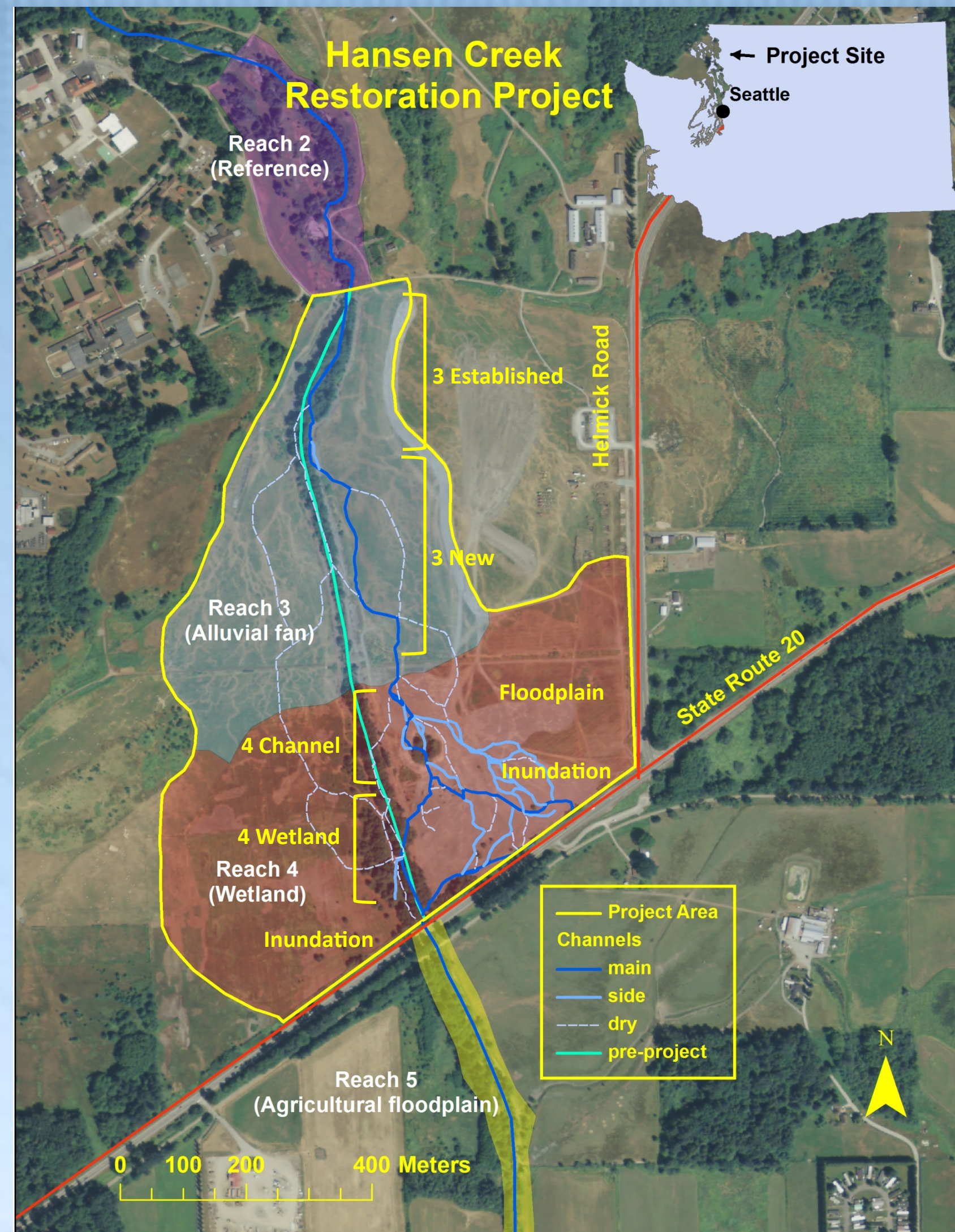


HANSEN CREEK ALLUVIAL FAN AND WETLAND RESTORATION PROJECT

Initial responses by juvenile salmon and invertebrates in a restored floodplain (Poster #3)

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Project Objectives

- Restore floodplain connectivity and natural geomorphic processes.
- Enhance fish habitat (Steelhead, Coho, Chinook, Chum, and Pink).
- Restore native riparian vegetation community.
- Eliminate need for downstream dredging and reduce downstream flooding.

Goals of the Aquatic Habitat Key Project Component

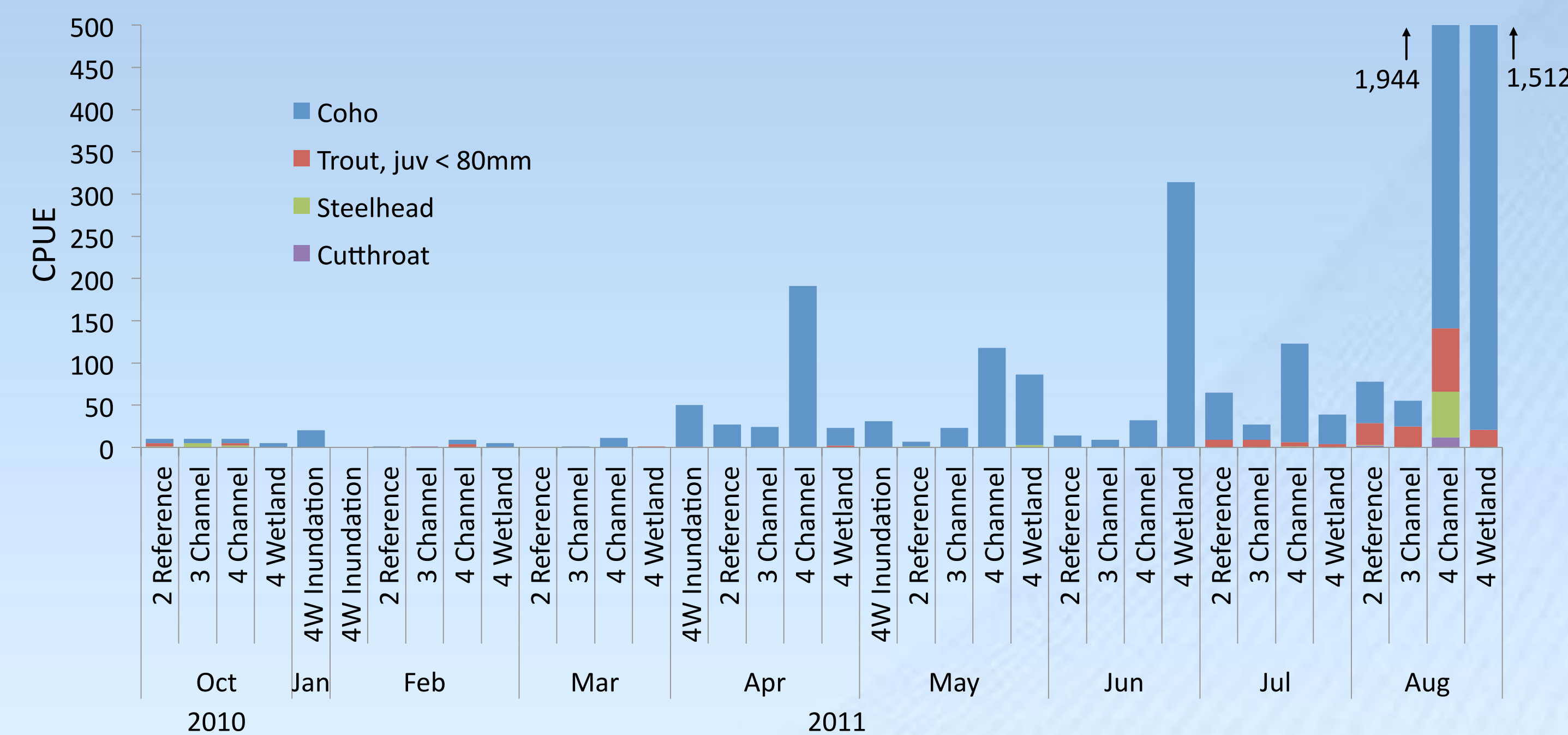
The overall goal of the study was to quantify early responses of juvenile salmonids and their prey resources to the Hansen Creek Floodplain restoration. To do this, we evaluated the following:

- Temporal and spatial composition of salmonids in 3 reaches of the system and one reference reach.
- Temporal and spatial abundance and composition of terrestrial invertebrates and aquatic prey resources.
- Diets of the dominant salmonid in Hansen Creek, juvenile coho salmon (*Oncorhynchus kisutch*).
- Comparison of the invertebrate data with the prey being consumed.

Salmonid Catch

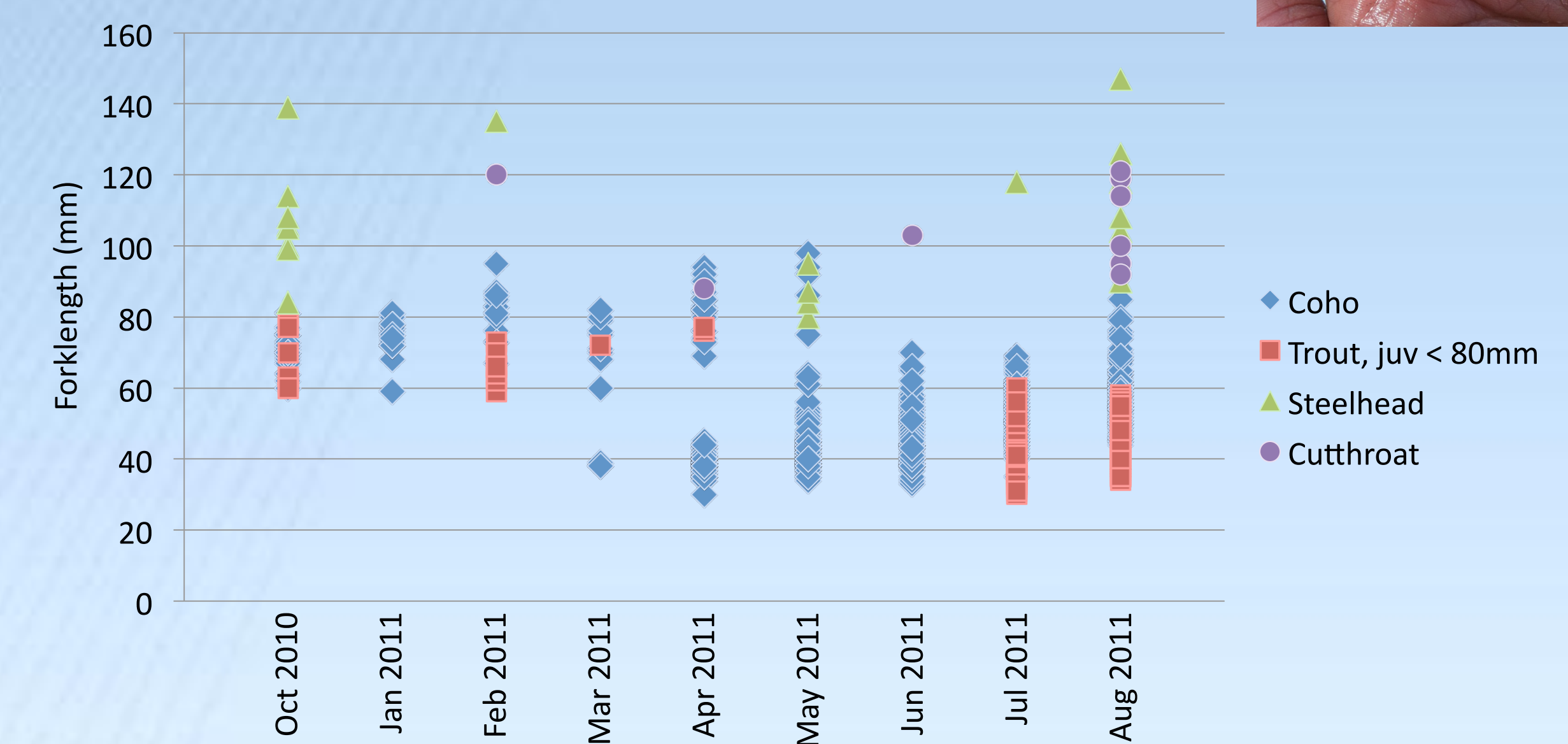
Methods

Salmonids were sampled in October 2010 once-monthly February through August 2011. Three areas were sampled in each reach, two by pole seine and one by dipnet around a logjam or undercut bank. The efforts in each reach were consistent from month to month. During periodic inundation events (Jan, Feb, Apr, May) salmonids were also sampled by pole seine in the wetland, at three sites on the east side of the channel and three sites on the west side of the channel.



Results

- Fall and Winter catches were lower than those in the Spring and Summer.
- Coho were more abundant in the inundated habitat during flooding.
- Reach 4 consistently had more salmonids in either the channel or the wetland or both, as compared to the other reaches.
- Coho fry first appeared in March, trout not until July.
- There were two Coho size classes in the spring; the larger Coho left the system by June.
- Trout were the largest salmonids, up to 147mm.
- No salmonids were found on the west side during inundations.



Insect Production

Methods

Terrestrial insect prey of salmonids was sampled once-monthly March-July 2011 with fallout traps (bins with soapy water deployed for 48 hours). For this sampling, reach 3 was divided into "established" habitat that was still within the original channel bank and had established riparian cover, and "new" habitat consisting of the new dynamic section of the channel.



Results

- A 2-way PERMANOVA multivariate test on assemblages showed significant site, month, and interaction differences ($p < 0.001$).
- Reaches can be similar when they are closer together, differences are more consistent the farther they are apart.
- The floodplain is most different from all other reaches (pairwise p-values always significant compared to other sites).
- Reach 3 new and established sites are the only two that directly border each other and are consistently different every month.
- Among the most abundant fallout insects were chironomids (midges), other dipteran flies, collembolans (springtails), and Acari (mites).
- Chironomids made up more of the insect assemblage at Reach 4 as compared to the other sites.

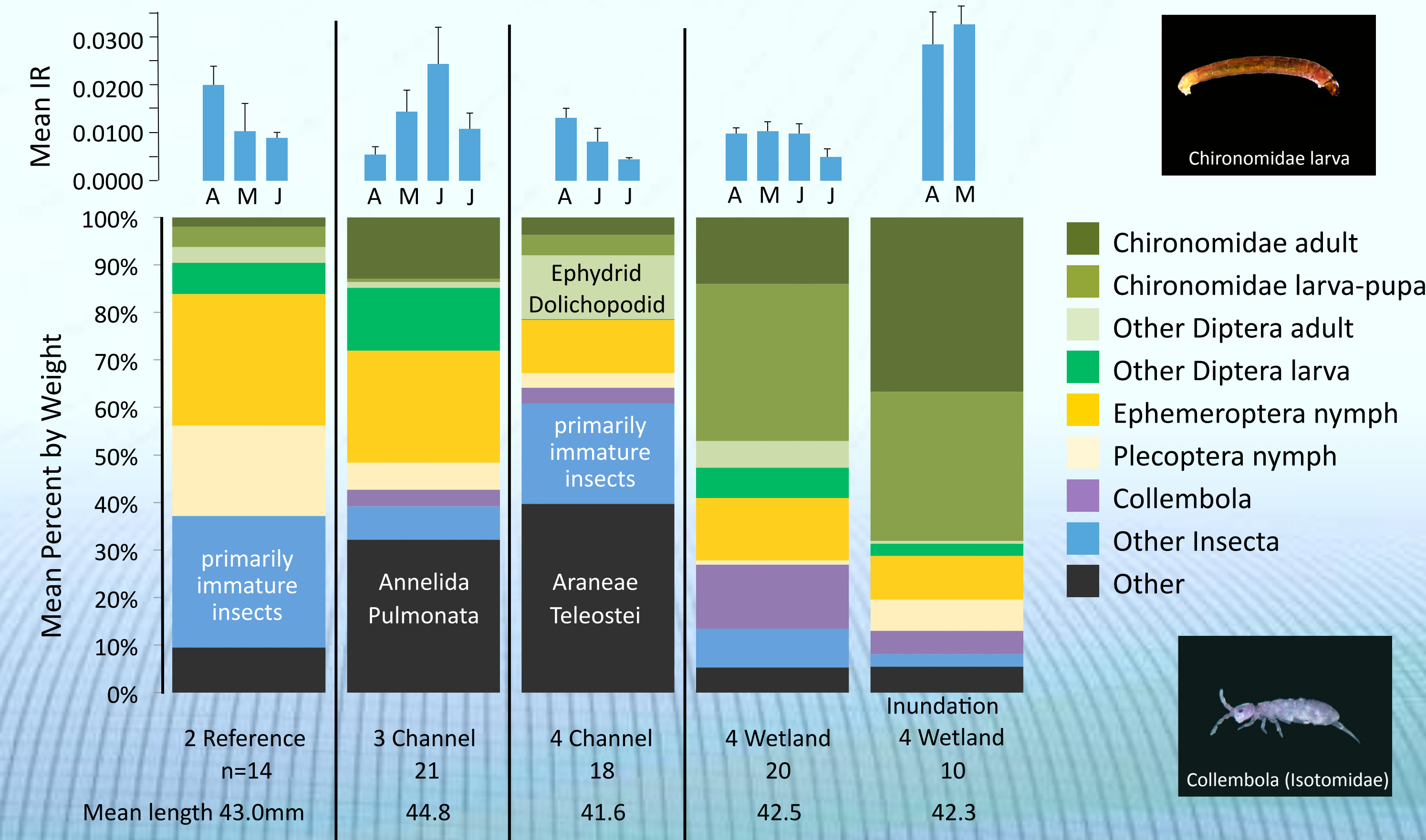
Salmonid Diets

Methods

Data presented here are from the smaller size class of coho salmon (<57mm FL) that were abundant through much of the year. On each date, diets were collected from up to five fish. Diet data are presented as mean percent gravimetric composition and as mean instantaneous ration (IR—total stomach content weight divided by fish weight), a metric that describes feeding intensity.

Results

- Coho diets in the upstream reaches were dominated by aquatic prey such as Ephemeroptera (mayfly) nymphs and other immature insects, as well as terrestrially produced prey such as slugs (Pulmonata).
- In contrast, diets from the wetland had much higher contributions by chironomids and collembolans.
- During inundation events, emergent and adult chironomids were especially abundant in the coho diets.
- Coho captured at the wetland during inundation events had significantly higher instantaneous rations than did those collected at most other sites in the same month (1-way ANOVA, p-value 0.0015 in April, 0.0023 in May).



Summary/Conclusions

- This study addressed the overall project objective of enhancing habitat for juvenile salmonids, by sampling juvenile Coho salmon distribution and diets, and terrestrial insects being produced in the restored habitats.
- Juvenile Coho salmon occurred throughout the project area, and were especially abundant in the wetland areas of Reach 4.
- Insect assemblages differed among the reaches sampled, with higher percentages of chironomids in Reach 4 compared to other reaches.
- Chironomids were also more abundant in Coho salmon diets in Reach 4, especially during inundation events, when the fish were accessing the restored floodplain; in the upper, more channelized reaches, aquatic insects were more prominent in the diets.
- Juvenile Coho salmon obtained higher diet rations when feeding during inundation events.
- Although the Hansen Creek Alluvial Fan and Wetland Restoration Project is in a very early stage, our results indicate that it is already being used by juvenile Coho salmon, and that different parts of the project are producing different types of prey for the fish.
- The site will continue to change, with rapid growth of planted vegetation in the floodplain and stabilization of channel habitats. Thus, site performance with regard to benefits for juvenile salmon may also change.



Acknowledgements

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