

Predator Reduction Electrofishing Study (PRES) Summary

The objective of PRES was to evaluate the feasibility of electro-fishing and relocation of predatory fish in Clifton Court Forebay (CCF) to comply with interim measure (a) from Condition 3 of the April 9, 2015 NMFS response letter.

Each year of the three-year PRES had a specific focus. During 2016 DWR conducted a pilot effort, focusing on field logistics, equipment and personnel needs, developing effective sampling methods, and collecting initial data on predator density patterns. During 2017 DWR evaluated the effectiveness of refined methods based on the 2016 effort, determined spatial and temporal patterns in predator catch rates using a standardized sampling regime, and assessed environmental variables that may affect catch rates, and assessed factors contributing to mortality of predators transported to Bethany Reservoir. In addition, DWR evaluated evidence for depletion of predators and estimated Chinook Salmon biomass potentially saved from predator consumption through predator removal. During the 2018 field season DWR utilized the information gained regarding the factors that affect predator catch rates as well as additional lessons learned from 2016 and 2017 efforts to maximize predator removal rates.

Electrofishing Effort and Catch

2016: Electrofishing occurred at CCF on 11 days between April 20 and May 18, 2016. Electrofishing ended after the temperatures reached levels that were too high to support salmonids. Non-native predator removals in 2016 included 2,059 Striped Bass, 594 black bass, and 33 catfish for a total of 2,686 predators removed. No listed species were caught during 2016.

2017: Electrofishing occurred at CCF on 39 days between January 23 and June 15, 2017. Electrofishing ended after the temperatures reached levels that were too high to support salmonids. Non-native predator removals in 2017 included 5,236 Striped Bass, 879 black bass, and 36 catfish for a total of 6,151 predators removed. There were 97 Chinook Salmon and 1 Steelhead caught during 2017.

2018: Electrofishing occurred at CCF on 54 days between January 8 and May 3, 2018. Electrofishing ended after the take limit for Steelhead of 50 fish was reached and NMFS instructed DWR to stop the study. Non-native predator removals in 2018 included 11,839 Striped Bass, 989 black bass, 23 catfish and 287 sunfish for a total of 13,138 predators removed. There were 55 Chinook Salmon and 49 Steelhead caught during 2018.

Study Findings

Predator catch rates (measured as catch per unit effort) were lower or similar in 2018 compared to 2016 and 2017. While the reduced catch rates observed in 2018 may be due to seasonal and annual variations of predator densities in CCF, they might also have been merely a consequence of high overall effectiveness of predator removal. Analyses of the 2018 catch data provided evidence of depletion (reduced catch rate through time) of black bass and Striped Bass during periods when fishing strategies were designed to specifically target removal of these predatory fish. These findings of depletion indicate that predator removal can be effective at reducing predatory fish numbers and biomass in CCF, however, it is uncertain whether changes to predator densities were enough to significantly reduce pre-screen loss.

Listed Species Capture

Federal Endangered Species Act “Take” of listed species did occur during the 3-year CCF-PRES. During this time 152 Chinook Salmon and 50 steelhead were seen entering the electric field of CCF-PRES electrofishing boats. While all the steelhead are listed under the Federal Endangered Species Act, only Spring-run and Winter-run Chinook Salmon have Federal protections under the Federal Endangered Species Act. Based on the timing of the Chinook Salmon captures in 2017, none were likely to be from Federally listed runs and all occurred after several large releases of Fall-run Chinook Salmon were made from the Merced River Fish Hatchery. In 2018, “take” of listed runs of Chinook Salmon may have occurred as individuals were seen entering the field from January 25 to May 2, 2018. Field crews were instructed to immediately stop electrofishing in areas where listed species were observed and to report all observations to the project manager. If possible, field crews noted the approximate size and if the adipose fin was present or absent on all individuals, however, in many cases the observations were too brief to note this information. None of individual Chinook Salmon and steelhead that were observed during the CCF-PRES were killed and all immediately recovered.

Table 1: CCF-PRES Chinook Salmon and steelhead catch data

| | Chinook Salmon | Steelhead |
|-------|----------------|-----------|
| 2016 | 0 | 0 |
| 2017 | 97 | 1 |
| 2018 | 55 | 49 |
| Total | 152 | 50 |

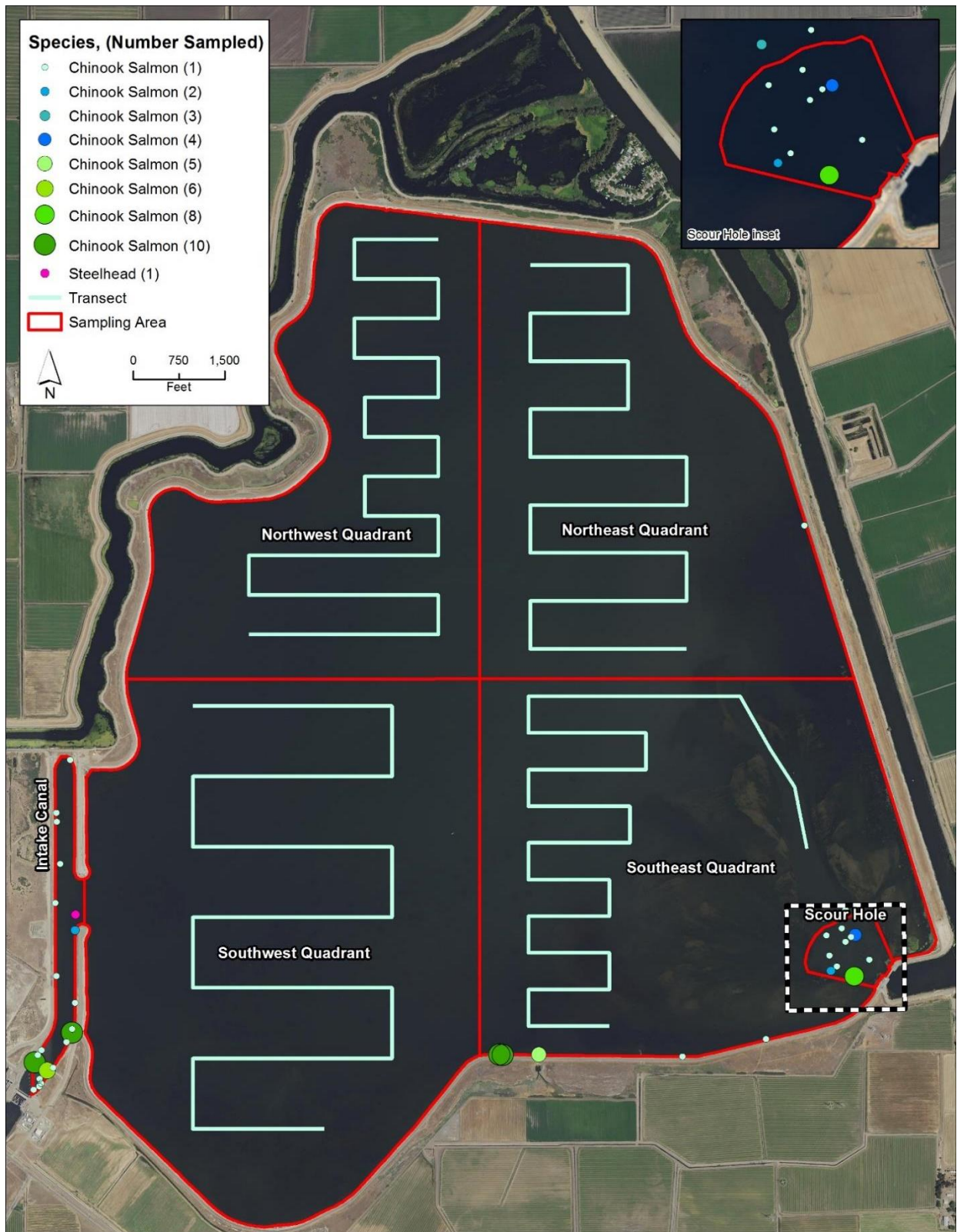


Figure 1: Catch locations for all 2017 Chinook Salmon and steelhead



Figure 2: Catch locations for all 2018 Chinook Salmon and steelhead