



# United States Department of the Interior



## FISH AND WILDLIFE SERVICE

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Memorandum

DATE: April 14, 2020

TO: Nicholas Hetrick, FAC Program Lead – Arcata Fish and Wildlife Office

FROM: Anne Voss, Fish Biologist – CA-NV Fish Health Center

The California-Nevada Fish Health Center (Center) works collaboratively with the Service's Arcata Fish and Wildlife Office, Karuk tribe, and Yurok tribe to monitor the prevalence of *Ceratonova shasta* and *Parvicapsula minibicornis* infections in juvenile salmon in the Klamath River. The Center coordinates this annual monitoring project, provides laboratory support, and generates an annual summary report for the study.

The Center would like to provide information to cooperators and outline the project for 2020 (see attached).

## 2020 Survey Outline for Klamath River Fish Health Monitoring Project

### 1) Real-time monitoring – Shasta River to Scott River reach, K4

- a) In 2020, the Center will again strive to provide Quantitative Polymerase Chain Reaction (QPCR) testing of juvenile Chinook salmon collected in the Shasta River to Scott River reach (K4 or “Kinsman”) in a time-sensitive manner.
- b) The goal is to provide weekly-stratified estimates of *C. shasta* prevalence of infection (POI) and DNA copy number to managers on a weekly basis during the outmigration season.
- c) Real-time monitoring schedule
  - i) Real-time monitoring will take place for 8 weeks total.
  - ii) Real-time monitoring will be shifted and start two weeks later in 2020, in order to provide QPCR results in early summer when POI is typically higher.
  - iii) Real-time monitoring in 2020 will occur the week of April 5 through the week of May 24.
  - iv) The two week delay in the onset of real-time monitoring described in items ii) and iii) above will be removed if early season water sampling suggests uncommonly elevated spore densities.
- d) Fish Collection
  - i) Target up to 60 fish collected per week, minimum of 30 fish required.
- e) Laboratory Deadline
  - i) The Center needs to receive fish no later than Wednesday afternoon in order to report results for the week.
- f) Reporting
  - i) Results will be reported by memorandum.
    - a. If the minimum number of fish cannot be collected, results will not be reported that week.
  - ii) Results will be sent to the Arcata Fish and Wildlife Office, Bureau of Reclamation, FASTA coordinator, and KFHat coordinator.
  - iii) Data reported will include:
    - a. Collection date
    - b. Number of fish collected
    - c. Number of fish positive for *C. shasta*
    - d. *Ceratonova shasta* POI; describes the proportion (percentage) of fish infected on that collection date.
    - e. DNA copy number range; describes the parasite load within the fish tissue.
    - f. Percent of fish with DNA copy number over 3 logs.
      - i. Interim metric for 2020. Requesting 30 additional Chinook salmon during peak *C. shasta* POI to evaluate disease threshold.

## 2) Hatchery Fish

### a) Schedule

- i) After hatchery release, focus will shift to collecting coded wire tagged hatchery fish (adipose fin clipped).
- ii) Hatchery fish will be collected below the Shasta River as fish migrate downstream.

### b) Fish Collection

- i) Target 30 hatchery fish collected per week in K4 and the estuary
- ii) Target 20 hatchery fish collected per week in K3, K2, and K1.

## 3) qPCR assay

- a) A standard curve will be ran in parallel with unknown samples (i.e. standards are included on every assay plate).
- b) All samples will be visually inspected using the qPCR software's amplification curve and component view analysis tools.
- c) Criteria for a positive test results:
  - i)  $\geq 5$  copies of *C. shasta* DNA
  - ii) Samples also produce a minimum change in fluorescent signal ( $\Delta R_n$ ) of 100,000 indicating significant amplification above background levels of the instrument.

**Collection Schedule:** Number of fish collected by week date and river reach: Natural Chinook salmon (Mar 22 to approximately May 24) shown in green rows, followed by Coded wire tagged (CWT) Chinook salmon collected after IGH hatchery release. An additional 10 fish for histology (H10) are collected in K4 & K3 on select weeks.

River Reach (Reach Code)	Shasta to Scott (K4)-AFWO	Scott to Salmon (K3)-KARUK	Salmon to TR (K2)-KARUK	TR to Estuary (K1)-YUROK	Estuary (K0)-YUROK
1 Mar 22	30				
2 Mar 29	30				
3 Apr 5	60	20			
4 Apr 12	60 (H10)	20 (H10)			
5 Apr 19	60	20			
6 Apr 26	60 (H10)	20 (H10)			
7 May 3	60	20			
8 May 10	60 (H10)	20 (H10)			
9 May 17	60	20			
10 May 24 (IG Release?)	60 (H10)	20 (H10)			
11 May 31	CWT-30	CWT-20	CWT-20		
12 June 7	CWT-30	CWT-20	CWT-20	CWT-20	
13 June 14		CWT-20	CWT-20	CWT-20	CWT-30
14 June 21		CWT-20	CWT-20	CWT-20	CWT-30
15 June 28		CWT-20	CWT-20	CWT-20	CWT-30
16 July 5		CWT-20	CWT-20	CWT-20	CWT-30
17 July 12		CWT-20	CWT-20	CWT-20	CWT-30
18 July 19			CWT-20	CWT-20	CWT-30
19 July 26				CWT-20	CWT-30
20 Aug 2				CWT-20	CWT-30
21 Aug 9					CWT-30
22 Aug 16					CWT-30
23 Aug 23					CWT-30