SNORKEL SURVEY REPORT FOR UPPER MATILIJA CREEK 2014

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Introduction

Between August 14, 2014 to October 27, 2014 a snorkel survey was conducted on the Matilija Creek by the California Department of Fish and Wildlife (CDFW) with help from the Pacific States Marine Fisheries Commission (PSMFC) and the Americorps Watershed Stewards Project (WSP). The survey took place beginning approximately 2.25mi upstream of Matilija Lake and extending approximately 5.7mi upstream, ending at a pool just below a total natural barrier to fish passage. As this survey was conducted during the summer of the third consecutive year of drought in southern California, water levels were lower than usual, likely resulting in lower fish counts than in the past due to less available habitat.

The purpose of this survey was to assess abundance and distribution of different size/age classes of *Oncorhynchus mykiss (O. mykiss)*, commonly known as Coastal Rainbow/Steelhead Trout. In order to maximize likelihood of survival of the species, these fish have evolved two distinct life history strategies. Resident rainbow trout remain in freshwater throughout their life cycle while steelhead are anadromous, migrating from freshwater to the ocean to mature before returning to freshwater streams to reproduce. Note that the fish observed in this survey reside above the Matilija Dam which is a total barrier to anadromy. Therefore, the observed *O. mykiss* are all resident rainbow trout. However, genetic samples indicate that these fish possess genes that would allow them to smolt given the proper habitat conditions. In the event that the dam is taken down, these fish maintain the capacity to be anadromous.

Southern California steelhead trout have been listed as endangered under the Federal Endangered Species Act since 1997. In order to be delisted, the species must be recovered to standards set by the Southern California Steelhead Recovery Plan, released by the National Marine Fisheries Service (NMFS) in 2012. These standards include the presence of a minimum number of viable populations within each of five biogeographic groups (BPGs). Watersheds within each BPG are classified as Core 1, 2, or 3 based on their potential to support viable steelhead populations. Watersheds with the highest potential are classified as Core 1, and therefore have the highest priority for recovery.

The Ventura Basin, which includes Matilija Creek, is listed as Core 1 for steelhead recovery within the Monte Arido Highlands BPG. Therefore, it is important to document current abundance and distribution of *O. mykiss* present in the watershed to reference when making management decisions.

Methods

The Upper Matilija Creek snorkel survey was performed by teams of two to three surveyors. Each team was comprised of one snorkeler and one or two data recorders. Although each unit was snorkeled twice to calibrate counts, only first pass data was used in this report. First pass snorkelers determined which units were able to be snorkeled and snorkeled every other snorkelable unit, reporting the number of *O. mykiss* observed and their size classes. Along with the snorkeler's observations,the GPS location of each

unit and photo of each unit was taken. First pass teams labeled each snorkeled unit with flagging tape to direct the second pass snorkelers to which units to snorkel. Since first pass and second pass fish counts were very similar, first pass fish counts were used for analysis purposes. Water and air temperatures were measured with thermometers every ten units. Length, width, mean depth, and maximum depth measurements of each unit were recorded. Unit length measurements were added together to determine the total length of stream snorkeled. This number was used to calculate the number of fish per unit snorkeled for the length of the reach. The total length snorkeled was then multiplied by the total width snorkeled to get an approximation for the total surface area snorkeled. The total number of fish seen was then divided by this number to get the average number of fish per unit area.

When snorkeled, each unit was assigned a shelter value between 0 and 3 from the California Salmonid Stream Habitat Restoration Manual: California Fish Bulletin 180. Shelter values incorporated presence of boulder cover, woody debris, undercut bank, root wad cover, submersed vegetative fish cover, and bubble curtain. Fish density per shelter value was determined by calculating the total surface area of the pools under each shelter classification. The total number of fish observed in each shelter value was then divided by this number.

Results

Total miles surveyed: 6.31 mi

Total miles snorkeled: 0.713 mi

Total number of units snorkeled: 128 pools

Total number of fish seen: 184 fish

Total length snorkeled: 3765.2 ft

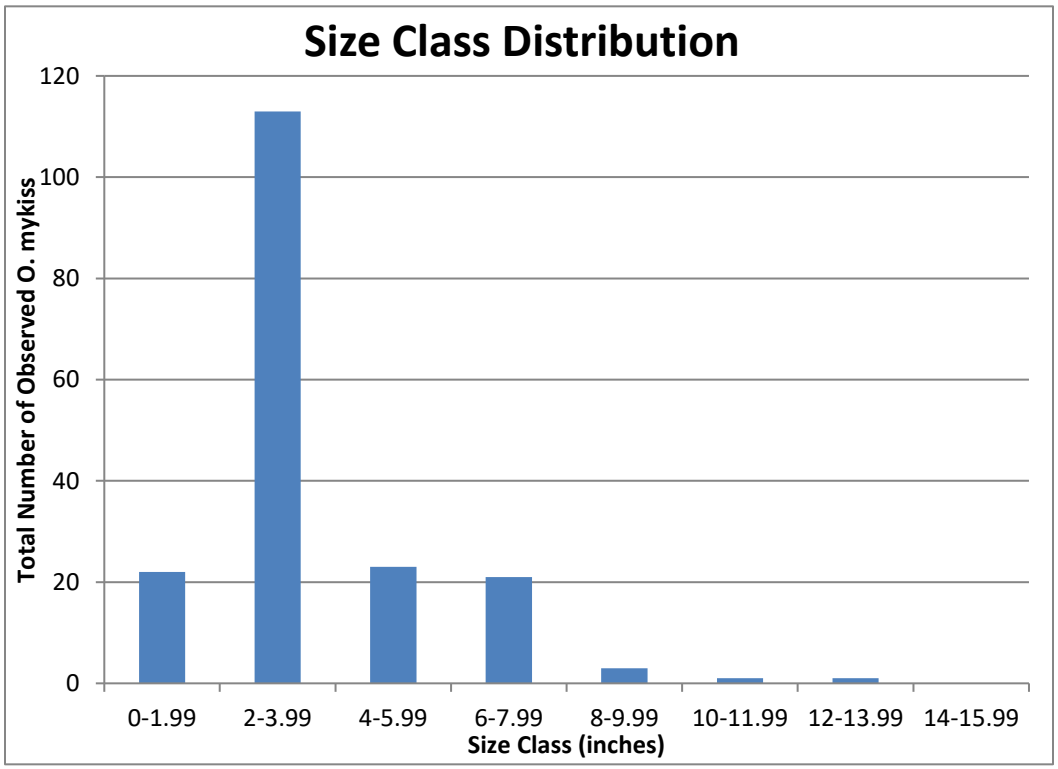
Total width snorkeled: 1806.5 ft

Surface area snorkeled: 6,801,833.8 ft^2

Density of fish per unit area snorkeled: $2.71x10^{-5}$ fish per square foot

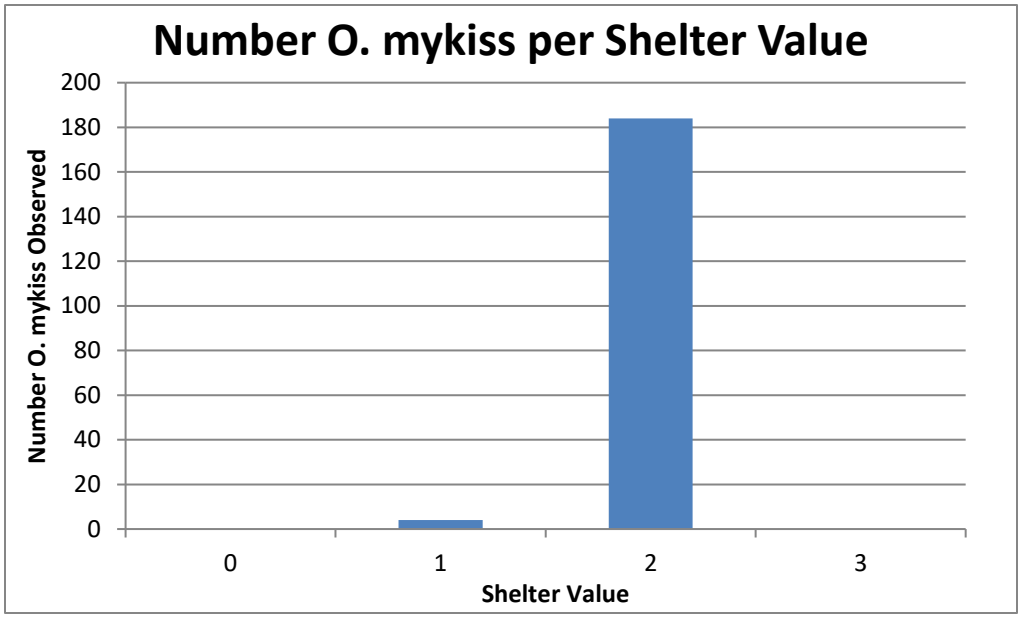
The chart and table below display the distribution of fish size classes observed in the 6.31 mile surveyed stretch.

Size Class Distribution								
Size Class (inches)	0-1.99	2-3.99	4-5.99	6-7.99	8-9.99	10-11.99	12-13.99	14-15.99
Total Number of Observed *O. mykiss*	22	113	23	21	3	1	1	0

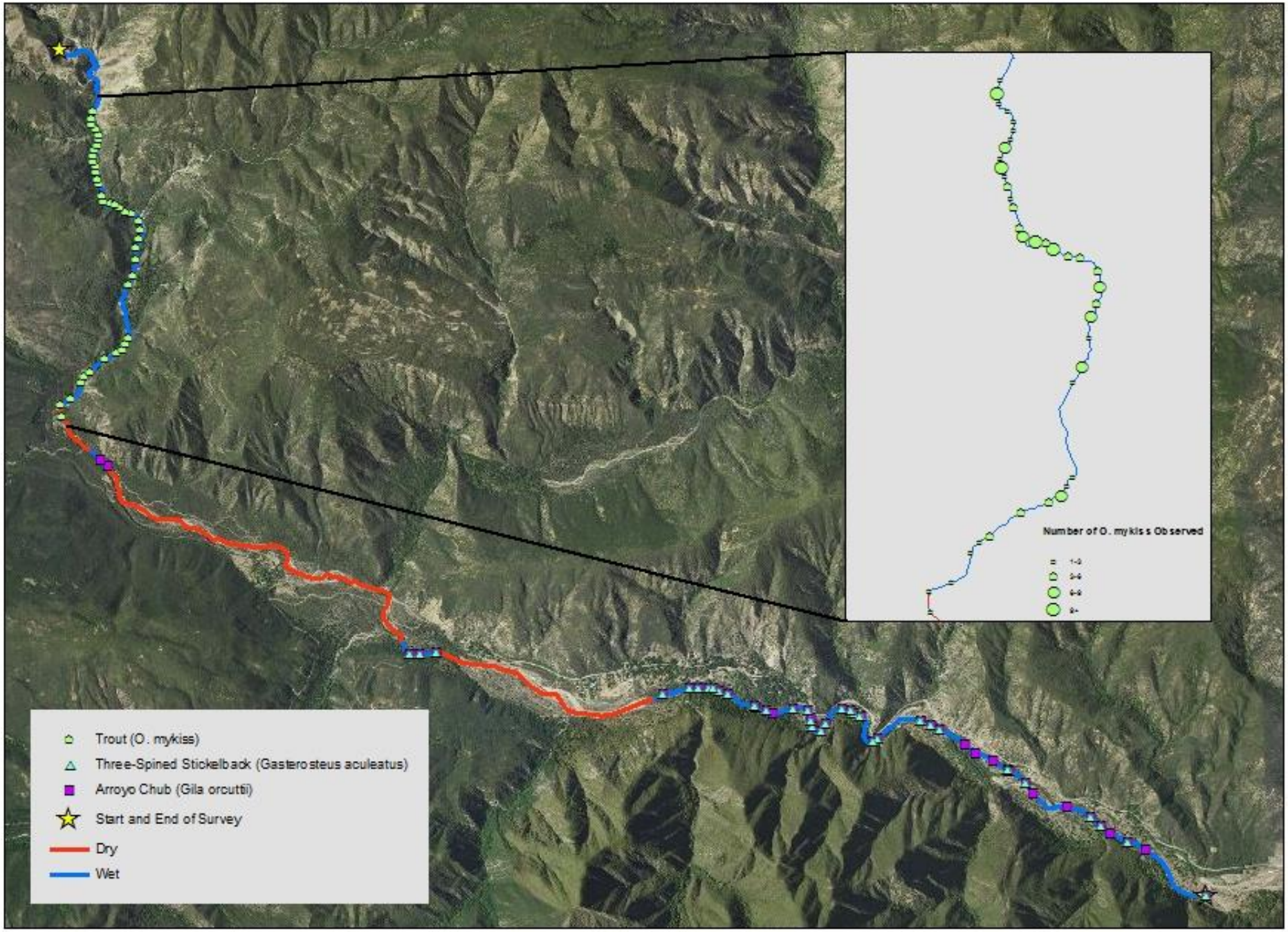


The chart and table below display the density of observed *O. mykiss* per shelter value. Snorkelers did not observe any units with shelter values of 0 or 3.

Shelter Value	O. mykiss Density (fish/ft^2)
0	0
1	3.95×10^{-4}
2	2.86×10^{-5}
3	0



Out of the 39 pools where trout were observed, 23 pools contained fish with blackspot disease. The image below shows a fish exhibiting symptoms of severe blackspot disease next to a healthy fish.


Trout (O. mykiss)
Three-Spined Stickelback (Gasterosteus aculeatus)
Arroyo Chub (Gila orcutti)
Start and End of Survey
Dry
Wet
Number of O. mykiss Observed

Habitat Unit Number	Mean Length	Mean Width	Mean Depth	Max Depth	Number *O. mykiss*
1	24	13	1.4	2.1	0
2	19	12	1.1	1.6	0
3	22	8	1	1.5	0
4	50	12	1.6	2.8	0
5	16	12	1.4	2.1	0
6	8	4	0.8	1	0
7	11	6	0.6	0.9	0
8	28	13	0.8	1.7	0
9	35	11	0.6	1.4	0
10	15	10.5	1.8	2.6	0
11	28	7	0.6	1.2	0
12	21	15	1.2	2.3	0
13	29	15	1	1.6	0
14	17	8	0.6	1.1	0
15	68	18	2	3.2	0
16	62	21	2	3.1	0
17	18	8	1	1.7	0
18	25	10	1.8	2.3	0
19	17	11	1.3		0
20	38	16	1.8	2.5	0
21	15	9	1.3	1.7	0
22	19	17	1.2	2	0
23	8.5	7.5	1	1.6	0
24	112	25	2.5	3.9	0
25	18	7.5	1	1.6	0
26	50	10	1.7	2.4	0
27	110	38	5.2	8.2	0
28	46	13	1.2	2.2	0
29	28	13	0.8	1.5	0
30	22	12	0.7	1.7	0
31	24	8	0.8	1.6	0
32	25	13	1.2	2.4	0
33	21	15	0.7	1.5	0
34	71	10	2	3.7	0
35	22	17	0.6	1.8	0
36	22	14	1	2.5	0
37	65	15	1	2	0
38	92	13	3.5	6.3	0
39	26	7	1.1	2.2	0
40	16	13	1.4	2.3	0
41	47	33	1.7	3.1	0
42	12	6	1.2	1.9	0
43	15	13	0.5	1.4	0
44	19	8	1	1.7	0
45	35	11	0.7	1.6	0
46	46	14	1	1.8	0
47	29	10	1	1.7	0
48	27	20	1	1.4	0
49	29	13	1.5	2.3	0
50	29	19	1.3	2.4	0
51	41	8	0.6	1.2	0
52	26	9	0.7	1.1	0
53	88	19	2.7	4.9	0
54	23	13	1.6	2.6	0
55	52	12	1.4	2.6	0

56	30	15	1.2	2.7	3
57	25	25	2.6	4.6	2
58	31	16	2.1	2.6	0
59	25	32	2.2	3.4	1
60	68	8.5	1	1.6	0
61	15	15	1.4	2.1	1
62	21	8	0.8	1.6	1
63	34	41	3.5	6.2	4
64	29	14	1	1.4	0
65	33	42	2.2	2.9	6
66	25	10	1.2	2.4	0
67	16	14	1	2.2	6
68	43	13	5	9.7	7
69	26	9	1.1	1.8	1
70	35	17	2	3.5	2
71	23	8	1.2	2	0
72	43	13	0.8	1.6	0
73	15	23	1.4	2.9	0
74	35	11	1	1.4	0
75	26	19	1.2	1.9	0
76	21	12	1.1	1.6	0
77	50	18	2.4	4.2	1
78	52	28	3	5.5	7
79	13	31	2.1	3.1	0
80	15	9	1.5	2.1	3
81	12	10	1.3	2	0
82	51	27	2	3.6	7
83	80	19	2	4	5
84	16	12	1.3	1.9	0
85	55	23	2.5	4.7	7
86	69	25	2	3.9	6
87	23	18	1.1	1.8	0
88	34	22.5	1	1.9	6
89	28.8	23.3	0.9	2.9	5
90	12	11	0.6	1.2	0
91	26.2	13.4	2.2	4.9	14
92	39	17.3	1	2.9	11
93	30	15	0.9	1.7	6
94	23	13.6	0.9	1.6	8
95	14.4	9.5	1.2	3.1	5
96	15	14	1	1.7	0
97	8	9	1.3	2	5
98	9	14	0.7	1.6	3
99	52	10	0.7	1.7	4
100	7.5	7.5	1.5	2.5	2
101	22.5	18	1.7	3.4	12
102	10	13	1	1.4	1
103	25	28	1.6	2.5	8
104	19	11	0.9	1.4	3
105	33	24	1.7	2.6	1
106	12	13	0.9	1.5	1
107	13	9	1.1	1.6	1
108	16	8	1	1.5	3
109	13	9	0.8	1.6	12
110	17	18	2.5	3.6	3
111	26	9	1.1	1.6	0
112	16	14	1	2.5	0
113	7.1	6.4	0.5	1	0
114	9	6	3.7	4.7	0
115	29.3	5	0.7	1.7	0
116	5.7	6.5	0.7	0.4	0
117	6	4.5	0.7	0.8	0
118	7	4.5	1.4	1.6	0

119	30	17.5	1.7	3.8	0
120	6.7	7.5	0.7	1.1	0
121	33	16	1.5	3	0
122	15	6	1	1.9	0
123	11	11.5	0.7	1.6	0
124	30	9	1.3	3.2	0
125	32.5	7	1.2	2.1	0
126	14.5	11	1.5	2.7	0
127	13.5	14	1	2.2	0
128	57	19	1.5	3.4	0

Discussion

This snorkel survey attempted a double-pass method to get an *O. mykiss* population abundance estimate for Matilija Creek, above the Matilija dam. Standard snorkel survey protocols involve electrofishing calibration to approximate the percentage of fish observed by snorkelers. This involves a snorkel survey crew preceding an electrofishing crew on a designated stretch of the surveyed stream. Since electrofishing can provide a nearly exact fish count, this count is then compared to the count observed by the snorkeler. Then, the rest of the reach is snorkeled and a total abundance estimate can be made based on the electrofishing comparison. However, severe drought conditions prevented the ability to perform an electrofishing calibration, as staff members did not want to add to the existing stress on the fish. Thus, the team employed a double-pass snorkel method which involved each pool being snorkeled on two separate occasions by two different snorkelers. However, the fish observations from each pass were strikingly similar, and it became clear that different fish had different probabilities of being seen by snorkelers, making it impossible to make an accurate abundance estimate. As this method was deemed ineffective thus the data in this report is based on the first snorkel pass of the survey. In order to obtain an *O. mykiss* population abundance estimate in Upper Matilija Creek, a snorkel survey paired with an electrofishing calibration will need to be conducted during a year when electrofishing will not overstress the fish.

Despite the inability of this survey to generate a population abundance estimate, approximate *O. mykiss* distribution in this area was able to be determined (Figure 3). Trout observations began approximately 1.6 miles upstream of the Upper North Fork Matilija confluence and continued for about 1.5 miles, stopping at the base of a natural bedrock falls. Snorkelers also took note when other fish species (three-spined stickleback and arroyo chub) were present. As shown on the map, no trout were observed in pools containing arroyo chub and three-spined stickleback. Much of the creek was dry since this survey was conducted during the summer of one of the driest years in California's history. Conducting an additional snorkel survey during a wetter year may show changes in species distribution. A habitat assessment survey could also be used to explain differences in distribution of these fish species.

It is hard to draw conclusions from the shelter value information since the vast majority of the pools had a shelter value of 2. There were no pools with a shelter value of 3, since this system relies on the presence of large woody debris to distinguish a pool with a shelter value of 3. However, it appears that the density (fish/ft^2) was smaller for pools with shelter value 2 than for pools with a shelter value of 1. This is to be expected since the presence of good shelter tends to decrease fish observability by giving them more places to hide from snorkelers.

Out of the 39 pools where trout were seen, 23 pools contained fish with blackspot disease. These fish have raised black spots on their skin due to the presence of a parasitic trematode. Little is known about the effects of this parasite on the livelihood of fish.