditions. Heavy loads of algae (filamentous green algae and *Nostoc* [gelatinous algae]) during low-flow periods often require the cleaning of live boxes twice daily. Traps and live boxes are inspected daily during operation to check for any damage. All dip nets are inspected prior to each daily use to check for rips in the mesh. Fish holding buckets are inspected weekly for leaks, cracks and sharp protrusions. Fish safety is paramount, and information gathering is considered secondary.

Traps are checked in early morning when water temperatures are low. Captured fish are anesthetized with MS-222, identified to species, enumerated, and juvenile salmonids are examined for hatchery marks and categorized according to developmental stage (young-of-the-year, parr, and smolt). On one or two trapping days per week, fork lengths are taken from random samples of up to 30 salmonids of each developmental stage and placed in a marked/unmarked category. Data are recorded on special field forms copied on "Rite-in-the-Rain" paper. With the exception of juvenile Chinook transported upstream to test trap efficiency (see next paragraph), all fish are released well below the trap in shallow quiet water away from larger fish predators.

Weekly trap efficiencies are estimated for out-migrating Chinook smolts using standard mark-recapture techniques. The Mattole has too few Coho to undertake efficiency estimation, and for juvenile steelhead we found that they don't emigrate promptly after marking and release. The mark-recapture protocol for Chinook is as follows: On day 1 of each week, up to 200 juvenile Chinook are marked by snipping a thin vertical slice from the tip of the caudal fin, alternating between the upper and lower caudal lobes in successive weeks. Chinook marked for trap efficiency trials are held in a live box to assess mortality from handling and marking, and then are released about 150 yards upstream from the trap (ideal release time is at dusk to reduce predation. Recaptures of marked Chinook occur over the ensuing 3 days. In three years of trap efficiency estimation in the lower mainstem Mattole near Petrolia, nearly all recaptures have occurred the morning following release (day 2 of trapping). We seldom have recaptures on day 3, and have very rarely sampled a marked Chinook on day 4.

Quality Assurance/Quality Control Procedures

Prior to the initiation of trapping, a half-day training session is required annually for all trap personnel. Training is given by experienced MSG staff (Gary D. Peterson, Deva Wheeler, and Sean James) and covers fish identification, trap operation, fish measurement (fork lengths of juvenile salmonids), data recording, trap efficiency

estimation, safety, and QA/QC procedures. Trained trap operators count the total number of fish trapped, and are able to accurately identify the species of each individual fish. On at least one trapping day every two weeks, the Principal Investigator (or designee) verifies identification and re-measures a 20% sample of captured salmonids. If greater than 1% error in identification or 10% error in measurement is found, the trap operator receives additional review in identification and/or measurement techniques.

All trapping operations are conducted in close coordination and communication with DFG personnel stationed in Eureka. Live boxes (on pipe traps only) have a means (devices) to separate young-of-the-year from older fish to reduce predation. When in operation, traps are monitored and cleaned at least once a day, and more often when debris loading or increased fish numbers could cause increased mortality. If mortality should exceed 5 percent on any single day, trapping is suspended immediately and DFG personnel notified within 24 hours. Resumption of trapping shall occur only after DFG concurrence that corrective action has been implemented to eliminate mortality.

Table-1

Station Name	Sampling Location	Sampling Gear	Sampling Schedule
lower mainstem Mattole River	near confluence of Mill Creek (river-mile 3.2) T2S, R2W, Section 16	Rotary-screw trap (5' diameter cone)	4/15 – 7/15 4 days on, 3 days off until mouth closes, then continuous trapping
middle mainstem Mattole River	just upstream from Bear Creek confluence (river-mile 42.8) T4S, R2E, Section 7	Pipe trap (dual 6" pipes), with 2 screened live boxes in series	4/1 – 6/1 At least 4 days per week
Bear Creek (enters Mattole River at river-mile 42.8, near Ettersburg)	0.6 miles upstream from mouth T4S, R2E, Section 7	Pipe trap (dual 6" pipes), with 2 screened live boxes in series	4/1 – 6/1 At least 4 days per week

Results

The 2004 season started later than usual due to issues confronted in the application and processing of the appropriate Scientific Collecting Permit and Memorandum of Understanding. Therefore, the two pipe traps located in Bear Creek and the middle mainstem Mattole were not operated this season. As shown in Table-1, the desired sampling schedule for these two trapping locations is from 4/1 to 6/1. Permission to initiate trapping was not given until after 6/1.

Downstream migrant trapping was conducted from 6/14 to 7/11 at river-mile 3.2, near the confluence of Mill Creek. The previous years trapping site, at river-mile 2.9, was found to be deeper and wider this year, so a canoe survey was conducted to scout for a new trapping location. A suitable site was found just upstream of the previous site, at river-

mile 3.2. The trap was installed along with weirs on both the left and right bank. These weirs were constructed to direct the migrating fish into the trap.

Two training sessions were given for all trap personnel, given by Gary Peterson and Deva Wheeler. Both Gary and Deva have extensive experience in downstream migrant trapping. Trapping personnel trained included Sean James, Reid Bryson, Mijanou Brown, Marika Smith, Olympia Franklin, Dick Brown, Bob Hoyle, David O'Donnell, Jody Pennycook, Drew Barber, Ben LeVering, and Steve Fortney.

Trapping conducted from 6/14 to 7/11 went extremely well. There were very few mortalities as MSG personnel followed protocol exactly. A total of 25 mortalities occurred; 5 Chinook, 15 steelhead young of the year, and 5 steelhead parr. Temperatures were monitored daily to keep track of warming trends. A high of 80°F was reached on two separate days. On days where high temperatures prevailed, blocks of ice were used to keep temperatures low while handling and identifying took place. Debris levels were fairly high, consisting of leaves, sticks, cones, and filamentous and *Nostoc* algae. This debris constantly bombarded the weir panels, and cleaning was done once in the morning, and once in the early evening depending on debris levels. Debris in the live box was minimized by a debris wheel device, which constantly removed debris from the live box as the 5' cone turned.

One trap efficiency test was conducted on June 14th, the first day of trapping. 156 wild Chinook were marked with a caudal fin clip and released 200 meters upriver from the trap site. A trap efficiency of 31% was obtained as 48 of the 156 were recaptured within the following 3 days. Further trap efficiency tests were not conducted due to low numbers of Chinook caught. Protocols called for 100-200 fish in order to conduct efficiency tests. As of 6/24, less than 100 Chinook were caught daily. In addition, on 6/16 the MSG began diverting 25% of total daily Chinook catch for our rescue-rearing program. This further depleted the numbers of Chinook available for conducting a trap efficiency test.

All data collected were entered into an Excel spreadsheet (attached at the end of this report), and conclusions and interpretations are as follows. Compared to previous years data, total numbers were very much lower due to a delayed start and a shortened season. However, in 2002, 1522 Chinook were captured from 6/14 to 7/2, and in 2004 a total of 2281 Chinook were caught over the same time period. The MSG feels that if trapping operations were initiated sooner, numbers of Chinook caught would have been much higher. Data from spawner surveys over the 2003-2004 winter showed a higher number of Chinook spaweners than in previous years. This along with data gathered from direct underwater observation dives just prior to trapping commencement, constitutes supporting evidence that a large run of down migrating Chinook occurred prior to the onset of the trapping season. As in previous years the steelhead run occurred in mid to late June. 26,126 steelhead were caught as compared to a much higher 41,708 for the same time period in 2002. This may indicate a much smaller steelhead run than in previous years. Due to a much earlier run than Chinook and steelhead, the number of Coho was very low, and the MSG believes that it may have missed the Coho run entirely.

A total of 95 marked Chinook were captured. These are Chinook from the MSG Hatchbox program that were released in three separate events from May to June. Having either a left or right clip of the maxillary identifies these Chinook.

The season ended in mid July, as in previous years, when levels of Chinook dropped to numbers lower than 15 total captures per day. Several consecutive days of a total of zero Chinook captured concluded the 2004 trapping season.