Streambank Plants Vital to Water Quality

Some studies suggest that up to 80 percent of streamside vegetation in northern California mountain meadows may have been lost as a direct result of human activities. Livestock grazing, logging, mining, road building, and recreational uses have all contributed to the destruction of the streambank ecology.

And without the plants needed to stabilize them, soil eroding from streambanks sends sediment down to clog drinking water reservoirs, reduce fish populations, and block hydroelectric dams, one of the region's main sources of power.

"Before we can reduce this type of damage, we have to know more about the native plants and how they grow," says ARS range scientist Tony J. Svejcar, who is based in Reno, Nevada.

He is part of a USDA/state task force aimed at stopping sedimentation and eventual destruction of this delicate environment along the banks of California's Feather River and its tributaries.

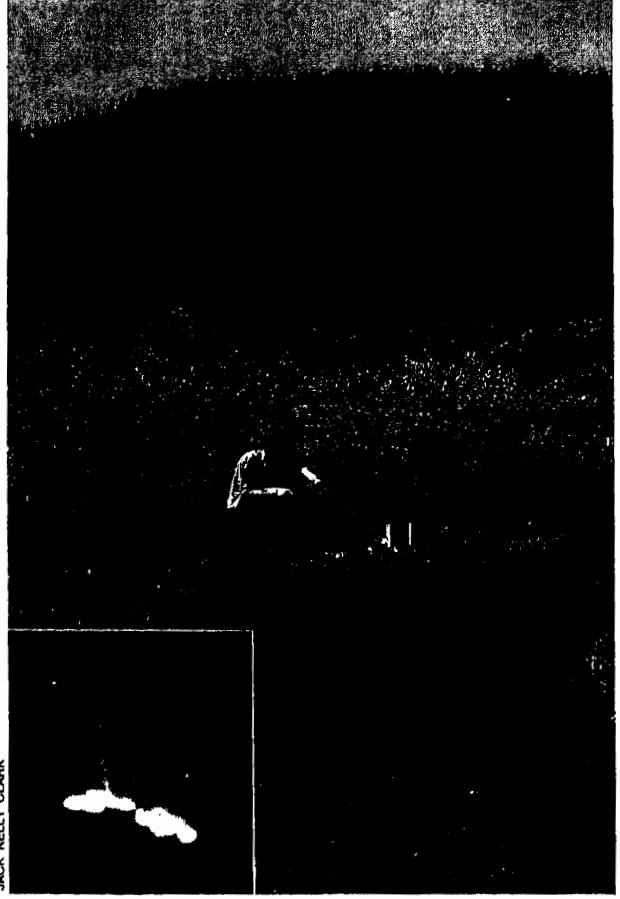
Svejcar has been studying the effect of seasonal climate changes on the root growth, photosynthesis, and water use of willows and grasses along three tributaries of the Feather.

He says, "besides providing healthy habitats for fish and forage production, these plants—in particular, their roots—are critically important for controlling erosion and sedimentation, especially in the spring when melting snows cause heavy streamflow."

Svejcar uses a high-tech, below-ground periscope to study root growth. Although the use of the periscope, also known as a rhizotron, is not new, this is the first time scientists have applied this technology to wetland plants.

Optical fibers in the scope light its sidewalls, enabling Svejcar to determine exactly when roots make their most growth. "First, we place a Pyrex glass tube into the ground at a 30-degree angle," he says. "Then, at various times, the periscope is inserted into the tubes so we can observe the number of roots that touch the glass tube at different depths."

Before the fiber-optic scope was developed, it was necessary to construct deep, glassed-in trenches to observe root growth.



JACK KELLY CLARK

On Freeman Creek in California's High Sierras, range scientist Tony Svejcar peers at the roots of streamside plants. (K-3197-15) Below ground (inset), roots are illuminated by optical fibers. (K-3197-5)

Svejcar also uses a portable photosynthesis meter to measure the amount of carbon taken in and moisture used by the plant. "It's another way to find out when maximum growth is taking place. In order to give plants the best opportunity to grow, it's critical that grazing be controlled at these times."

Although streamside vegetation makes up only 5 to 10 percent of these meadowlands, it provides about 90 percent of the usable forage for northern California livestock producers.

Svejcar and USDA Forest Service range conservationist Scott Conroy of the Plumas National Forest are evaluating different techniques for replanting willows along streambanks and seeding them with such grasses as reed canarygrass, wheatgrass, meadow foxtail, and redtop.

Svejcar is also working with livestock grazing researcher Mark Judkins, University of Nevada, Reno, to evaluate the impact of different grazing patterns on plants livestock select to eat. Their purpose: To see how early-season versus late-season grazing affects the growth of these plants and water quality and how many cattle can safely graze a given area.—By **Howard Sherman,** ARS.

Tony J. Svejcar is in USDA-ARS Landscape Ecology of Rangelands Research, 920 Valley Rd., Reno, NV 89512 (702) 784-6057. ◆