MEMORANDUM

DATE: **September 12th, 2012**

TO: **Nick Hetrick, Arcata FWO**

FROM: **Kimberly True**
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SUBJECT: **2012 Klamath River Salmonid Health Monitoring**

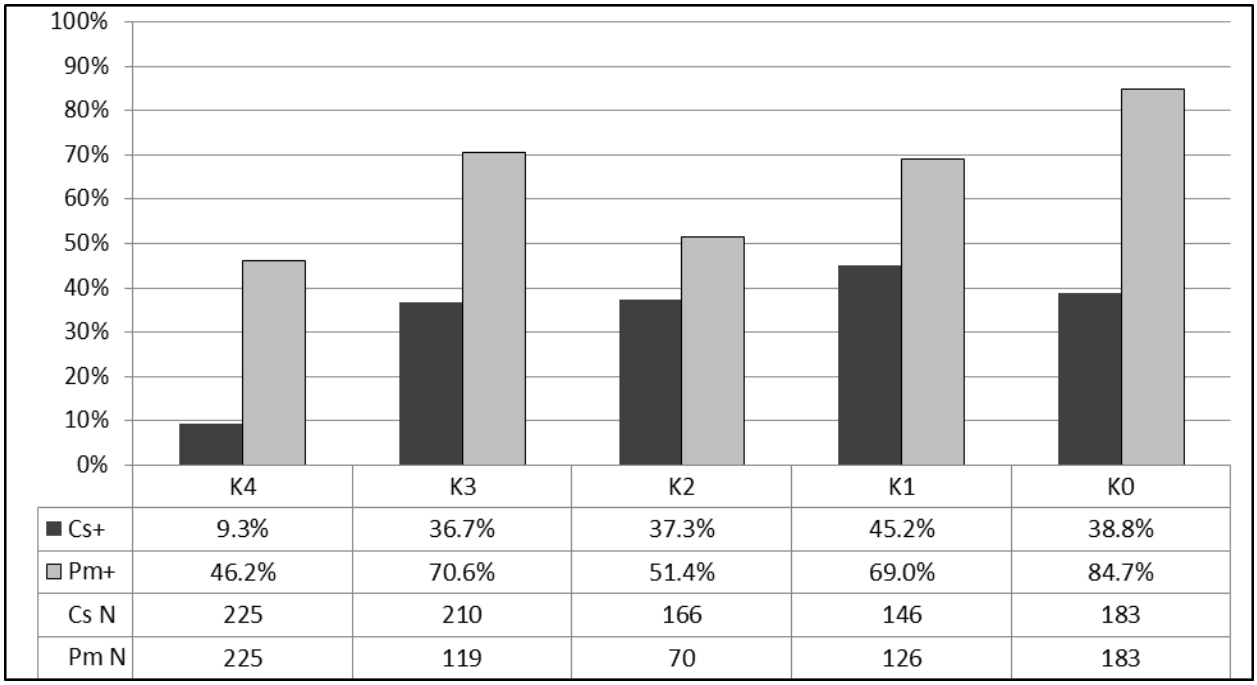
As a component of Klamath River fish health assessment, the California-Nevada Fish Health Center is examining juvenile Klamath River and Trinity River Chinook salmon to monitor the prevalence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infection. Fish are collected by biologists with the Karuk 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.

Testing by Quantitative Polymerase Reaction (QPCR) has been completed for 1167 fish of natural, unknown, or coded-wire tagged (CWT) origin collected from 11 April through 24 August in the four major reaches of the Klamath River, the upper and lower Trinity River (Pear Tree and Willow Creek rotary screw traps) and in the Klamath Estuary. Histological examinations will be completed for all samples in the next few weeks. Coded-wire tags are being read by the Arcata Fish and Wildlife Office, which will allow analyses of health status of juvenile Chinook salmon with known exposure periods in the main stem Klamath, particularly for fish captured in the Trinity to Estuary (K1) and Estuary (K0) reaches.

In the Klamath River, *Ceratomyxa shasta* has been detected in 30.3% (226/747) of juvenile fish collected in the Shasta to Scott (K4), Scott to Salmon (K3), Salmon to Trinity (K2) and Trinity to Estuary (K1) reaches. Note that an unknown proportion of juvenile fish collected in the Trinity to Estuary (K1) and Estuary (K0) reaches are of Trinity Hatchery origin; pending CWT data will provided in our final report. *Parvicapsula minibicornis* was detected in 57.6% (311/540) of Fall Chinook juveniles from the above reaches.

In the Trinity River, *Ceratomyxa shasta* has been detected in 3.8% (9/237) juvenile fish collected at either Pear Tree (RM 94) or Willow Creek (RM 21) rotary screw traps. *Parvicapsula minibicornis* has been detected in 24.1% (57/237) of juveniles tested from those sites.

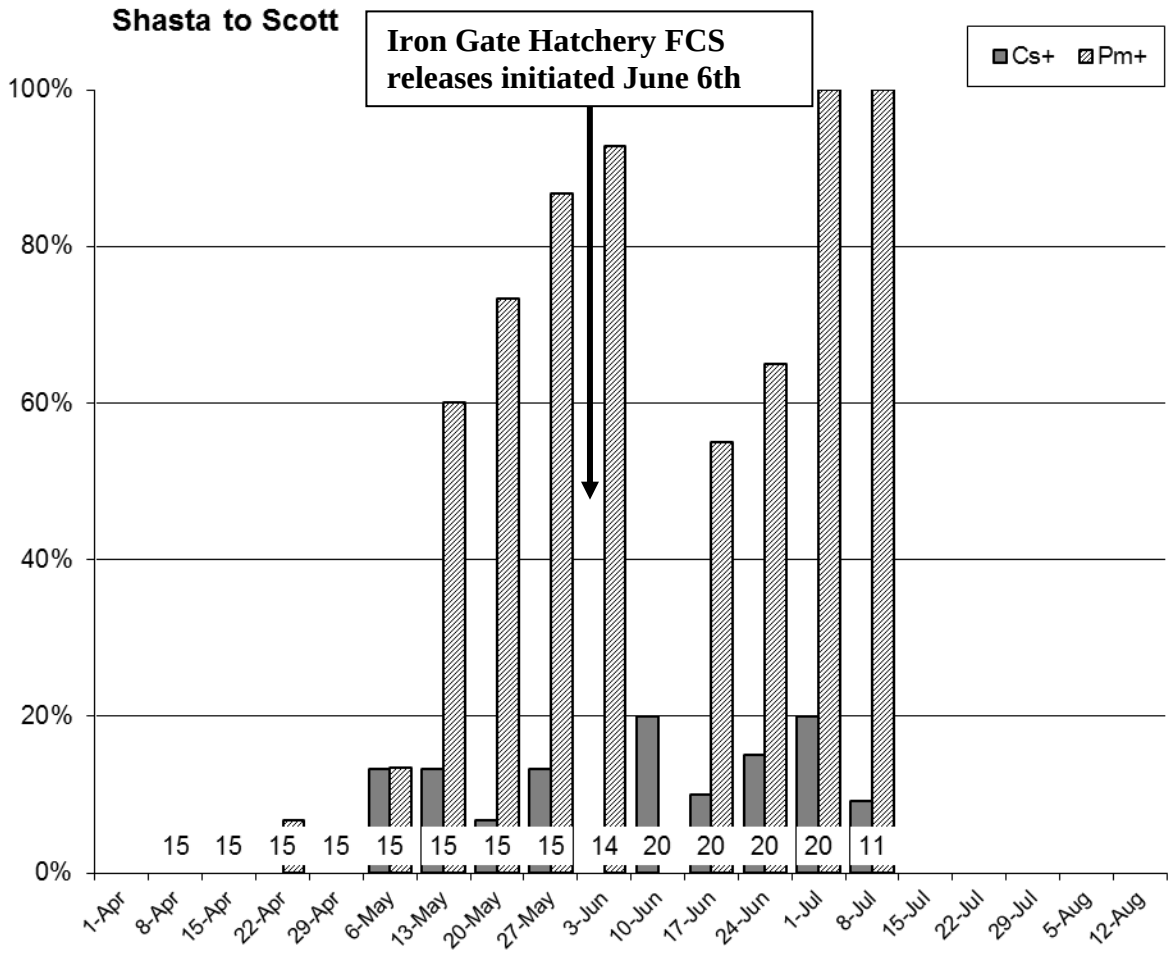
Data are summarized for all fish collected in the Klamath River by collection reach in Figure 1, and then by weekly sample date for each reach in Figures 2-6. Trinity River data are summarized by weekly sample date for the Pear Tree and Willow Creek sites in Figures 7-8. All data are preliminary and subject to revision.



	K4	K3	K2	K1	K0
Cs+	9.3%	36.7%	37.3%	45.2%	38.8%
Pm+	46.2%	70.6%	51.4%	69.0%	84.7%
Cs N	225	210	166	146	183
Pm N	225	119	70	126	183

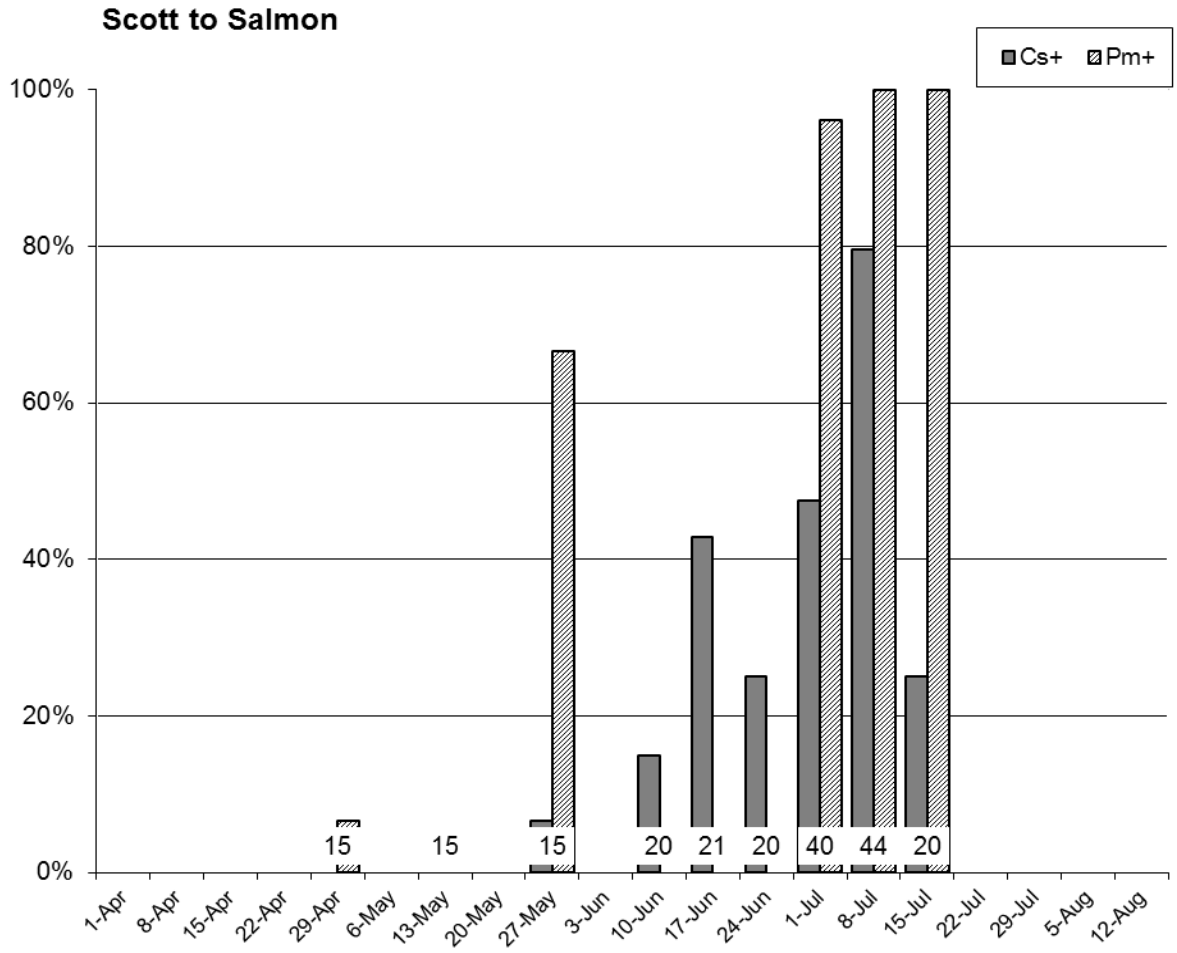
Reach	Total Number of Cs Samples (N)	Number Cs Positive	Total Number of Pm Samples (N)	Number Pm Positive
K4 Shasta-Scott	225	21	225	104
K3 Scott-Salmon	210	77	119	84
K2 Salmon-Trinity	166	62	70	36
K1 Trinity-Estuary	146	66	126	87
K0 Estuary	183	71	183	155

Figure 1/Table 1. Prevalence of *Ceratomyxa shasta* (Cs) and *Parvicapsula minibicornis* (Pm) infection in juvenile Chinook salmon by reach in which fish were captured in the Klamath River. Percent positive and sample numbers collected in each reach are displayed in the table within the graph.



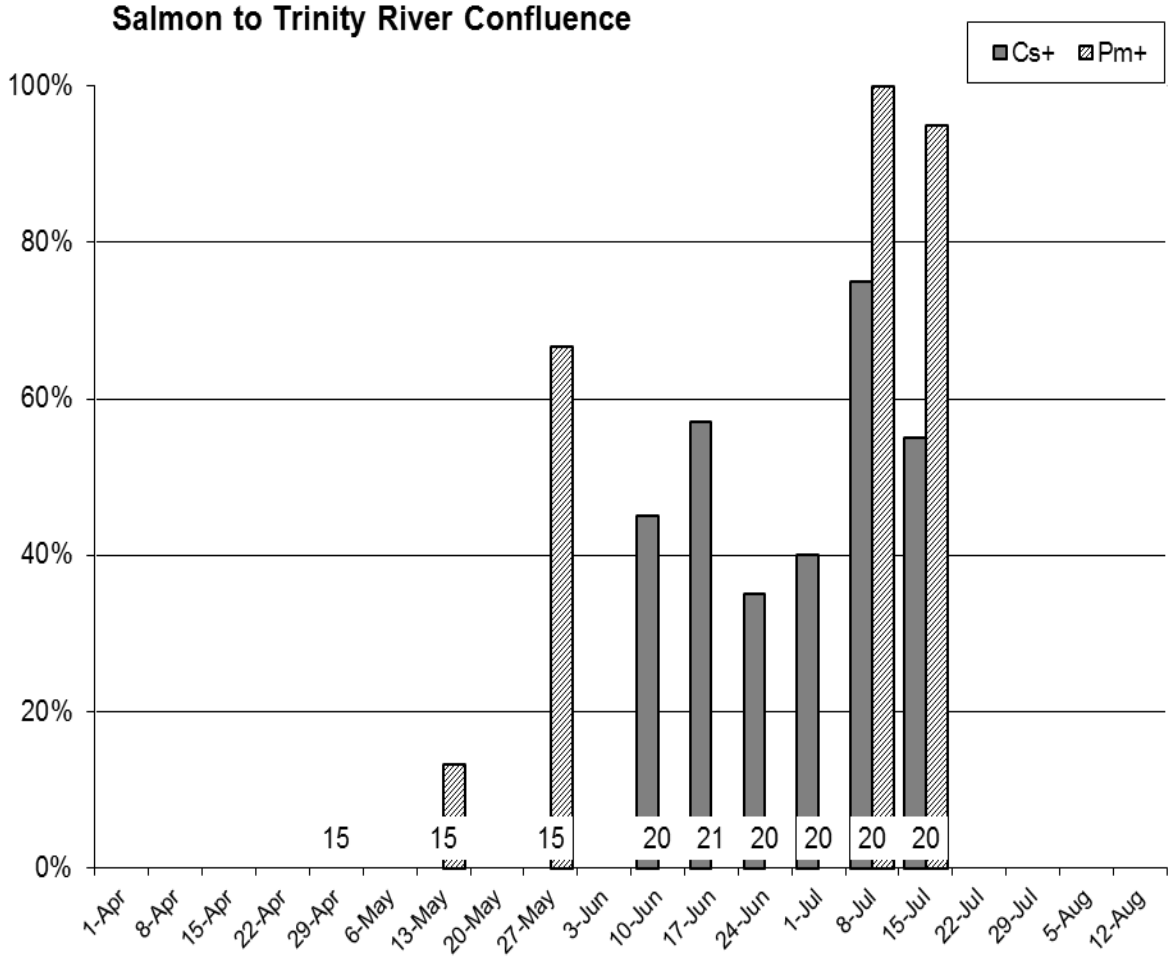
Weekly Date	Total Number of Samples (N)	Number *Cs* Positive	Number *Pm* Positive
8-Apr	15	0	0
15-Apr	15	0	0
22-Apr	15	0	1
29-Apr	15	0	0
6-May	15	2	2
13-May	15	2	9
20-May	15	1	11
27-May	15	2	13
3-Jun	14	0	13
10-Jun	20	4	0
17-Jun	20	2	11
24-Jun	20	3	13
1-Jul	20	4	20
8-Jul	11	1	11

Figure 2/Table 2. Weekly prevalence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infection in juvenile Chinook salmon captured in the Shasta to Scott (K4) reach (RM 177-144) on the Klamath River.



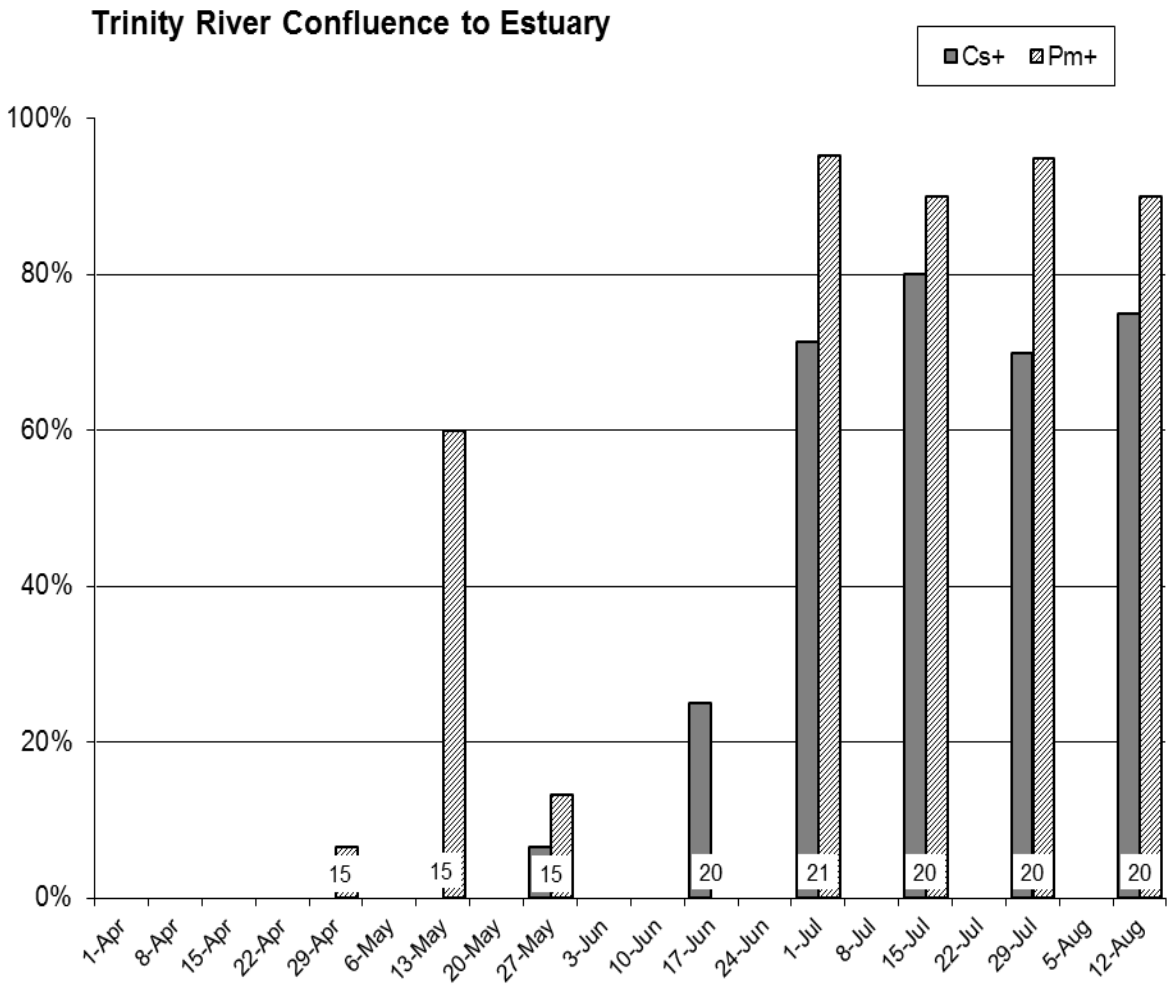
Weekly Date	Number of Cs Samples (N)	Number *Cs* Positive	Number of Pm Samples (N)	Number *Pm* Positive
29-Apr	15	0	15	1
13-May	15	0	15	0
27-May	15	1	15	10
10-Jun	20	3	NT	NT
17-Jun	21	9	NT	NT
24-Jun	20	5	NT	NT
1-Jul	40	19	26	25
8-Jul	44	35	28	28
15-Jul	20	5	20	20

Figure 3/Table3. Weekly prevalence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infection in juvenile Fall Chinook salmon captured in the Scott to Salmon (K3) reach (RM 144-66) on the Klamath River. NT= Not tested: only sub-sets of natural and CWT Chinook salmon were tested for *P. minibicornis* in this reach. Sample numbers listed at base of columns are for *C. shasta*, when sample numbers vary by the pathogen tested.



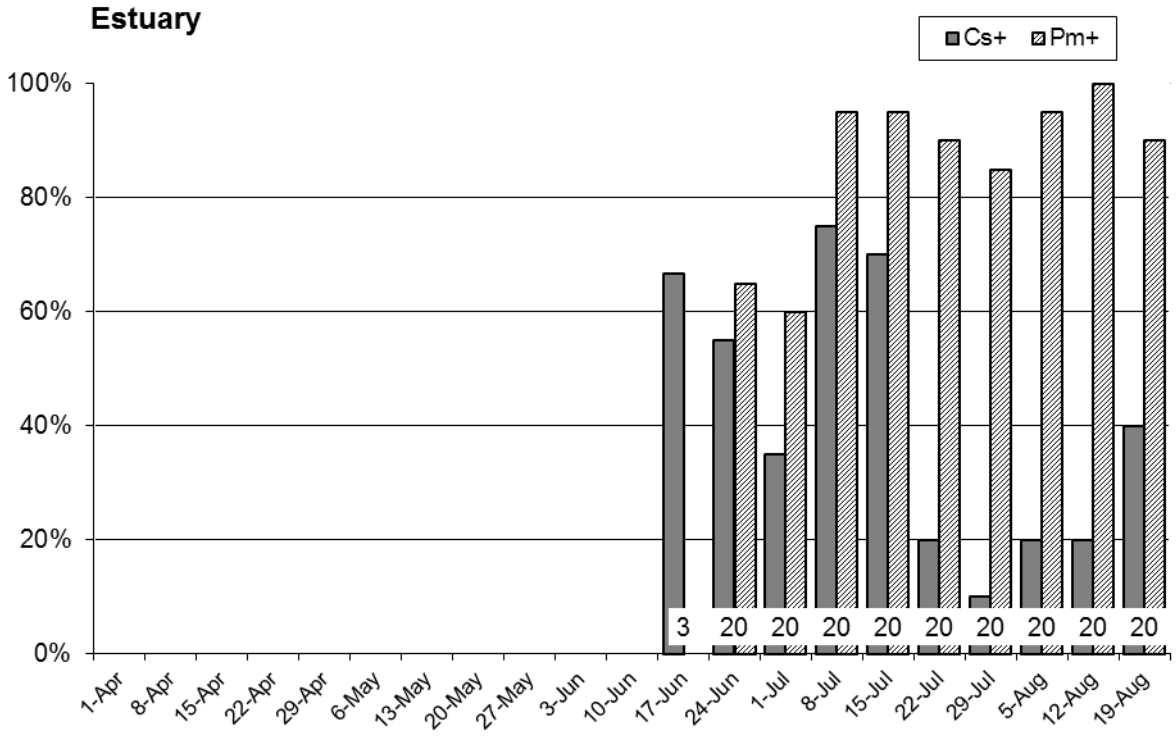
Weekly Date	Number of Cs Samples (N)	Number *Cs* Positive	Number of Pm Samples (N)	Number *Pm* Positive
29-Apr	15	0	15	0
13-May	15	0	15	2
27-May	15	0	15	10
10-Jun	20	9	NT	NT
17-Jun	21	12	NT	NT
24-Jun	20	7	NT	NT
1-Jul	20	8	NT	NT
8-Jul	20	15	5	5
15-Jul	20	11	20	19

Figure 4/Table 4. Weekly prevalence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infection in juvenile Fall Chinook salmon captured in the Salmon to Trinity confluence (K2) reach (RM66-44) on the Klamath River. NT= Not tested: only sub-sets of natural and CWT Chinook salmon were tested for *P. minibicornis* in this reach. Sample numbers listed at base of columns are for *C. shasta*, when sample numbers vary by the pathogen tested.



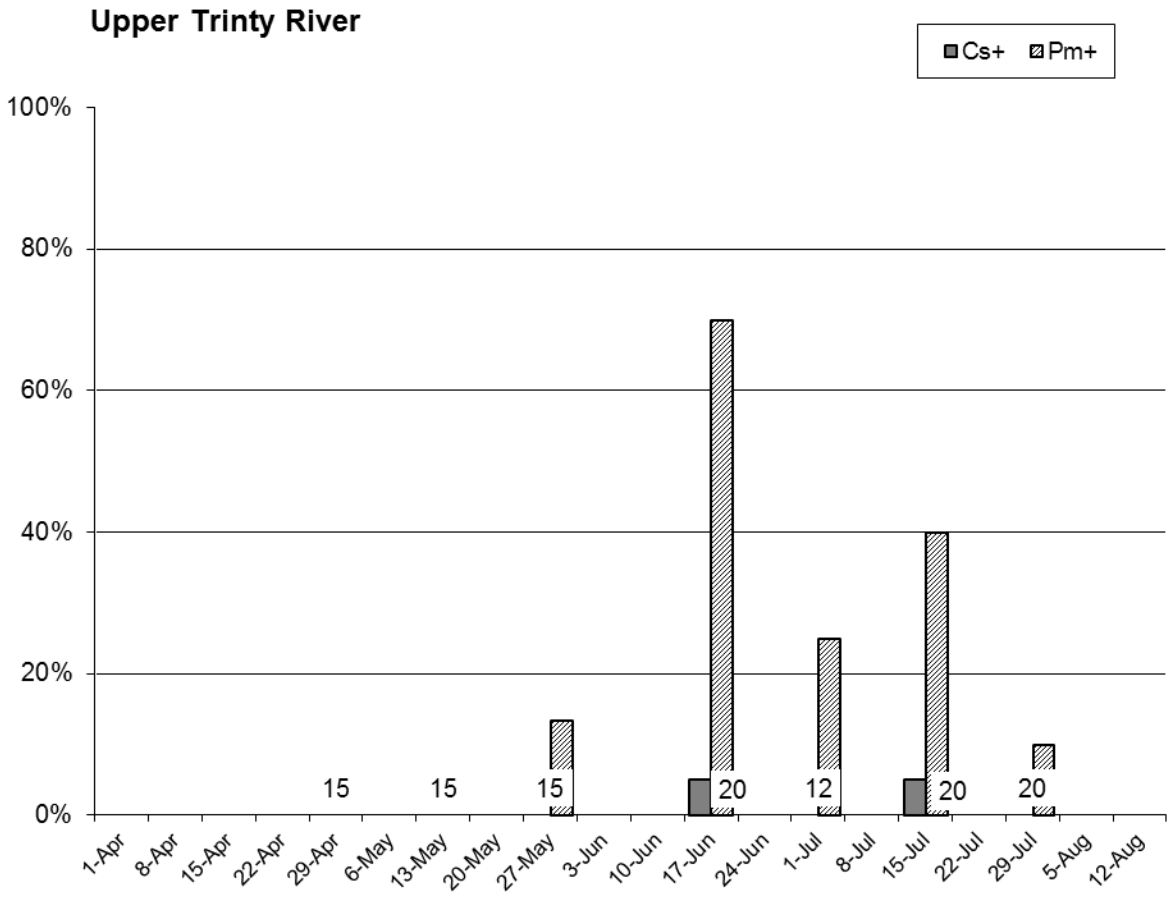
Weekly Date	Number of Cs Samples (N)	Number *Cs* Positive	Number of Pm Samples (N)	Number *Pm* Positive
29-Apr	15	0	15	1
13-May	15	0	15	9
27-May	15	1	15	2
17-Jun	20	5	NT	NT
1-Jul	21	15	21	20
15-Jul	20	16	20	18
29-Jul	20	14	20	19
12-Aug	20	15	20	18

Figure 5/Table 5. Weekly prevalence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infection in juvenile Fall Chinook salmon captured in the Trinity to Estuary (K1) reach (RM44-4) on the Klamath River. NT= Not tested: only sub-sets of natural and CWT Chinook salmon were tested for *P. minibicornis* in this reach. Sample numbers listed at base of columns are for *C. shasta*, when sample numbers vary by the pathogen tested.



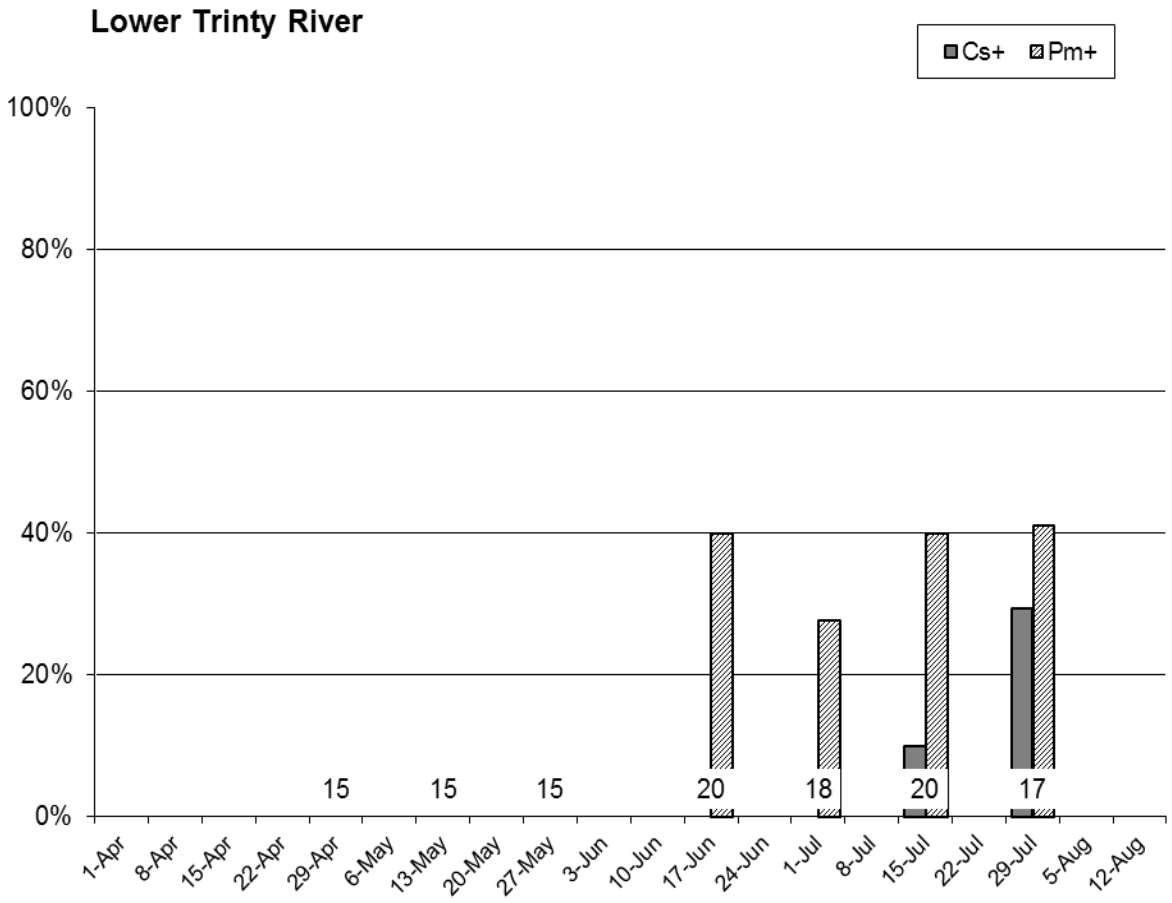
Weekly Date	Total Number of Samples (N)	Number *Cs* Positive	Number *Pm* Positive
17-Jun	3	2	0
24-Jun	20	11	13
1-Jul	20	7	12
8-Jul	20	15	19
15-Jul	20	14	19
22-Jul	20	4	18
29-Jul	20	2	17
5-Aug	20	4	19
12-Aug	20	4	20
19-Aug	20	8	18

Figure 6/Table 6. Weekly prevalence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infection in juvenile Fall Chinook salmon captured in the Klamath River Estuary (RM4-0).



Weekly Date	Total Number of Samples (N)	Number *Cs* Positive	Number *Pm* Positive
29-Apr	15	0	0
13-May	15	0	0
27-May	15	0	2
17-Jun	20	1	14
1-Jul	12	0	3
15-Jul	20	1	8
29-Jul	20	0	2

Figure 7/Table 7. Weekly prevalence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infection in juvenile Fall Chinook salmon captured in the upper Trinity River at the Pear Tree rotary screw trap (RM 94).



Weekly Date	Total Number of Samples (N)	Number *Cs* Positive	Number *Pm* Positive
29-Apr	15	0	0
13-May	15	0	0
27-May	15	0	0
17-Jun	20	0	8
1-Jul	18	0	5
15-Jul	20	2	8
29-Jul	17	5	7

Figure 8/Table 8. Weekly prevalence of *Ceratomyxa shasta* and *Parvicapsula minibicornis* infection in juvenile Fall Chinook salmon captured in the Lower Trinity River at the Willow Creek rotary screw trap (RM 21).