Oversummer Survival of Juvenile Coho in the Russian River Basin

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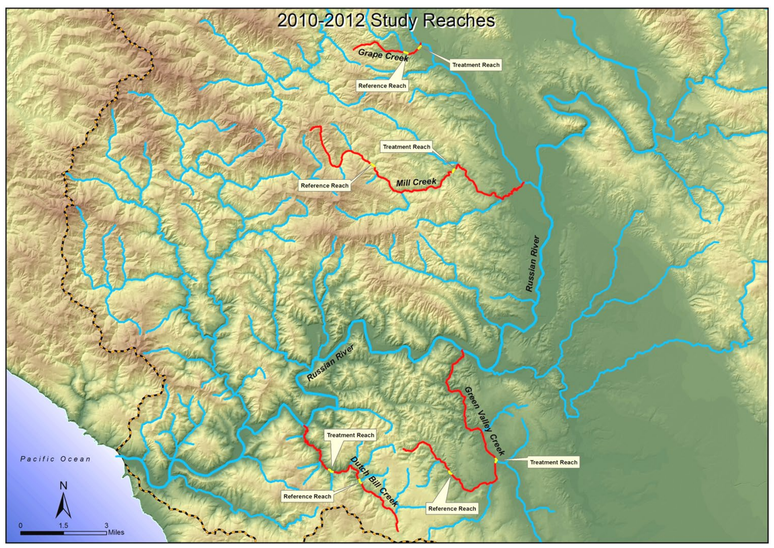
http://ca-sgep.ucsd.edu/russianrivercoho http://coho partnership.org

Overview

UC Sea Grant is conducting a study to correlate flow with oversummer survival of juvenile coho, through a collaborative effort known as the Russian River Coho Water Resources Partnership. The Partnership is working to return a viable, self-sustaining population of coho salmon to the Russian River watershed by improving spring and summer stream flow for coho smolts and rearing juveniles in five tributaries of high priority for coho recovery, including Dutch Bill, Green Valley, Mark West, Mill and Grape creeks. Program partners work with streamside landowners to develop flow enhancement projects, including frost protection fans, rainwater catchment basins, off-channel storage ponds and other alternatives to water diversions during the summer months.

UC Sea Grant's role in the Partnership is to monitor survival of juvenile coho before and after project implementation, in order to determine whether survival is increasing as a result of flow enhancement projects. This data is also being used to evaluate how much water Russian River coho need to survive throughout the critical summer months. Answering this question in varied and dynamic stream systems requires careful consideration of the complex relationship between flow, other environmental conditions and survival.

Studies were conducted on Green Valley, Mill and Grape creeks in the summers of 2010-2012 and on Dutch Bill Creek in the summers of 2011 and 2012.



Monitoring Methods

A flow-impaired treatment reach is established, along with a reference reach, on each study stream. PIT tag antennas are installed at reach boundaries to track movement of tagged fish out of study reaches.

Young-of-the-year coho from the Russian River Broodstock Program are PIT tagged at the Warm Springs Hatchery in early June.

Approximately 500 PIT -tagged coho yoy are planted in every study reach in late June. Release totals are adjusted based on the number of wild coho observed in each reach during spring snorkel surveys.

Habitat characteristics and dissolved oxygen are measured monthly. Flow and temperature loggers collect data on a continuous basis.

Paired PIT tag wanding samples are conducted on consecutive days each month between June and October to determine monthly survival of planted fish. Survival estimates are compared to flow hydrographs as a first step in defining minimum flow thresholds. Environmental parameters, such as wetted volume, pool depth, and dissolved oxygen, are used as covariates in survival models in order to identify specific limiting factors associated with low flows.

Acknowledgements

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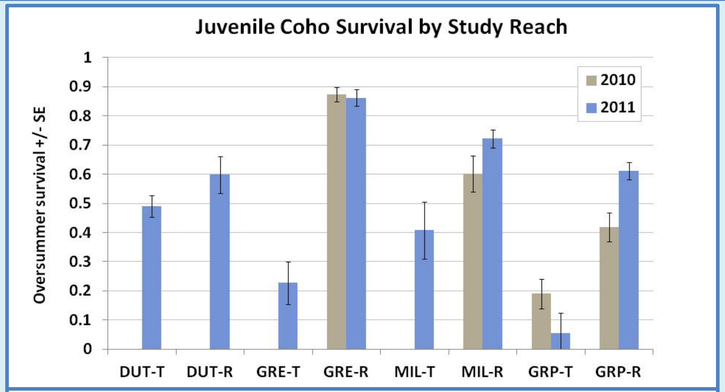
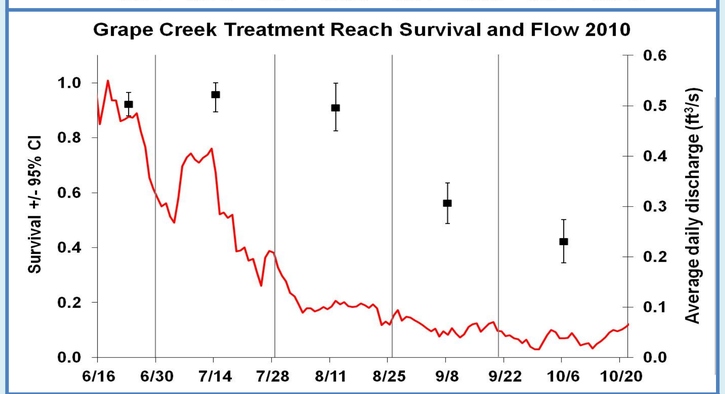
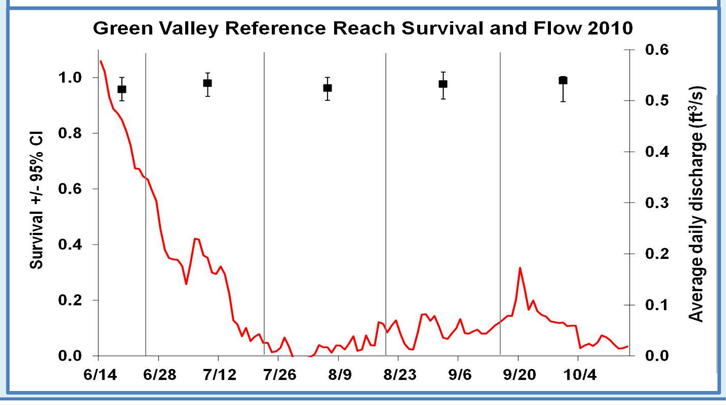
Results







Conclusions

Oversummer survival in the study reaches ranged from 19 to 87% in 2010 and 6 to 86% in 2011. Survival varied among streams and was generally higher in reference reaches than in flow-impaired treatment reaches. Relationships between flow and survival varied by stream. For example, in the Grape treatment reach, survival dropped when average daily discharge fell below 0.2 cfs, whereas in the Green Valley reference reach, survival remained high despite surface flows as low as 0 cfs. Wetted volume better explained the disparity in survival between these two reaches; as surface flow dropped in Grape, pools dried out, whereas in Green Valley wetted pool volume remained high even with no surface flow. Future monitoring will include evaluations of groundwater and hydrogeo-morphology to help explain such differences between reaches.