If Conditions Are Right, They Will Come

Bringing Back Steelhead Trout in Ross Valley Creeks

by Carole d'Alessio

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Small dark images darted in and out of watery shadows and under twisted root wads of mature alders. As we walked along the creek, our footsteps caused another two to flit around the back side of a rock. They defy being caught. They are the last remaining sport fish in urban Corte Madera Creek.

Steelhead trout are born in fresh water, migrate to the ocean where most of their growth occurs, and then return to fresh water to spawn. Locally, they spawn from December through April in tributaries where cool, well oxygenated water is available year-round. The female selects a site (redd) where there is good flow, then digs a nest and deposits as many as 1,200 eggs while an attendant male fertilizes them. The eggs are then covered with gravel when the female begins excavation of another redd just upstream.

Fry emerge from the gravel four to six weeks after hatching, depending on redd depth, gravel size, amount of fine sediment, and temperature. The newly emerged fry first move to the shallow, protected areas associated with the stream margin and then to other areas of the stream where they establish and defend feeding locations. Most juveniles occupy shallow portions of the stream, but some of the larger ones will inhabit pools or deeper runs.

A few individuals will remain in a stream, mature, and even spawn without ever going to sea; others will migrate to sea at less than a year of age. They typically spend one to four growing seasons before returning to fresh water to spawn, but some will return to fresh water after spending less than a year in the ocean.

For steelhead to reproduce successfully, they require appropriate water depth, velocity, and temperature, as well as gravel spawning areas and vegetation along the creek to provide shade and shelter. If we hope to reverse the decline in steelhead populations in the Corte Madera Creek Watershed, we must work to protect and improve these characteristics.

Water Depth: For spawning, steelhead prefer a water depth of about 14 inches. Fry prefer water approximately eight inches deep, while parr (slightly older steelhead) prefer a water depth of 10 inches. In natural channels, pool depth is not a factor in adult migration. However, channelized creeks that do not have a low-flow channel (an engineered area when sufficient depth is maintained through periods of low flow) are problematic for migrating fish. Seven inches is the minimum depth required for successful migration of adult steelhead, although the distance fish must travel through shallow water is a critical factor as well.

Water Velocity: Excessive water velocity and obstacles that may impede swimming and jumping can also hinder and block migration. Water velocities that are too great may overpower weak returning spawners. High flows can erode spawning beds, flushing eggs out of the gravel and pushing over-wintering juveniles downstream. Stream systems that flush heavily or frequently may accumulate fewer nutrients and temporarily eliminate insects and other aquatic organism on which fish depend.

Water Temperature: Optimum temperature requirements of steelhead may vary, but egg mortality begins to occur at 56 degrees F. Steelhead have difficulty extracting oxygen from water at temperatures greater than 70 degrees. Cool temperatures are sustained through warm summer months by vegetation overhanging creek banks.

Spawning Beds: Adult steelhead use mostly gravel-sized material for spawning, but will also use sand-gravel and gravel-cobble mixtures. The gravel must be highly permeable to keep the incubating eggs well oxygenated and should contain less than 5% sand and silt.

Vegetation: Trees and shrubs are necessary for food and shelter. Tree canopies furnish leafy sustenance for insects, which may be eaten by steelhead. Tree root clusters, woody debris, and downed trees give fish a place to hide from predators and provide protection from the heat of the sun. Larger fish need these cool spots to over-summer.

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