



Livestock, Range & Watershed

Division of Agriculture & Natural Resources

Counties of San Luis Obispo and Monterey

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Summer 2007

Inside this issue:

- **Announcements**
- **Meet Amy Breschini**
- **Steelhead in the Upper Salinas Watershed.**

Announcements

Ryan Cooper has accepted a job with the Carrizo Plains National Monument. We appreciated all the hard work Ryan has done for Cooperative Extension and wish him the best at his new job. Amy Breschini started work for UC Cooperative Extension on July 16, 2007.

Meet Amy Breschini, University of California Cooperative Extension

Amy Breschini is joining the UCCE office as the Farm Advisors Field Assistant for the San Luis Obispo County. She will be helping Royce Larsen, Mary Bianchi, and Mark Battany with research and educational programs. Amy is originally from the Ojai Valley and received her BS in Ornamental Horticulture from Cal Poly, with a concentration in nursery and greenhouse production. She has worked for wholesale commercial growers and for a commercial seed company in the seed physiology department. She was most recently a temporary technician for the SLO County Ag. Dept., in the Pest Exclusion program as a Glassy Winged Sharpshooter Nursery Inspector and in Insect and Monitoring Program, trapping and monitoring for exotic fruit flies. She is looking forward to meeting everyone and starting her new position.

Steelhead in the Upper Salinas Watershed

This article is adapted from the final report of a study titled "Habitat Requirements of Steelhead in the Upper Salinas River Watershed", by Jenna Voss, Lisa Thompson, Royce Larsen, Bill Tietje, Ryan Cooper and Peter Moyle. This research was done during the summer of 2006.

Little is known about the abundance, distribution, and habitat requirements of steelhead in the upper Salinas River watershed. We conducted this study in order to provide landowners and other stakeholders with information to make better informed decisions concerning these fish in this area. We were specifically interested in how distribution and habitat use of steelhead and other fish species were related to large wood (LW) availability in streams.

Steelhead and rainbow trout are the same species (*Oncorhynchus mykiss*). Steelhead are the anadromous form, that hatch in fresh water, migrate to the ocean where they grow until mature, and then return to fresh water to spawn. For the remainder of this article we will refer to all *O. mykiss* as steelhead. As cold water fishes, steelhead require cool to cold water temperatures in order to maintain body mass, grow, find food, and reproduce.

The Salinas River and its tributaries have been designated by the National Marine Fisheries Service as critical habitat for steelhead, where spawning fish can still migrate upstream. The coast of California has a Mediterranean climate, characterized by a cool, rainy winter season, and hot, dry weather the rest of the year.

Most of the sites we sampled in this study originated upstream of Paso Robles and on the eastern side of the Coast Mountain range, a few of the sites were on the western side of the coast

mountain range. The Salinas River watershed as a whole, receives little precipitation the majority of the year. Similarly to other hardwood-dominated watersheds in California, these conditions can lead to high maximum water temperatures and critical low flows. Deep, cool pools can often serve as refugia for salmonids such as steelhead in streams that can reach a maximum temperature at or near the lethal limit for cold-water fish species. Pools occur naturally in streams, formed by water plunging over boulders or bedrock in the channel. The presence of LW in the upper Salinas River watershed may be important in the formation of suitable habitat for steelhead. LW was the primary agent in the formation of a majority of pools at about one third of our sites, and was influential in forming pool shape or providing overhead cover at another third of the sites. Since adult steelhead presence is tied to the presence of pools, hardwood LW may provide fish habitat in this watershed through its influence on pool formation.

Steelhead abundance was correlated with fallen dead LW frequency, and fallen dead LW is important in the formation of wood jams. However, standing trees contributed a large proportion of total LW loading across all of our sites and may be important in the formation of suitable habitat for steelhead. Due to the Mediterranean climate of southern California, water temperatures and stream flows vary greatly from the short, rainy winter to the hot, dry weather the rest of the year. The variation in precipitation creates wide bankfull widths during short-term high winter flows, scouring out deep pools around the roots of standing trees. During the hot, dry summer months, the wetted stream channel becomes very narrow, sometimes drying up completely. The receding wetted channel allows establishment of trees within the moist bankfull width, but limits the habitat area for fish. The pools formed around tree roots were very important, becoming the last refuges for fish at some sites.

Standing trees may also be important in forming fish habitat due to their ability to anchor wood jams. While fallen dead LW pieces may form the key piece in a jam, the rapid decay rate of hardwood may make these jams short-lived. A jam anchored by a standing tree is likely to be more persistent in a hardwood-dominated system. Standing trees within

the bankfull width are also likely to fall within the bankfull width once they die, contributing to fallen dead LW. As a result, a standing tree, though often interacting only with high flows reaching the base of the trunk, may be important to the formation of fish habitat in the Salinas River watershed.

Native fish species were present at all sites sampled. The number of native species increased with decreasing gradient for each tributary and the mainstem Salinas. These species included Sacramento sucker, threespine stickleback, hitch, Monterey roach, Sacramento pikeminnow and speckled dace. Steelhead was the only species in the highest upstream sites (highest elevation). These higher elevation sites were cooler, had higher flow velocities, and a higher proportion of overhead cover. Other native fish species may have been naturally excluded from these sites because they are less adapted to colder water temperatures and/or higher flow velocities. Non-native fish species were in lower abundance than native species at all sites, and tended to be observed at the more downstream sites on the mainstem and tributaries. These species included bullhead, carp, green sunfish, bluegill, smallmouth bass, and largemouth bass. These sites were typically warmer and had lower flow velocities than upstream sites

Steelheads were present at sites with more overhead cover, more pools, and in the case of adults, more wood jams. Young-of-the-year steelheads were usually observed in shallow riffles over a gravel bottom, whereas juvenile and adult steelheads were observed in deeper water, such as pools or runs, and under large wood. Steelheads were present at nine of fourteen sites (64 percent). We conducted our sampling at the hottest time of the year, when we would expect steelhead to be restricted to the coolest locations, such as deep, cool pools. As a result, our data may represent the minimum distribution of steelhead across these sites in 2006.

Sites in the upper Salinas River watershed had loadings of fallen dead LW comparable to privately owned sites studied in northern California. Tree species making up LW included California black walnut, California laurel, California sycamore, coast live oak, Fremont cottonwood, red willow, big leaf maple, alder, blue oak, and valley oak. Mean loading was one third that of conifer-dominated

Sierra Nevada sites, and only one sixteenth that of conifer-dominated sites in the Pacific Northwest. While it may be unreasonable to expect hardwood-dominated areas to contribute the volume of LW possible in conifer forests, average volumes at our predominantly private sites were less than half that of hardwood-dominated public sites (e.g., protected watersheds within parks) studied in northern California.

Since LW appears to be important in the formation and maintenance of habitat for steelhead, it may be beneficial to increase the volume of fallen dead hardwood LW in streams through the use of best management practices (BMPs). Landowners whose properties include steelhead streams could adopt BMPs such as: (1) the promotion of hardwood riparian tree regeneration such as oaks, California sycamore, Fremont cottonwood, and willows; (2) promoting the survival of hardwood seedlings; (3) allowing trees to reach a size at which their DBH would be sufficient to allow them to function as LW; and (4) leaving fallen dead LW in the channel to contribute to fish habitat such as pools. Given the broad distribution of fish in the watershed, the concerns of landowners over fish-related

regulations, and the role of hardwood LW in contributing to pool habitat, the adoption of voluntary BMPs should increase the capacity of private landowners, resource agency staff, and public interest groups to cooperate in the management of fish-bearing streams on hardwood-dominated lands.



Royce Larsen

Watershed/Natural Resource Advisor
San Luis Obispo and Monterey Counties



Wayne Jensen

Livestock & Natural Resources Farm Advisor
San Luis Obispo and Santa Barbara Counties

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Pulling together when the chips are down



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July 27, 2007

Dear Livestock, Range and Watershed Subscribers

To be sure we're meeting the needs of our clients, Cooperative Extension in San Luis Obispo County is conducting a Customer Satisfaction Survey. We will use the information gathered from this survey to assess how effectively we are meeting our clientele needs and explore new ways to ensure customer service. The results will be shared with the County of San Luis Obispo and the University of California Cooperative Extension.

The survey takes less than 5 minutes to complete and can be accessed at:

<https://ucce.ucdavis.edu/survey/survey.cfm?surveynumber=1935>

Thank you for your time and thoughts.

Sincerely,

Royce Larson
Extension Advisor
Natural Resources/ Watershed