

Lower Arroyo Grande Creek and Lagoon
Fishery and Aquatic Resources
Summary 2006 Monitoring Report

Oceano Dunes State Vehicular Recreation Area

Pismo Dunes State Reserve

by
Douglas Rischbieter
Environmental Scientist
Central Valley District

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ABSTRACT

The lowest half-mile of Arroyo Grande Creek, including a periodically-closed euryhaline lagoon, is within or adjacent to Oceano Dunes State Vehicular Recreation Area (SVRA) and Pismo Dunes State Reserve (San Luis Obispo County, California). Qualitative sampling of the fishery in this area was conducted four times throughout 2006, and this report is intended to summarize the results of this activity. Purposes of sampling included gathering information about various species' use of the habitats within the State Park, evaluating whether any Park activities may be impacting the fishery and aquatic habitat, and documenting the impacts of habitat disturbance caused by upstream water management activities. We used a generally-consistent regime of electrofishing, seining, dipnetting, and direct observation during each survey episode, which followed methods and patterns established during similar activity in 2004 and 2005. A total of 12 fish species were collected during the 2006 sampling. Of continued noteworthiness in 2006 was the apparent tenuous presence in the lagoon of tidewater goby, a federally-listed Endangered species. A single juvenile/post-larval goby was collected, the first indication of natural goby reproduction at this location. Also noteworthy among the native fish collected were steelhead, a federally-listed Threatened species, usually present in the study reach in low numbers but demonstrating a significant (relatively abundant) downstream migration during February high flows. Despite predictably low summer inflow to the lagoon, flow through the freshwater reach of Arroyo Grande Creek was reportedly sustained without interruption during 2006.

INTRODUCTION

Arroyo Grande Creek arises from the mountains of San Luis Obispo County and flows to the Pacific Ocean. Within the watershed is one major reservoir, Lopez Lake storing up to 52,000 acre-feet, that is situated about 15 miles upstream from the ocean. Within the last few miles to the ocean, a low-gradient reach of stream flows through an alluvial agricultural valley and then forms a lagoon behind the beach. The lagoon is closed by a sandbar in some summers, but otherwise flows over the beach to the sea. The terminal half-mile of Arroyo Grande Creek, including the aforementioned lagoon, are part of Oceano Dunes SVRA and Pismo SB Dune Preserve. Adjacent to this reach of stream are a municipal airport and a wastewater treatment plant. Most of the lower reach of the creek is confined by parallel levees and some riparian vegetation is periodically removed for flood control purposes. Relatively extensive vegetation removal occurred in and adjacent to the upper half of the study area in the fall of 2005 and 2006.

Study Area

Arroyo Grande Creek in and adjacent to Oceano Dunes SVRA and Pismo SB Dune Preserve typically consists of three distinct aquatic habitats: a few hundred feet to yards of low-complexity, relatively shallow (maximum depth <1.5 feet) channel that proceeds up from the surf line and is characterized by sand banks and substrate; a several-acre elongate lagoon behind the back-beach that is typically 2 to 6 feet deep and varies in extent depending on tides and high flow events, characterized by patches of submerged and emergent aquatic vegetation and varying substrates of mud, silt, and gravel; and a lotic environment upstream of the lagoon characterized by a series of short low gradient riffles and shallow (maximum depth usually <3 feet) pools,

runs, and glides. This upper reach is usually characterized by dense riparian vegetation on and overhanging the banks, and predominantly small-gravel substrate with sparse distribution of large woody debris fragments. The north end of the lagoon and both sides of the upstream reach are confined by levees.

Figure 1 shows the lower half-mile of Arroyo Grande Creek and the relative locations of the habitats described above. "Guiton Crossing" is the approximate upstream limit of State Park ownership, though electrofishing/sampling was conducted a few hundred feet upstream from this point on some occasions.

Streamflow was cursorily estimated to be between about 0.5 and 7 cfs in the lotic areas during all survey periods. Water quality of lagoon inflow appeared good; water quality within the lagoon seemed good on all 2006 survey dates, even during the one instance of sampling during the period of lagoon mouth closure. High tides were observed washing seawater into the lagoon on several occasions. Periodic disturbances to these habitats during the survey period also included short-duration floods, beaver activity in and upstream from the lagoon, and autumn removal of some riparian vegetation for flood control maintenance purposes. The depth of the lagoon and its extent upstream varied notably, sometimes more than two feet, depending on the dynamics of sandbar formation, inflow, outflow, tidal wash, and because of the location of a beaver dam in the middle of the lagoon.

Purpose and Scope

This study was conducted for two primary purposes: 1) to continue the evaluation, commenced in 2003 through 2005 (Rischbieter 2004, 2006) of the composition and significance of the fishery in Arroyo Grande Creek associated with State Park habitat; and 2) to gage the impact (if any) of SVRA vehicle traffic on these aquatic resources, especially in the beach area where vehicles traverse the wetted stream. Towards these goals, aquatic sampling was generally limited to the Park reach of Arroyo Grande Creek. Most information sought was qualitative. Quantitative evaluation was limited to routine estimation of the relative abundance of species collected.

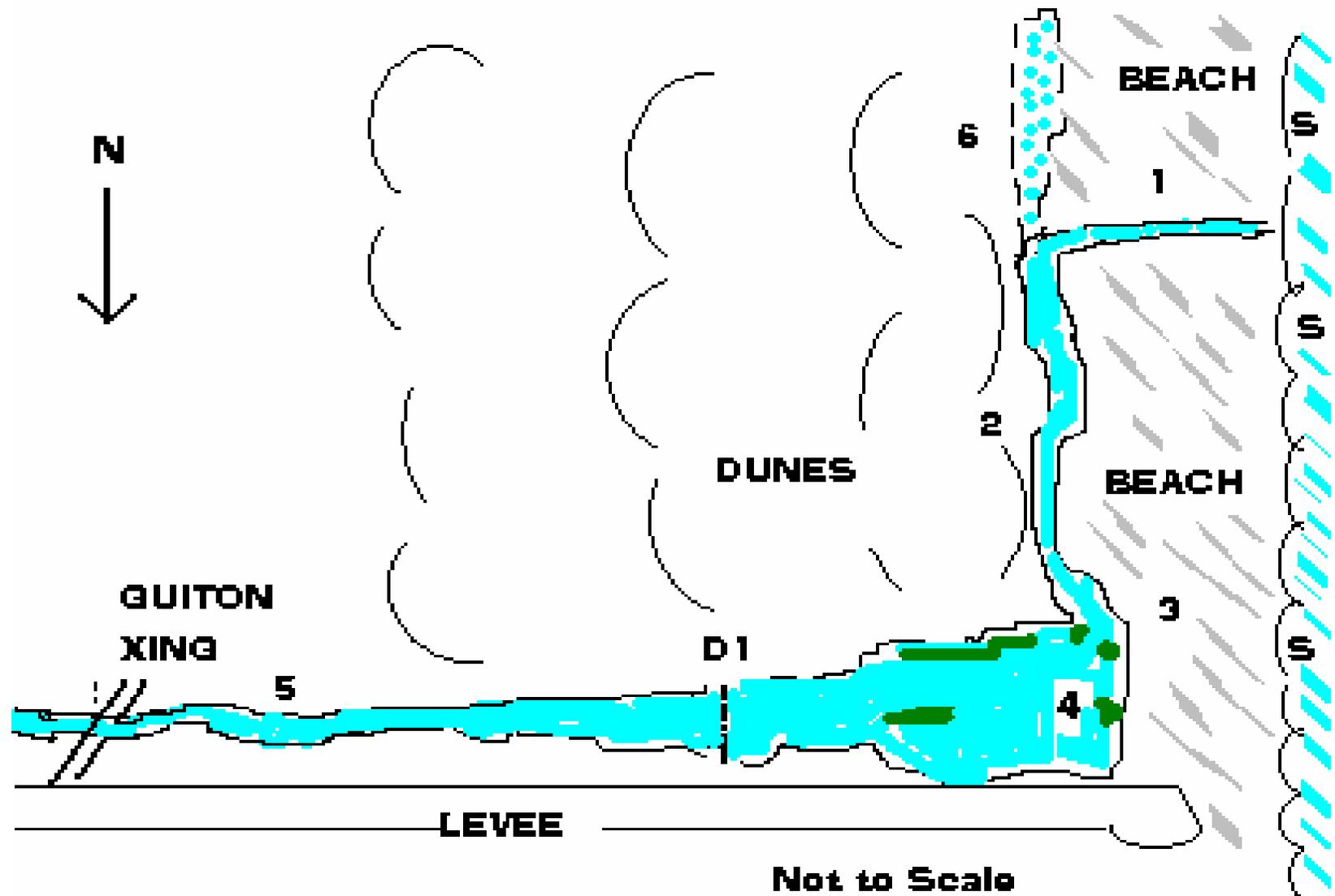
MONITORING PROCEDURES

We typically used dipnets, beach seine, direct observation, and electrofishing to observe, collect, and identify fish in each of the three habitat zones described above. Each of these methods had some shortcomings in various areas from time to time, but generally a similar degree and type of effort was expended on each survey date. More detailed description of activities pursued during each of the seven surveys can be found within the summary reports prepared for each individual fish-sampling survey (Rischbieter, various dates). However, the following summary describes typical procedures conducted over the study period.

The back-beach reach, lagoon-tail outlet area, and west end of the lagoon were usually subject to 5-10 seine hauls using a 4' x 50' beach seine with 3/16" mesh. The seine was typically swept in an arc, with a set pivot-point on shore, and closed and dragged ashore. After each haul the seine was checked for organisms and, if any were present, they were removed and identified and released.

FIGURE 1. Relative locations of zones of Study Area, lower Arroyo Grande Creek and Lagoon, San Luis Obispo County.

1 - Surf-line Outlet Reach; 2 - Back-beach Reach; 3 - Lagoon-tail Outlet Area; 4 - Lagoon Pool; 5 - Upstream of Lagoon Head;
6 - South Arm of Lagoon (transient in 2006, not present on any 2006 sampling dates) D1 - 2005-2006 Beaver Dam; S - Normal Surf Zone



Electrofishing was also conducted above the head of the lagoon. Effort was usually continuous from a relatively easy access point about 1,000 feet downstream of Guiton Crossing upstream to Guiton Crossing and occasionally 100-500 feet beyond. The electrofisher was accompanied by two netters, using dipnets, who netted immobilized fish and placed noteworthy or representative specimens into a bucket for recovery, identification, and release. Roughly 1,000 seconds of electrofishing current was usually applied throughout this reach; settings were routinely 60 Hertz at 100-200 Volts DC.

RESULTS

Thirteen species of fish were collected over the four survey dates. Species collected, relative locations of collection for each species, general relative maturity of each species collected, and survey dates are summarized in Table 1. Virtually all fish collected were returned alive to the approximate location of capture. Exceptions to the preceding statement include: 1) the bass captured (February); 2) about 5 larval suckers taken for identification in June; 3) a juvenile goby that succumbed to handling stress in September and could not be successfully released; and 4) the dead bullhead found in December.

No reptiles, only one amphibian (bullfrog tadpole, December), and seemingly few aquatic invertebrates were observed during any of the surveys, but the lagoon and creek support substantial numbers of migratory waterfowl. Wading shorebirds, both predators and scavengers, were frequently observed both resting and stalking in the lagoon, in back-beach pools, and in the surf zone outlet reach.

Beaver activity appeared to affect fish habitat. Though no beavers were seen, the dam in the middle of the lagoon (originally constructed in 2005) produced two different lagoon water levels simultaneously (the head of the lagoon was often about 18" higher than the lower half). This dam probably varied in height, consequently backing water further upstream and reducing the remaining reach suitable for electrofishing, especially by December. Several deeply-recessed bankside holes, presumed to be lodge entrances, provided habitat for a notable concentration of native fish.

TABLE 1. Fish of lower Arroyo Grande Creek and Lagoon: species collected, status, collection dates, approximate collection locations, and life history stages observed.

<u>SPECIES</u>	<u>STATUS</u>	<u>FEB 27,</u> <u>2006</u>	<u>*JUN 6,</u> <u>2006</u>	<u>SEP 19,</u> <u>2006</u>	<u>DEC 20,</u> <u>2006</u>	<u>COMMENTS</u>
California roach <i>Lavinia symmetricus</i>	n	O5,o5	A5,a5	A5,a5	u5	A 132mm (TL) specimen, captured in June, was the largest of this species ever observed here.
speckled dace <i>Rhinichthys osculus</i>	N	U5	--	--	--	Only one individual, 50mm TL, seen in 2006 (February).
Sacramento sucker <i>Catostomus occidentalis</i>	n	O5,o5	O5,a2	A5,a5	O5,o5	
steelhead <i>Oncorhynchus mykiss</i>	N	a5,u2	o5	u5	u2	More captured (22) in 2006 than any previous (2003-2005) DPR survey period.
mosquitofish <i>Gambusia affinis</i>	I	--	--	u2	--	
threespine stickleback <i>Gasterosteus aculeatus</i>	N	O2,3,5; u2	Aa2,Aa5	Aa2,Aa5	U2,o2,u5	
black bullhead <i>Ameiurus melas</i>	I	--	--	--	u4	First known AG Creek occurrence of this species; found recently-dead in lagoon.
largemouth bass <i>Micropterus salmoides</i>	I	--	a2	u2	--	
prickly sculpin <i>Cottus asper</i>	N	O5	A5,a5	O5,o5	O5,o5	A 181mm (TL) specimen, captured in June, was the largest of this species ever observed here.
staghorn sculpin <i>Leptocottus armatus</i>	N	aA2,Aa3	u1,Oo2	A2,a2	o2	
tidewater goby <i>Eucyclogobius newberryi</i>	N	--	U2*	u2	--	One individual found on each of 2 dates: June effort limited; in September, 1st juvenile ever observed here
starry flounder <i>Platyichthys stellatus</i>	N	Uu2,Oo3	o2	U2	O2,o2	"Adult" flounder probably sub-adult, but significantly larger than young-of-year (ca. 120-155+ mm)

KEY Status: **N** = Native to watershed; **n** = Native to California, but likely introduced to watershed; **I** = Introduced to California

Zones Where Found (Figure 1): **1** - Surf-line Outlet Reach; **2** - Back-beach Reach; **3** - Lagoon-tail Outlet Area; **4** - Lagoon Pool (limited effort);

5 - Upstream of Lagoon Head; **6** - South Arm of Lagoon (only present in March and December).

* - Sampling limited because of Permitting delay; June collection of goby was unexpected.

Abundance (UPPER CASE = Adults; lower case = Young-of-Year): **A/a** - Abundant or Common; **O/o** - Occasionally Collected; **U/u** - Infrequently Collected

DISCUSSION

The 2006 surveys of Arroyo Grande Creek are noteworthy for several reasons. Though tidewater goby were rarely captured here, 2006 bore the first evidence of goby reproduction since site colonization was documented early in 2005. High flow events appeared to be associated with the downstream migration of numerous juvenile steelhead; the 13 individuals captured (plus others eluding capture) in February were more than the cumulative total captured during the four surveys of the previous year. Exceptionally-large individual prickly sculpin and California roach were captured. The first occurrence of black bullhead here was recorded. Additional information and discussion related to each of the four surveys can be found within the summary reports prepared for each individual fish sampling survey (Rischbieter, various dates).

One species observed in 2005 (Rischbieter 2006), topsmelt, was not collected in 2006. Native speckled dace did not occur in 2005, but were collected in 2004. The possibility of black bullhead was predicted (Rischbieter 2004), since they occur upstream in Lopez Lake, but the 2006 collection here (of the first individual ever recorded in the Park) likely succumbed to brackish- or salt-water conditions in the lagoon. Little conclusion can be drawn from these species' observed status, as speckled dace have previously been present only in low numbers, and topsmelt are usually marine and occur only transitorily at this location. Overall, the difficulty of sampling within the heart of the lagoon itself probably results in an understatement of the diversity and abundance of species in lower Arroyo Grande Creek.

One purpose of this monitoring was to gain insight as to whether high traffic volume in the SVRA (including vehicles fording the seasonal lagoon outlet) might be affecting fish or their habitat. Regular closure of all or most of the back-beach reach to vehicle entry appears capable of avoiding or minimizing impacts. Vigilant maintenance of posted closure signs seemed effective at almost eliminating public encroachment into sensitive closed lagoon areas, based on observation on these survey dates of few if any straying tire tracks. In general however, fish typically do not use the surf-line outlet reach, where vehicles most frequently and efficiently ford the stream. Furthermore, the quality of habitat in this lowest reach (sand banks, sandy channel) does not appear to be significantly altered by vehicle traffic, owing largely to the naturally transitory and dynamic nature of sandy features near the surf line and through the beach.

Recommendations

Recommendations made earlier warrant repeating. Continued periodic fishery monitoring in this area will provide additional useful information for resource managers. Additional or continued sampling may serve to identify the periodic presence of the aforementioned species in the future. The effect of freshets, late-summer drought, and other cyclic hydrologic conditions may be deduced in the future through continued monitoring. A similar frequency of surveying and monitoring (3-4 times throughout the year) is proposed to continue in 2007. The exact timing of 2007 surveys should be scheduled dependent upon the timing of significant hydrologic events such as following periods of flood, lagoon closing/opening, and any extended periods of low or no flow.

Future study objectives should continue to include attempts to sample and observe fish that periodically may reside in the area subject to regular vehicle traffic. Practically, this should usually be limited to the surf-line outlet reach; however, the back-beach reach of the creek is dynamic and occasionally is outside the vehicle closure zone. Even in the absence of future evidence of direct or indirect impacts attributable to vehicle traffic upon fish of any species, the closure zone should generally be aligned so as to include as much length and area of active streambed as reasonably possible, to the degree practicable and consistent with necessary Park operations.

The one goby (juvenile) collected in September remains in possession, preserved, because it became moribund after handling and release. Consistent with federal Recovery Permit conditions, it will be delivered to Dr. Dave Jacobs at UCLA as part of an ongoing genetic study. The recovery permit secured for this work further allows collection of up to 49 additional goby specimens from Arroyo Grande Creek to be contributed to that genetic study, but no collection for that purpose should occur here unless a reproducing population becomes convincingly established.

Other researchers may be interested in an opportunity to document the persistence, habitat utilization, growth rate, abundance, and other natural history characteristics of the steelhead here. For example, if the dozen steelhead collected in February could have been marked, it would have been insightful to know if any of the half-dozen collected in June were from the previous sample. Such information could reveal the suitability of conditions in this area for steelhead growth and rearing, and perhaps an insight into population size. If such modest numbers of steelhead are collected in future years, the Department should cooperate with researchers, agencies, and/or institutions that express a wish to pursue scientific collection here.

Park staff can provide useful information by remaining observant and recording unusual biological sightings and changes in hydrologic conditions. At a minimum: photographs should be taken of unusual, large, or abundant fish observed (such as fish occasionally found dead) and representative specimens preserved by freezing¹; the dates of significant floods, lagoon closing and breach, and cessation and restoration of stream surface flow (into the lagoon) should be recorded; any other natural or man-made disturbances to water quality or aquatic habitat should be cursorily documented (fuel or sewage spills, flood channel maintenance or vegetation removal, etc.). These activities can help ensure the continued effective management and protection of the aquatic resources of Arroyo Grande Creek and Oceano Dunes SVRA.

¹ Handling and storage of listed species, such as steelhead, legally requires coordination with NOAA Fisheries and/or the California Department of Fish and Game.

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