

15571
Bibkey
GOGA

SIG LAGOON/REDWOOD CREEK FISHERIES INVESTIGATION PROGRESS REPORT

22 December 1992

Dr. Jerry J. Smith
Department of Biological Sciences
San Jose State University

METHODS

Water temperature and dissolved oxygen profiles were taken at sites in Redwood Creek lagoon and in the deep series of pools upstream of the delta above the lagoon on 17 June, 23 July, 14 August, 19 September and 14 November; both morning and afternoon profiles were taken, except in June. Salinity profiles were also taken in the lagoon on all five dates. During June and July sampling, nutrient (nitrogen and phosphate) inflows from Redwood Creek and Green Gulch to the system were also determined.

Fish populations in the lagoon were sampled by seining in July, August and November. Fish populations in the pools upstream of the delta were sampled by backpack electroshocker in July, August and November and by seining in July.

Fish populations and stream habitat conditions were sampled in Redwood Creek at 4 sites upstream of the beach area. Sampling above and below the first bridge was done in July/August and again in November. Sampling at a site (Eucalyptus Grove) downstream of the town water supply diversion was done in September and November. Sampling above the third roadcrossing of the creek (Tamalpais State Park) was done in September. Sampling in Muir Woods National Monument, near the parking lot and at the bridge downstream, was done in August.

Fish and amphibian populations in the ponds at the Zen Center on Green Gulch were sampled by backpack electroshocker in August.

SUMMARY OF RESULTS

Lagoon

1. The lagoon opened and closed several times in June, but was closed from late June until late October. In July, with inflow of approximately 0.2 cfs, the lagoon was freshwater except for a narrow bottom lens of brackish water. Maximum lagoon depth was less than 1.3 m. By August the inflow was less than 0.01 cfs, lagoon depth was declining, and the entire water column of the lagoon was brackish. In November the sandbar had re-formed after the October storm, and the lagoon was very saline. Dissolved oxygen conditions in the lagoon were probably good all summer, but afternoon water temperatures probably exceeded 23.5 degrees C (75 degrees F) on warm, clear days in July through September.

2. Threespine stickleback, juvenile striped bass (50 - 170 mm standard length) and juvenile steelhead (85-120 mm SL) were abundant in the lagoon in July and August. Juvenile starry flounder and staghorn sculpin were also present. Only Striped bass were collected in November after the sandbar had breached. Tidewater gobies were not collected and are unlikely to persist in the present small lagoon.

Pools Upstream of the Delta

3. Water temperatures ¹probably exceeded 20 degrees C (68 degrees F) on clear, warm days in July through September. Extensive surface algal mats had developed by August, and morning dissolved oxygen levels were probably low (<4 mg/l) throughout August and September during periods of overcast. There was no surface inflow from Redwood Creek during that period. Stressed fish were observed in the morning in September.

4. In June and July phosphate was always detected in inflow waters from Redwood Creek and Green Gulch and in the pools above the delta. Only very low levels of ammonia nitrogen were detected and no nitrate was detected. The extensive growth of algae that developed in the pools, and the floating aquatic vegetation in the deep, backwater channel along the levee, was apparently maintained by earlier nitrogen inflows or from bottom sediments.

5. Prickly sculpin and juvenile coho salmon and steelhead were common during July sampling. Steelhead and coho had sharply declined by August, and none were collected in November. Threespine stickleback, yellowfin goby and juvenile blackfish were also collected in July and August. Only stickleback and prickly sculpin were collected in November.

Green Gulch / Zen Center

6. Newt larvae were collected in one of the reservoirs at the Zen center and in the stream channels in Green Gulch. Threespine stickleback were also present in the streams and onchannel ponds. The largest water supply reservoir at the Zen Center contained three native California fish species: prickly sculpin, Sacramento blackfish and Sacramento perch. The last two, and possibly the first, were introduced from outside the drainage. No frog larvae or adults were collected.

Redwood Creek

7. Stream shading, pool development, and escape cover for fish were generally very good at all four stream sites investigated; substrate conditions for insect production and salmonid spawning were very good except at the downstream site.

8. The major habitat problem for the creek was loss of streamflow downstream of the town's streamside well. In

September streamflow at the bridge upstream of the well was estimated at 0.25-0.3 cfs, but greater than 200 m downstream of the well streamflow was <0.01 cfs and much of the stream channel was dried to isolated pools with little or no surface flow. Dissolved oxygen levels were low in some of the sampled pools.

9. Coho outnumbered steelhead at all four sample sites, except in the shallowest microhabitats. Total salmonid density was greatest at the upstream (Muir Woods) site; within sites density was highest in well-developed pools and glides with bank or woody escape cover. Prickly sculpins were collected at all four sites. Threespine sticklebacks and coastrange sculpin were collected at the downstream site. Riffle sculpins were abundant at Muir Woods and were also collected at the next two sites downstream. Riffle sculpins normally are not found in coastal streams without a previous freshwater inland connection; they may not be native.

10. Coho and steelhead density at the downstream site declined over 35% from August to November, as shallower habitats were lost to reduced streamflows (0.2 cfs in July to 0.01 cfs in September). Downstream of the town well salmonid densities in the intermittent pools amounted to less than 20 to 40% of the density of other sites in August/September. Numbers further declined by half by November, primarily due to loss of coho.

Table 1. Population estimates and (densities/100') for coho and steelhead collected by electroshocking on Redwood Creek in 1992.

Site	Sampl. Date	Habitat Types Sampled				Length Sampled	Est. Coho	Population Steelhead	
		P1	G1	Rn	Rf			0+	1/2+
1. Muir Woods	20 Aug	30%	53%	12%	5%	302'	253 (84)	58 (19)	25 (8)
2. 3rd Bridge	19 Sep	60	15	7	19	166	50 (30)	26 (16)	12 (7)
3. Downstream of Town Diversion	19 Sep	19	37	dry		250 129 wet	32 (13)	16 (6)	2 (1)
	14 Nov						10 (4)	15 (6)	1 (.5)
4. 1st bridge	23 Jul	39	56	2	4	314	169 (54)	153 (49)	3 (1)
	14 Aug								
	14 Nov						104 (33)	92 (29)	6 (2)
5. Pools > Delta	23 Jul					200	59*	22	3
	14 Aug						6	2	3
	14 Nov						0	0	0

*Data for site 5 are actual capture totals, not population estimates