

## MEMORANDUM

**DATE:** July 12, 2016

**TO:** Nick Hetrick, Arcata FWO, KFHAT

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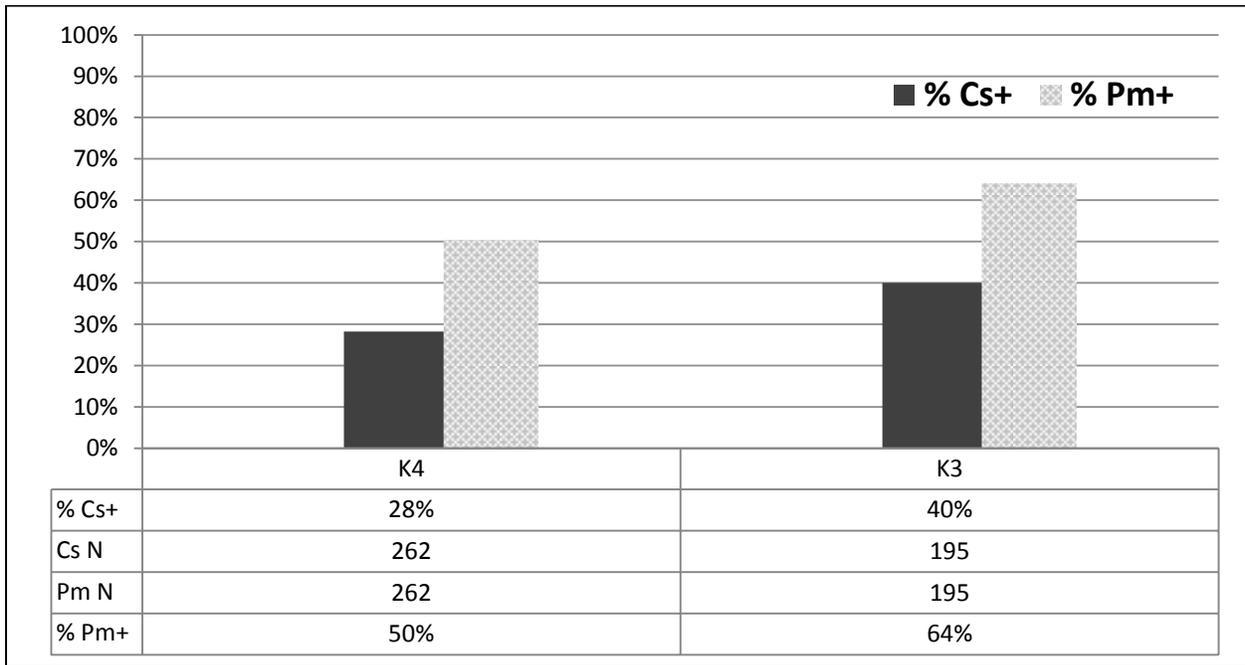
**SUBJECT:** 2016 Klamath River Juvenile Chinook Salmon Health Monitoring,  
*Ceratonova shasta* and *Parvicapsula minibicornis* Prevalence Data

As a component of Klamath River fish health assessment, the California-Nevada Fish Health Center is examining juvenile Klamath River Chinook salmon to monitor the prevalence of *Ceratonova shasta* and *Parvicapsula minibicornis* infection. Fish are collected by biologists with the Karuk Tribe, Yurok Tribe, and US Fish and Wildlife Service. The CA-NV Fish Health Center is coordinating disease monitoring efforts and providing laboratory support for the project.

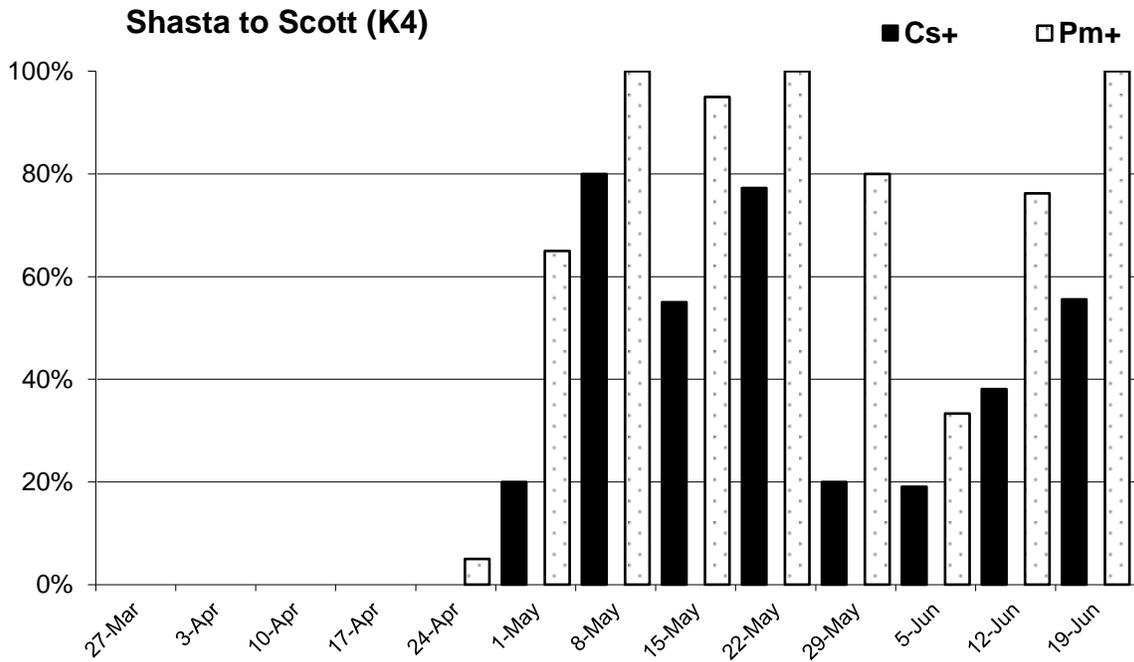
To date, QPCR testing has been performed for natural and coded-wire tagged fish collected from 31 March through 27 June in the upper Shasta to Scott (K4) and Scott to Salmon (K3) reaches. Natural fish tested negative for *C. shasta* the first 5 weeks of monitoring in K4, with the first parasite detection by QPCR occurring May 5th (Figure 2). Field crews reported approximately 15% of juvenile chinook at Kinsman rotary screw trap had external clinical disease signs (distended abdomen) the week of May 8th.

Iron Gate Hatchery juvenile Chinook releases occurred from mid- May (17th and 27th) through early-June (3rd and 9th). Monitoring effort shifted to collection of coded wire tagged (CWT) fish after hatchery releases, when adequate numbers were present in each reach. Field crews reported difficulty collecting 20 CWT fish in a given week in the Scott to Salmon (K3) and Salmon to Trinity (K2) reaches in June. Crews noted a lower density of CWT fish within thermal refugia collection sites, possibly due to cooler river temperatures and greater dispersion of juvenile Chinook salmon.

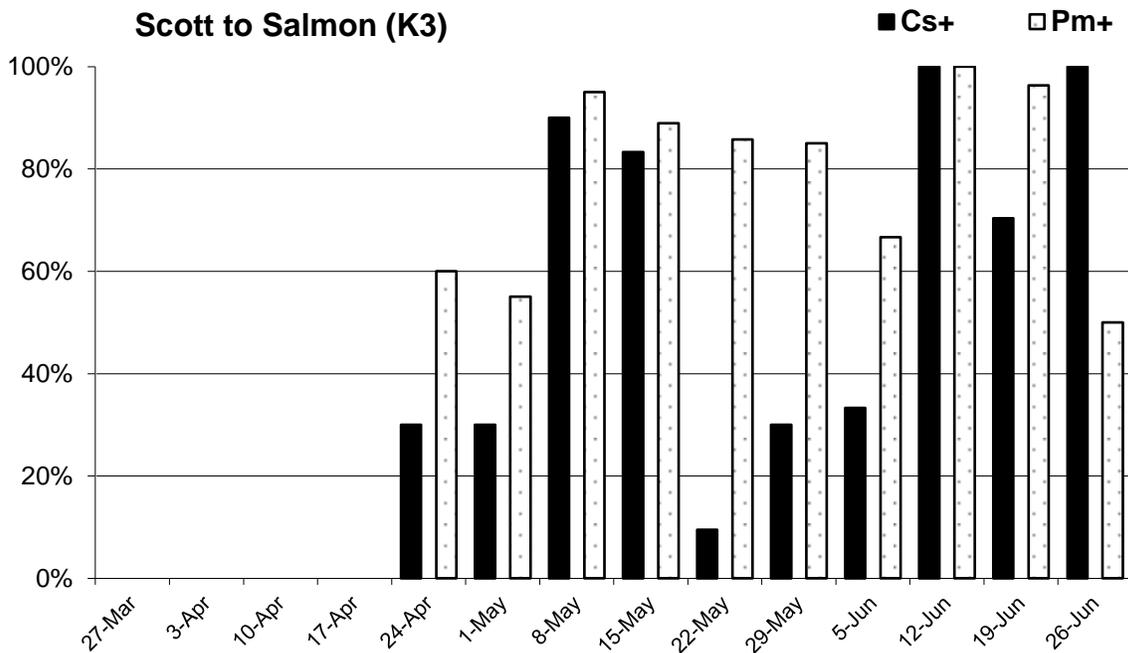
*Ceratonova shasta* has been detected in 33% (152/457) of fish tested to date. *Parvicapsula minibicornis* has been detected in 56% (257/457) of fish tested. Mild to moderate clinical disease (hemorrhagic intestine) was observed upon necropsy in fish collected June 14 to 20, in both K4 and K2 reaches. The increase in *C.shasta* prevalence of infection (POI), coupled with clinical signs in intestinal tissue, is indicative of enteronecrosis disease progression within these fish groups. All data is preliminary and subject to revision. Bi-weekly updates will be communicated to the Klamath Fish Health Advisory Team (KFHAT). The next written update will occur in late July to early August.



**Figure 1. *Ceratonova shasta* and *Parvicapsula minibicornis* prevalence of infection (POI) by sampling reach. Percent positive by Quantitative Polymerase Chain Reaction (QPCR) testing. Sample testing for additional reaches is in progress.**



**Figure 2.** Weekly prevalence of *Ceratonova shasta* and *Parvicapsula minibicornis* infection in juvenile Chinook salmon captured in the Shasta to Scott (K4) reach on the Klamath River. Eighteen to twenty-one fish were sampled weekly from 27 March to 19 June: the first five weeks all fish tested negative for *C. shasta*. First detection of *C. shasta* occurred week of May 1 (on 5 May).



**Figure 3.** Weekly prevalence of *Ceratonova shasta* and *Parvicapsula minibicornis* infection in juvenile Chinook salmon captured in the Scott to Salmon (K3) reach on the Klamath River. Sampling of this reach commenced the week of 10 April: both parasites were not detected during the first two weeks of sampling (10-17 April). Note: CWT sample size was small for 5 and 12 June (n=3) and 26 June (n=2) in this reach.