

MEMORANDUM

DATE: September 10, 2010

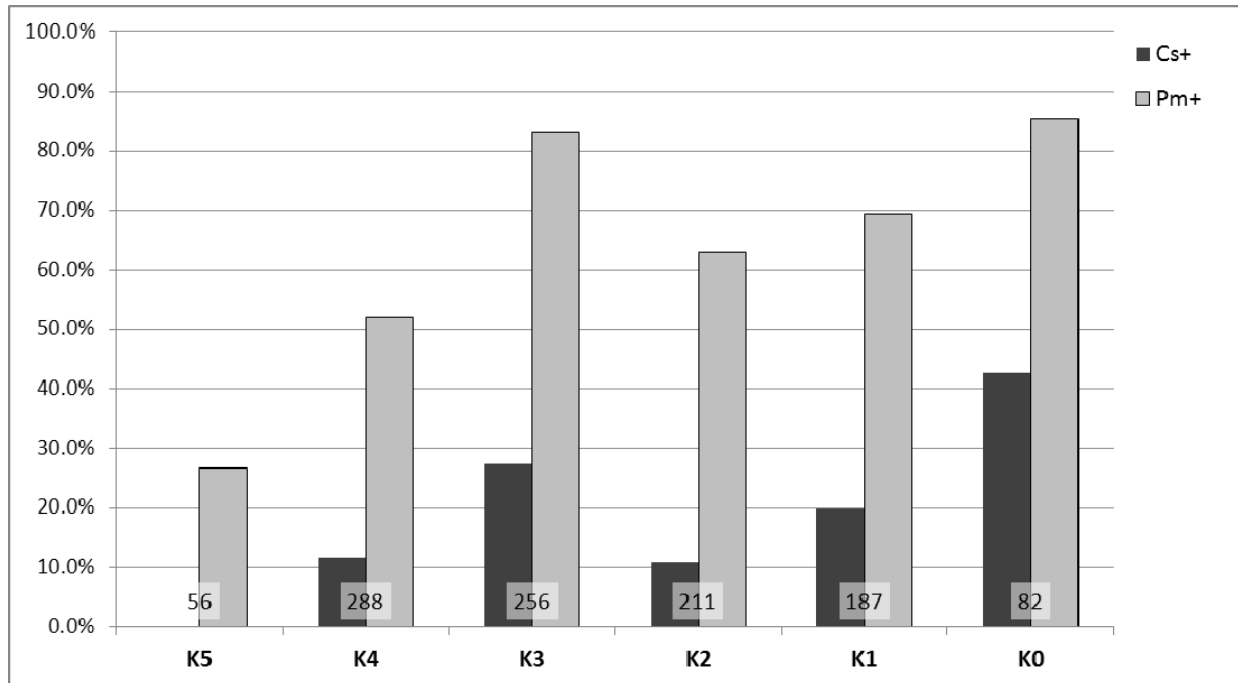
TO: Nick Hetrick, Arcata FWO

FROM: Anne Bolick
CA-NV Fish Health Center
(530) 356-4271 Ext. 201
Anne_Bolick@fws.gov

SUBJECT: 2010 Klamath River Salmonid Health Monitoring

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 incidence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infection. Fish are collected by biologists with the Karuk Tribe, Yurok Tribe, Hoopa 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.

Pathogen testing by QPCR has been performed for the majority of Chinook juveniles collected through the week of 26 July for all reaches. *Ceratomyxa shasta* has been detected in 18.4% (199/1080) and *Parvicapsula minibicornis* has been detected in 65.8% (711/1080) of Klamath Chinook juveniles tested thus far. Incidence of infection for all samples tested to date is summarized by reach in Figure 1 and Table 1. Weekly incidence of infection is reported for each reach in Figures 2-7. Annual comparison of mean log parasite DNA copy number for 2009-2010 is reported in Figures 8-9. All data are preliminary and subject to revision.



Reach	Total Number of Samples (N)	Number Cs Positive	Number Pm Positive
K5	56	0	15
K4	288	34	150
K3	256	70	213
K2	211	23	133
K1	187	37	130
K0	82	35	70
Total Fish Sampled	1080		
Overall POI (%)		199/1080 (18.4%)	711/1080 (65.8%)

Figure 1/Table 1. Incidence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infections in juvenile Klamath River Chinook salmon by capture reach. Sample numbers collected in each reach are displayed in column 2 of Table 1. Number of positive fish for each myxozoan parasite, and incidence of infection (IOI), are given in columns 3 and 4. Reach descriptions are provided below.

Sample Reach	Reach Code	River Mile Klamath main stem
Iron Gate Dam to Shasta	K5	Klamath 190-177
Shasta to Scott	K4	Klamath 177-144
Scott to Salmon	K3	Klamath 144-66
Salmon to Trinity Confluence	K2	Klamath 66-44
Trinity Confluence to Estuary	K1	Klamath 44-4
Klamath Estuary	K0	Klamath 4-0

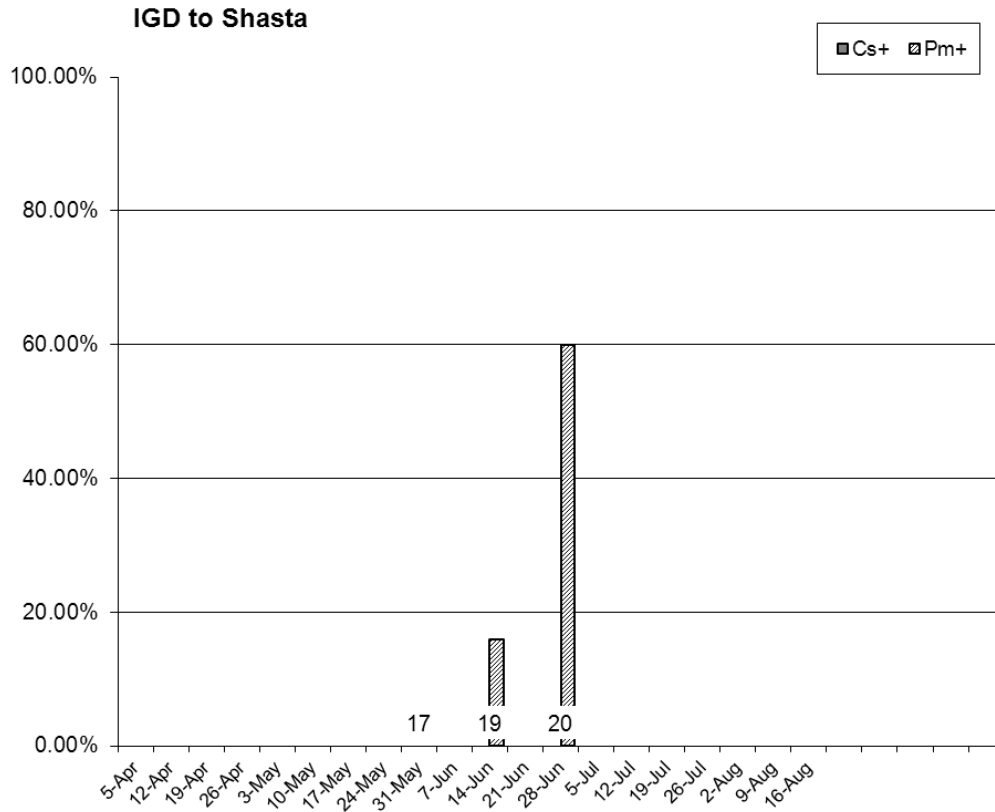


Figure 2. Weekly incidence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infections in juvenile Klamath River Chinook salmon captured in the Iron Gate dam (IGD) to Shasta (K5) reach. All data are preliminary and subject to revision.

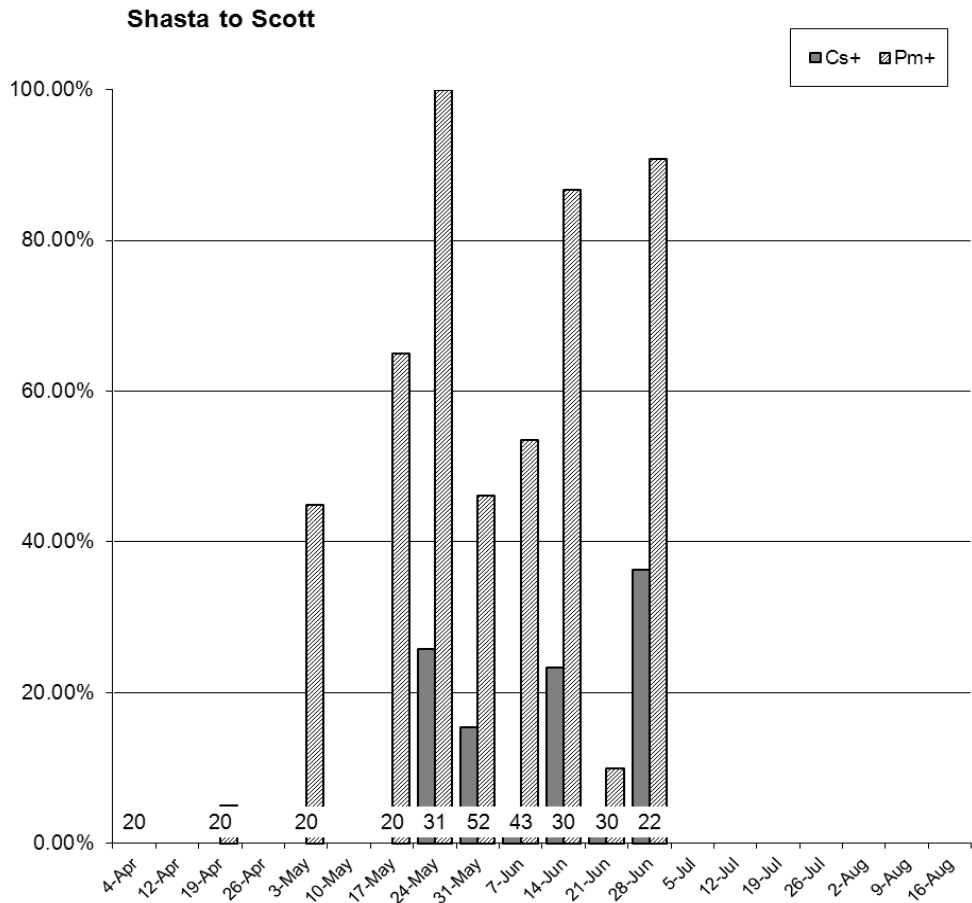


Figure 3. Weekly incidence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infections in juvenile Chinook salmon captured in the Shasta to Scott (K4) reach. All data are preliminary and subject to revision.

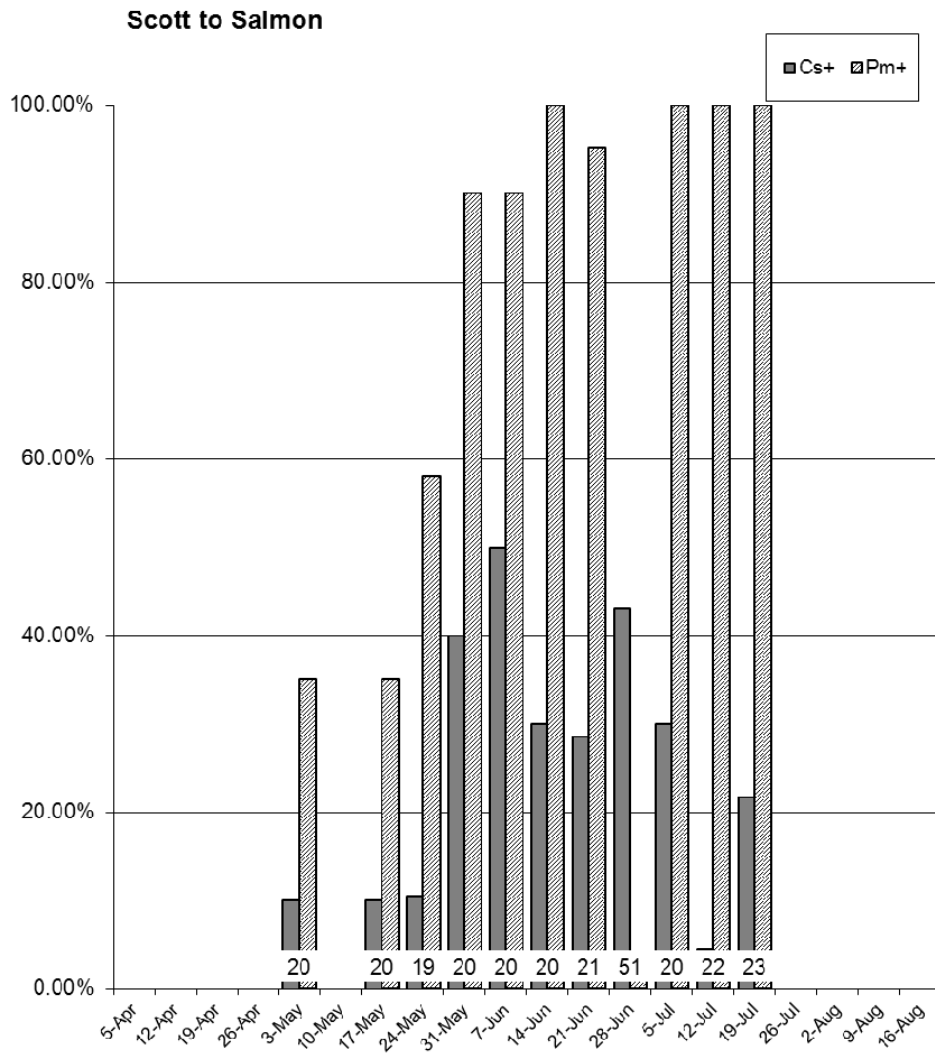


Figure 4. Weekly incidence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infections in juvenile Klamath River Chinook salmon captured in the Scott to Salmon (K3) reach. All data are preliminary and subject to revision.

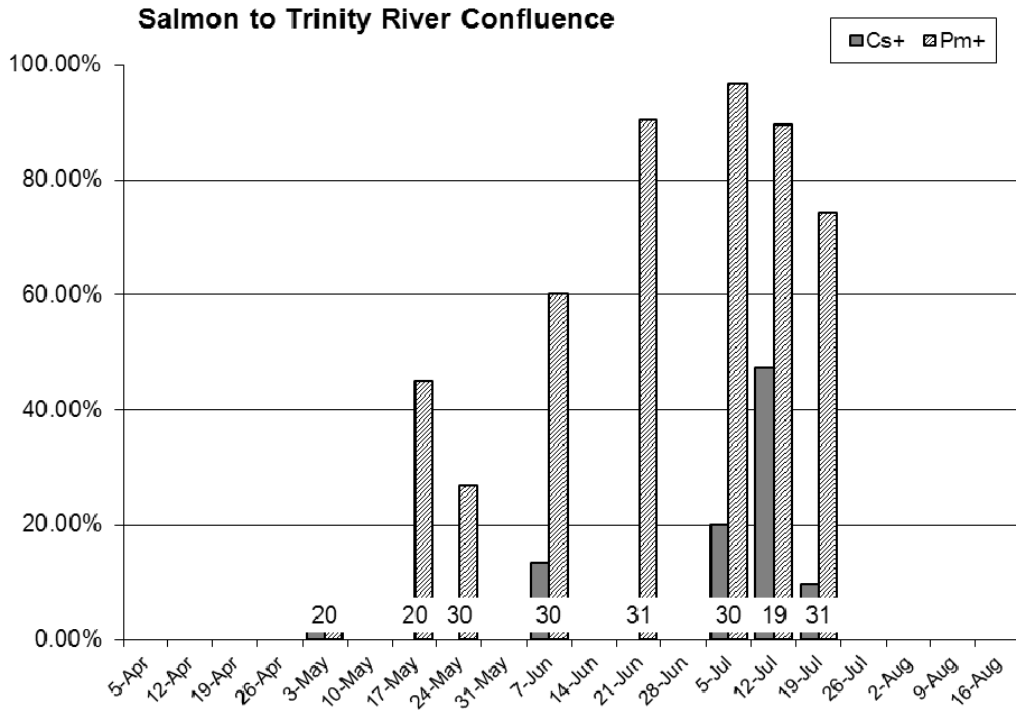


Figure 5. Weekly incidence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infections in juvenile Klamath River Chinook salmon captured in the Salmon to Trinity River confluence (K2) reach. All data are preliminary and subject to revision.

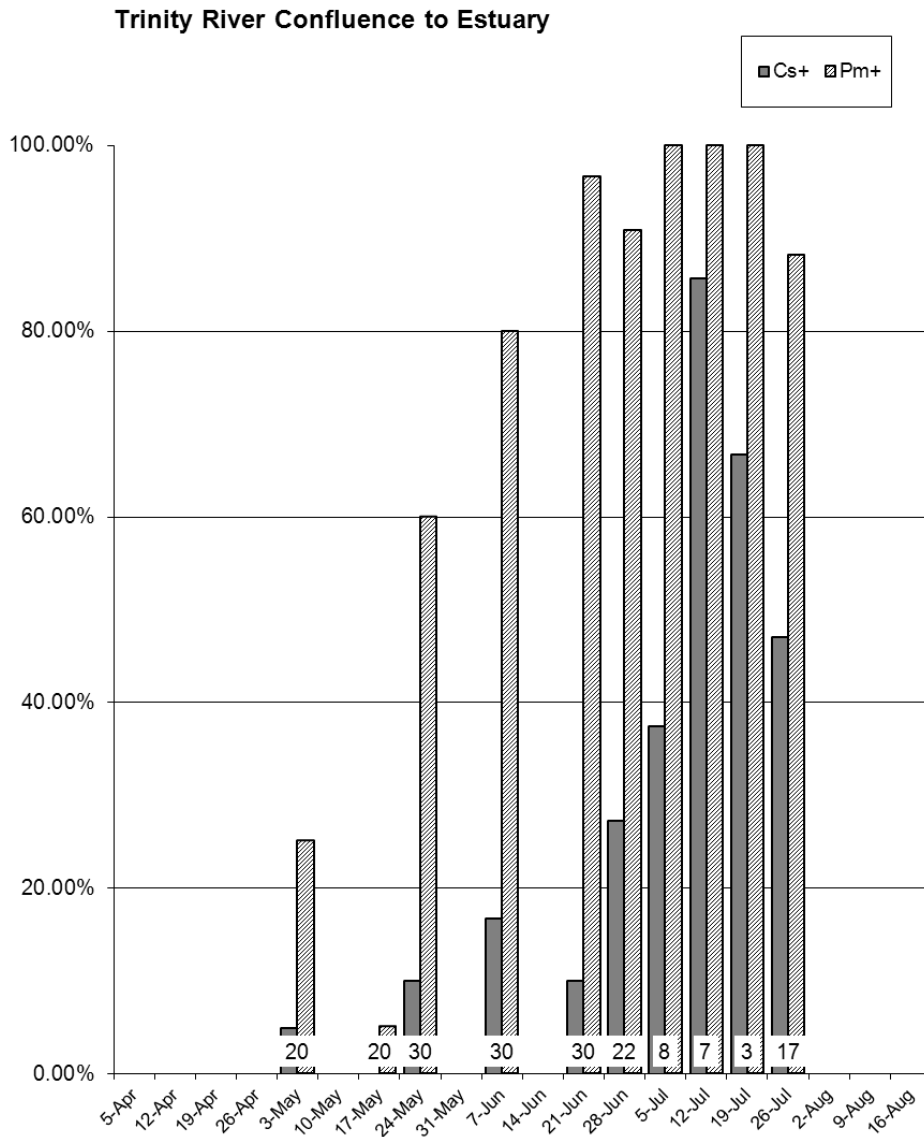


Figure 6. Weekly incidence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infections in juvenile Klamath River Chinook salmon captured in the Trinity River confluence to Estuary (K1) reach. All data are preliminary and subject to revision.

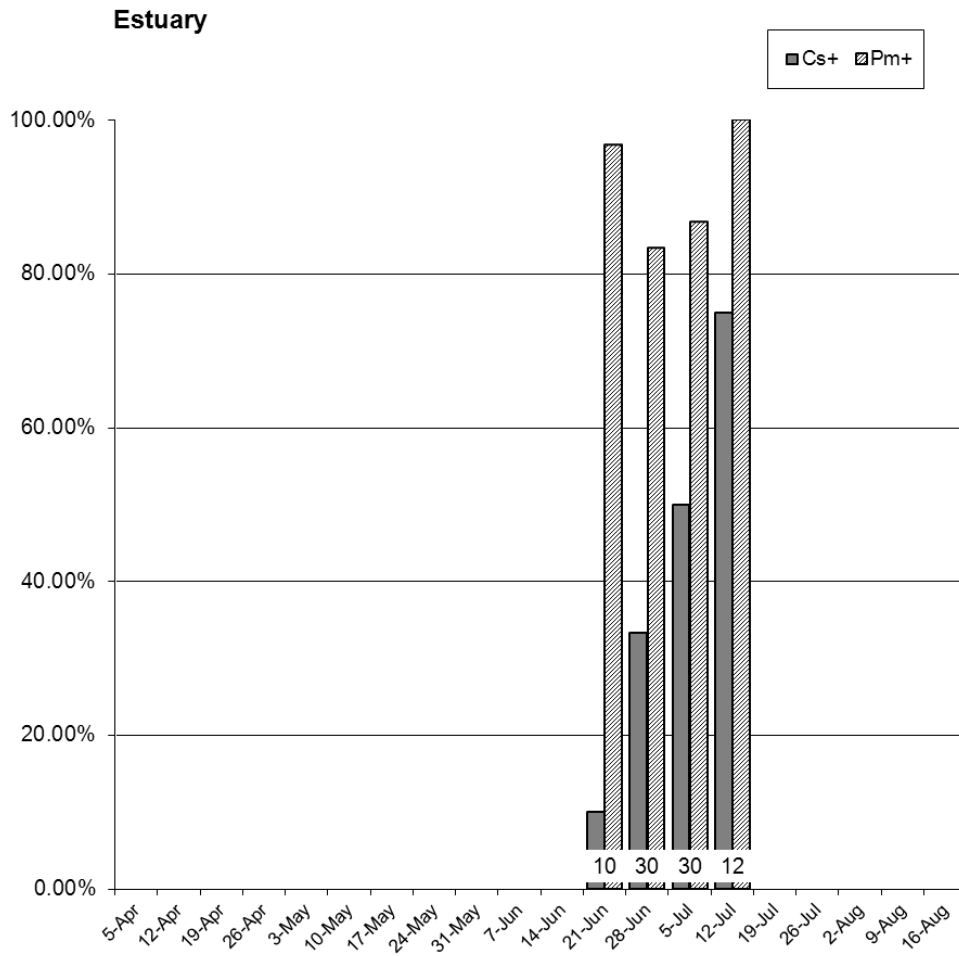


Figure 7. Weekly incidence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infections in juvenile Klamath River Chinook salmon captured in the Estuary (K0) reach. All data are preliminary and subject to revision.

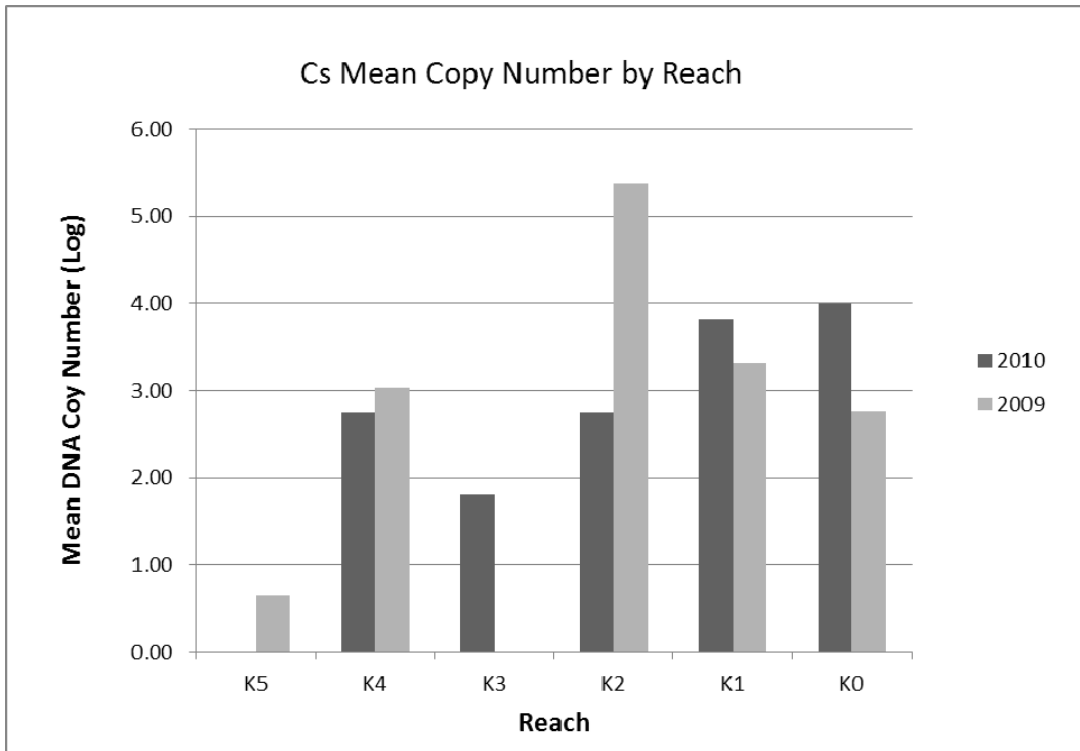


Figure 8. Comparison of *Ceratomyxa shasta* DNA levels (mean log copy number) in juvenile Klamath River Chinook salmon tested by QPCR in 2009-2010. Fish were not collected in the Scott to Salmon reach (K3) in 2009; data are reported through the week of July 26 for 2010. All data are preliminary and subject to revision.

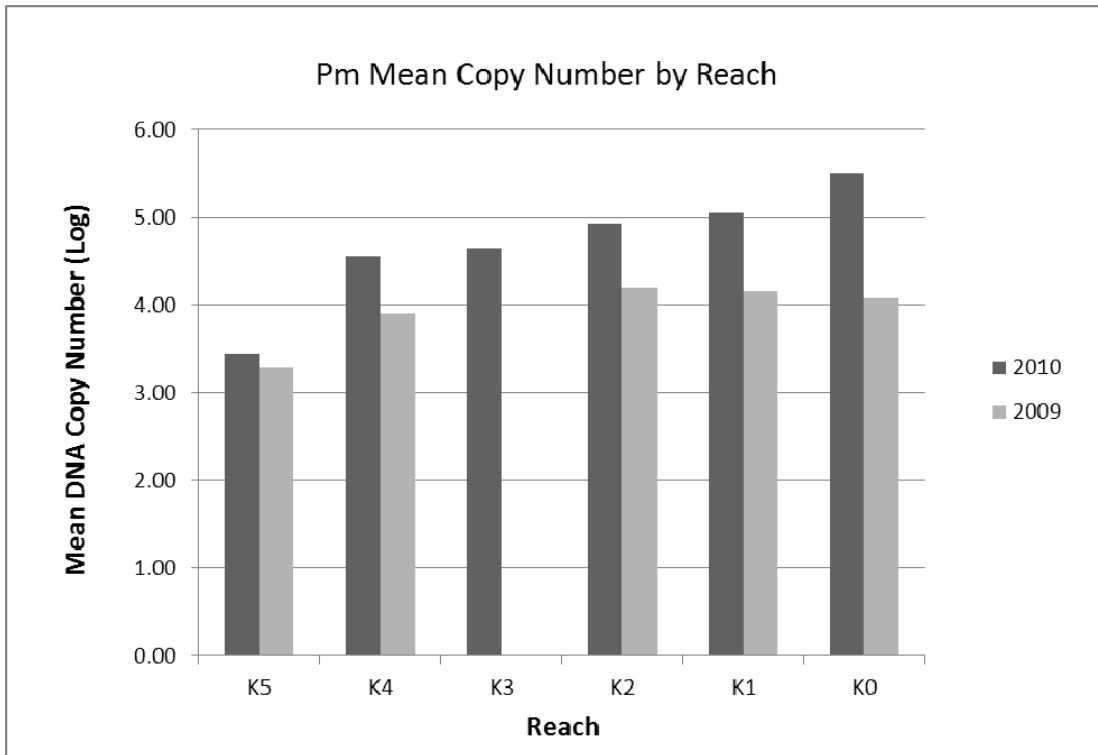


Figure 9. Comparison of *Parvicapsula minibicornis* DNA levels (mean log copy number) in juvenile Klamath River Chinook salmon tested by QPCR in 2009-2010. Fish were not collected in the Scott to Salmon reach (K3) in 2009; data are reported through the week of July 26 for 2010. All data are preliminary and subject to revision.