

**REDWOOD NATIONAL AND STATE PARKS
SUBTIDAL FISH SURVEY – PROGRESS REPORT
DECEMBER 2005**

Fish surveys were conducted in the subtidal waters of Redwood National and State Parks, Humboldt and Del Norte counties, CA (Figure 1). All surveys were done from Humboldt State University's R/V Coral Sea. Two day sampling trips were conducted in June, July and September 2005. Each leg (day 1, Eureka to Crescent City; day 2, Crescent City to Eureka) typically took 14 hours, depending on sea conditions. Trips scheduled for October and November were postponed due to bad weather. A 32' benthic otter trawl, with 1 inch stretch mesh, was used to sample subtidal fishes, over sandy bottoms, off of Gold Bluffs Beach, False Klamath Cove, and Enderts Beach. Two replicate, 12 minute tows were done at each site on successive days of each trip. Depths ranged from 11 to 30 m. Subtidal fishes over rocky reefs, off Redwood and Damnation Creeks, were sampled by hook and line on the 2nd day of the July and September trips. Fishing was conducted for 1.25 hrs., over each reef, by six experienced fishers using six or eight inch scampy jigs with 8/0 or 9/0 size hooks as bait. Depths ranged from 10 to 29 m. All fishes sampled were identified, measured and released. Temperature and salinity were measured, in the field, concurrently with fish sampling using a hand held thermometer and optical refractometer, respectively (Table 1).

A total of 34 fish species representing 16 families have been collected to date (Table 2, Figure 2). Twenty eight species were taken over the sandy bottom sites, Gold Bluffs Beach, False Klamath Cove, and Enderts Beach, while 11 species were caught over the rocky reef sites, Redwood and Damnation Creeks (Tables 3 and 4). Trawl sites were dominated by night smelt, *Spirinchus starksi*, Pacific tomcod, *Microgadus proximus*, and various flatfishes. The rocky reef sites were highly dominated by black rockfish, *Sebastes melanops*. Overall the 12 most abundant species are shown in Table 5. Overall, diversity and abundances were highest in July (Tables 3 and 4, Figure 3). Collections to date indicate that diversity at the trawl sites is greatest at False Klamath Cove while the Damnation Creek site shows the highest diversity of the hook and line sites (Table 6).

Additional sampling trips are scheduled for January, February, March and May of 2006. The same sites will be examined using the same techniques outlined above. This additional effort will greatly expand the species inventory and will allow for seasonal comparisons to be made.

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Table 1. Temperature and salinity at subtidal sites within Redwood National and State Parks, Humboldt and Del Norte Counties, CA, 25 June to 18 September 2005.

Station	Date	Temperature (°C)	Salinity (ppt)
Gold Bluffs	06 / 25 / 05	12	n/a
Beach	06 / 26 / 05	14	30
	07 / 30 / 05	15	31
	09 / 17 / 05	14	30
	09 / 18 / 05	14	33
False Klamath	06 / 25 / 05	13	n/a
Cove	06 / 26 / 05	14	21
	07 / 30 / 05	16	31
	07 / 31 / 05	16	26
	09 / 17 / 05	15	30
	09 / 18 / 05	14	25
Enderts	06 / 25 / 05	14	n/a
Beach	06 / 26 / 05	14	25
	07 / 30 / 05	17	29
	07 / 31 / 05	16	29
	09 / 17 / 05	15	28
	09 / 18 / 05	15	29
Damnation	07 / 31 / 05	16	24
Creek	09 / 17 / 05	15	27
	09 / 18 / 05	14	28
Redwood Creek	07 / 31 / 05	15	30
	09 / 17 / 05	15	27
	09 / 18 / 05	14	31

Table 2. A list of fish species collected at subtidal sites within Redwood National and State Parks, Humboldt and Del Norte Counties, CA, 25 June to 18 September 2005. X = species collected; blank = species not collected.

Family, Scientific name (Common name)	Gold		False		Dannation		
	Bluffs Beach	Klamath Cove	Enderts Beach	Creek	Redwood Creek		
<i>Myliobatidae</i>							
<i>Myliobatis californica</i> (bat ray)		X					
<i>Rajidae</i>							
<i>Raja binoculata</i> (big skate)	X	X		X			
<i>Clupeidae</i>							
<i>Clupea harengus</i> (Pacific herring)		X		X			
<i>Engraulidae</i>							
<i>Engraulis mordax</i> (Northern anchovy)	X	X		X			
<i>Salmonidae</i>							
<i>Oncorhynchus kisutch</i> (coho salmon)		X					
<i>Osmeridae</i>							
<i>Allosmerus elongatus</i> (whitebait smelt)	X						
<i>Hypomesus pretiosus</i> (surf smelt)	X	X		X			
<i>Spirinchus starksi</i> (night smelt)	X	X		X			
<i>Gadidae</i>							
<i>Microgadus proximus</i> (Pacific tomcod)	X	X		X			
<i>Scorpaenidae</i>							
<i>Sebastes flavilatus</i> (yellowtail rockfish)						X	
<i>Sebastes maliger</i> (quillback rockfish)						X	
<i>Sebastes melanops</i> (black rockfish)		X				X	X

Table 2. CONTINUED.

Family, Scientific name (Common name)	Gold Bluffs Beach	False Klamath Cove	Enderts Beach	Damnation Creek	Redwood Creek
Scorpaenidae (cont.)					
<i>Sebastes mystinus</i> (blue rockfish)				X	
<i>Sebastes nebulosus</i> (China rockfish)				X	
<i>Sebastes pinniger</i> (canary rockfish)				X	
Hexagrammidae					
<i>Hexagrammos decagrammus</i> (kelp greenling)				X	
<i>Ophiodon elongatus</i> (lingcod)		X	X	X	X
Cottidae					
<i>Artedius notospilotus</i> (padded sculpin)		X			
<i>Leptocottus armatus</i> (staghorn sculpin)	X	X			
<i>Scorpaenichthys marmoratus</i> (cabezon)			X	X	X
Agonidae					
<i>Occella verrucosa</i> (warty poacher)		X			
<i>Stellerina xyosterna</i> (pricklebreast poacher)	X	X	X		
Liparididae					
<i>Liparis pulchellus</i> (showy snailfish)		X	X		
Embiotocidae					
<i>Amphistichus rhodoterus</i> (redtail surfperch)		X			
<i>Cymatogaster aggregata</i> (shiner surfperch)		X			
<i>Hyperprosopon anale</i> (spotfin surfperch)	X	X	X		

Table 2. CONTINUED.

Family, Scientific name (Common name)	Gold		False		Damnation	
	Bluffs Beach		Klamath Cove	Enders Beach	Creek	Redwood Creek
Bothidae						
<i>Citharichthys sordidus</i> (Pacific sanddab)	X		X		X	
<i>Citharichthys stigmaeus</i> (speckled sanddab)	X		X		X	
Pleuronectidae						
<i>Isopsetta isolepis</i> (butter sole)	X		X		X	
<i>Microstomus pacificus</i> (dover sole)			X			
<i>Parophrys vetulus</i> (english sole)						
<i>Platichthys stellatus</i> (starry flounder)	X				X	
<i>Psetichthys melanoscius</i> (sand sole)	X		X		X	
Molidae						
<i>Mola mola</i> (common mola)						X

Table 3. Abundances and lengths of fish species collected by trawling at Gold Bluffs Beach, False Klamath Cove, and Enderts Beach, Redwood National and State Parks, Humboldt and Del Norte Counties, CA, 25 June to 18 September 2005. Blank spaces = species not collected. *Raja binoculata* lengths are taken by disc width.

Species	June		July		September	
	# Caught	$\bar{X}$ (range)	# Caught	$\bar{X}$ (range)	# Caught	$\bar{X}$ (range)
<i>Myliobatis californica</i>	1	135.0				
<i>Raja binoculata</i>	17	249.7 (40 – 541)	3	200.0 (134 – 319)	2	141.0 (132-150)
<i>Clupea harengus</i>	1	121.0	1	182.0		
<i>Engraulis mordax</i>	27	108.1 (94 – 123)	15	112.4 (101 – 131)	65	57.0 (32 – 116)
Osmeridae spp. (unidentified)	2	65.0 (62 – 68)	4	70.0 (67 – 76)		
<i>Allosmerus elongatus</i>	1	102.0				
<i>Hypomesus pretiosus</i>	13	94.6 (68 – 136)	1	100.0		
<i>Spirinchus starksi</i>	71	108.0 (69 – 130)	960	104.1 (65 – 143)	229	97.4 (50 – 130)
<i>Microgadus proximus</i>	193	152.1 (128 – 201)	26	156.7 (145 – 174)	2	126.0 (88 – 164)
<i>Sebastes melanops</i>			1	420.0	1	201.0
<i>Ophiodon elongatus</i>	1	740.0	1	161.0		
<i>Arctidius notospilotus</i>					1	96.0
<i>Leptocottus armatus</i>	5	226.6 (201 – 244)			1	162.0
<i>Scorpaenichthys marmoratus</i>			1	73.0		
Agonidae spp. (unidentified)	4	134.3 (120 – 143)				
<i>Ocella verrucosa</i>			4	70.5 (65 – 77)	1	79.0
<i>Stellerina xyosterna</i>			21	110.1 (49 – 185)	16	81.0 (64 – 110)
<i>Liparis pulchellus</i>	5	119.2 (114 – 125)			4	103.8 (62 – 183)
<i>Amphistichus rhodoterus</i>			2	338.5 (267 – 410)		

Table 3. CONTINUED.

Species	June		July		September	
	# Caught	$\bar{X}$ (range)	# Caught	$\bar{X}$ (range)	# Caught	$\bar{X}$ (range)
<i>Cymatogaster aggregata</i>			1	136.0		
<i>Hyperprosopon male</i>	1	122.0	45	101.6 (52 – 159)	4	126.3 (89 – 154)
<i>Citharichthys sordidus</i>	20	119.8 (95 – 278)	5	147.6 (57 – 210)		
<i>Citharichthys stigmaeus</i>			57	79.2 (58 – 120)	12	93.3 (75 – 120)
<i>Isopsetta isolepis</i>	35	146.5 (98 – 251)	40	164.4 (113 – 288)	5	179.2 (134 – 150)
<i>Microstomus pacificus</i>			1	93.0		
<i>Parophrys vetulus</i>	20	224.3 (137 – 380)	66	126.3 (62 – 336)	4	246.5 (88 – 371)
<i>Platichthys stellatus</i>	3	223.0 (129 – 300)	1	333.0		
<i>Psettiichthys melanostictus</i>	15	258.5 (105 – 480)	2	134.0 (118 – 150)		
Total fish caught	435		1,258		347	
# of species	19		22		14	

Table 4. Abundances and lengths of fish species collected by hook and line sampling at Redwood and Damnation Creeks, Redwood National and State Parks, Humboldt and Del Norte Counties, CA, 25 June to 18 September 2005. Blank spaces = species not collected.

Species	July		September	
	# Caught	$\bar{X}$ (range)	# Caught	$\bar{X}$ (range)
<i>Oncorhynchus kisutch</i>	1	685.0		
<i>Sebastes flavidus</i>			1	301.0
<i>Sebastes maliger</i>	3	420.0 (340 – 394)	1	400.0
<i>Sebastes melanops</i>	112	404.2 (195 – 543)	128	419.2 (276 – 560)
<i>Sebastes mystinus</i>	1	183.0	2	292.5 (216 – 369)
<i>Sebastes nebulosus</i>			1	480.0
<i>Sebastes pinniger</i>	2	307.5 (255 – 360)		
<i>Hexagrammos decagrammus</i>	2	314.0 (307 – 321)	1	332.0
<i>Ophiodon elongatus</i>	6	637.3 (376 – 796)	6	628.5 (462 – 770)
<i>Scorpaenichthys marmoratus</i>	2	538.5 (534 – 543)	3	479.3 (320 – 634)
<i>Mola mola</i>			1	472.0
Total fish caught	129		144	
# of species	8		9	

Table 5. The relative abundance of the 12 most abundant fish species collected within Redwood National and State Parks, Humboldt and Del Norte Counties, CA, 25 June to 18 September 2005.

Scientific name (Common name)	Overall		
	# Caught	% of Total	Rank
<i>Raja binoculata</i> (big skate)	22	0.95	11
<i>Engraulis mordax</i> (Northern anchovy)	107	4.62	4
<i>Spirinchus starksi</i> (night smelt)	1,260	54.47	1
<i>Microgadus proximus</i> (Pacific tomcod)	221	9.55	3
<i>Sebastes melanops</i> (black rockfish)	242	10.46	2
<i>Stellerina xyosterna</i> (pricklebreast poacher)	37	1.60	9
<i>Hyperprosopon anale</i> (spotfin surfperch)	50	2.16	8
<i>Citharichthys sordidus</i> (Pacific sanddab)	25	1.08	10
<i>Citharichthys stigmaeus</i> (speckled sanddab)	69	2.98	7
<i>Isopsetta isolepis</i> (butter sole)	80	3.46	6
<i>Parophrys vetulus</i> (english sole)	90	3.89	5
<i>Psettichthys melanostictus</i> (sand sole)	17	0.73	12
Overall Totals	2,220	95.95	
Total fish caught	2,313		

Table 6. Abundances and lengths of fish species collected at subtidal sites within Redwood National and State Parks, Humboldt and Del Norte Counties, CA, 25 June to 18 September 2005. Blank spaces = species not collected. *Raja binoculata* lengths are taken by disc width. GBB = Gold Bluffs Beach; FKC = False Klamath Cove; EB = Enderts Beach; DC = Damnation Creek; RC = Redwood Creek.

Species	GBB		FKC		EB		DC		RC	
	#	$\bar{X}$ (range)	#	$\bar{X}$ (range)	#	$\bar{X}$ (range)	#	$\bar{X}$ (range)	#	$\bar{X}$ (range)
<i>Myliobatis californica</i>			1	135.0						
<i>Raja binoculata</i>	7	191.6 (40-480)	11	203.2 (132-541)	4	387.8 (319-495)				
<i>Clupea harengus</i>			1	182.0	1	121.0				
<i>Engraulis mordax</i>	26	54.5 (32-65)	41	110.0 (94-131)	40	64.5 (48-109)				
<i>Oncorhynchus kisutch</i>			1	685.0						
Osmeridae spp. (unidentified)	2	65.0 (62-68)	4	70.0 (67-76)						
<i>Allosmerus elongatus</i>	1	120.0								
<i>Hypomesus pretiosus</i>	2	81.0 (80-82)	9	100.6 (68-136)	3	87.7 (78-100)				
<i>Spirinchus starksi</i>	58	95.4 (73-128)	801	107.5 (70-143)	401	96.8 (50-130)				
<i>Microgadus proximus</i>	1	197.0	191	152.8 (88-201)	29	152.3 (134-198)				
<i>Sebastes flavidus</i>							1	301.0		
<i>Sebastes maliger</i>							4	388.5 (340-420)		
<i>Sebastes melanops</i>	3	340.3 (201-420)					44	367.3 (195-543)	195	422.4 (204-560)
<i>Sebastes mystinus</i>							3	256.0 (183-369)		
<i>Sebastes nebulosus</i>							1	480.0		
<i>Sebastes pinniger</i>							2	307.5 (255-360)		
<i>Hexagrammos decagrammus</i>							3	320.0 (307-332)		
<i>Ophiodon elongatus</i>	1	161.0			1	740.0	7	653.6 (462-796)	5	604.0 (376-770)
<i>Arctidius notospilotus</i>	1	96.0								

Table 6. CONTINUED.

Species	GBB		FKC		EB		DC		RC	
	#	$\bar{X}$ (range)	#	$\bar{X}$ (range)	#	$\bar{X}$ (range)	#	$\bar{X}$ (range)	#	$\bar{X}$ (range)
<i>Leptocottus armatus</i>	2	181.5 (162-201)	4	233.0 (219-244)						
<i>Scorpaenichthys marmoratus</i>					1	73.0	4	548.8 (484-634)	1	320.0
Agonidae spp. (unidentified)			1	138.0	3	133.0 (120-143)				
<i>Ocella verrucosa</i>	1	70.0	3	70.7 (65-77)	1	79.0				
<i>Stellerina xyosterna</i>			37	97.8 (49-185)						
<i>Liparis pulchellus</i>			7	104.4 (62-125)	2	140.0 (97-183)				
<i>Amphistichus rhodoterus</i>			2	338.5 (267-410)						
<i>Cymatogaster aggregata</i>			1	136.0						
<i>Hyperprosopon anale</i>	2	109.5 (89-130)	13	113.7 (103-131)	35	100.0 (52-159)				
<i>Citharichthys sordidus</i>	8	110.1 (98-119)	10	147.0 (57-278)	7	111.7 (101-120)				
<i>Citharichthys stigmaeus</i>	10	91.8 (67-120)	13	76.9 (64-115)	46	80.9 (58-120)				
<i>Isopsetta isolepis</i>	1	197.0	65	165.6 (105-288)	14	117.2 (98-154)				
<i>Microstomus pacificus</i>			1	93.0						
<i>Parophrys vetulus</i>	4	339.0 (285-380)	50	187.8 (137-352)	36	82.1 (62-207)				
<i>Platichthys stellatus</i>	3	223.0 (129-300)			1	333.0				
<i>Psetichthys melanosticus</i>	8	217.9 (109-440)	1	118.0	8	285.6				
<i>Mola mola</i>									1	472.0
Total fish caught	139		1270		633		69		202	
# of species	17		25		17		9		4	

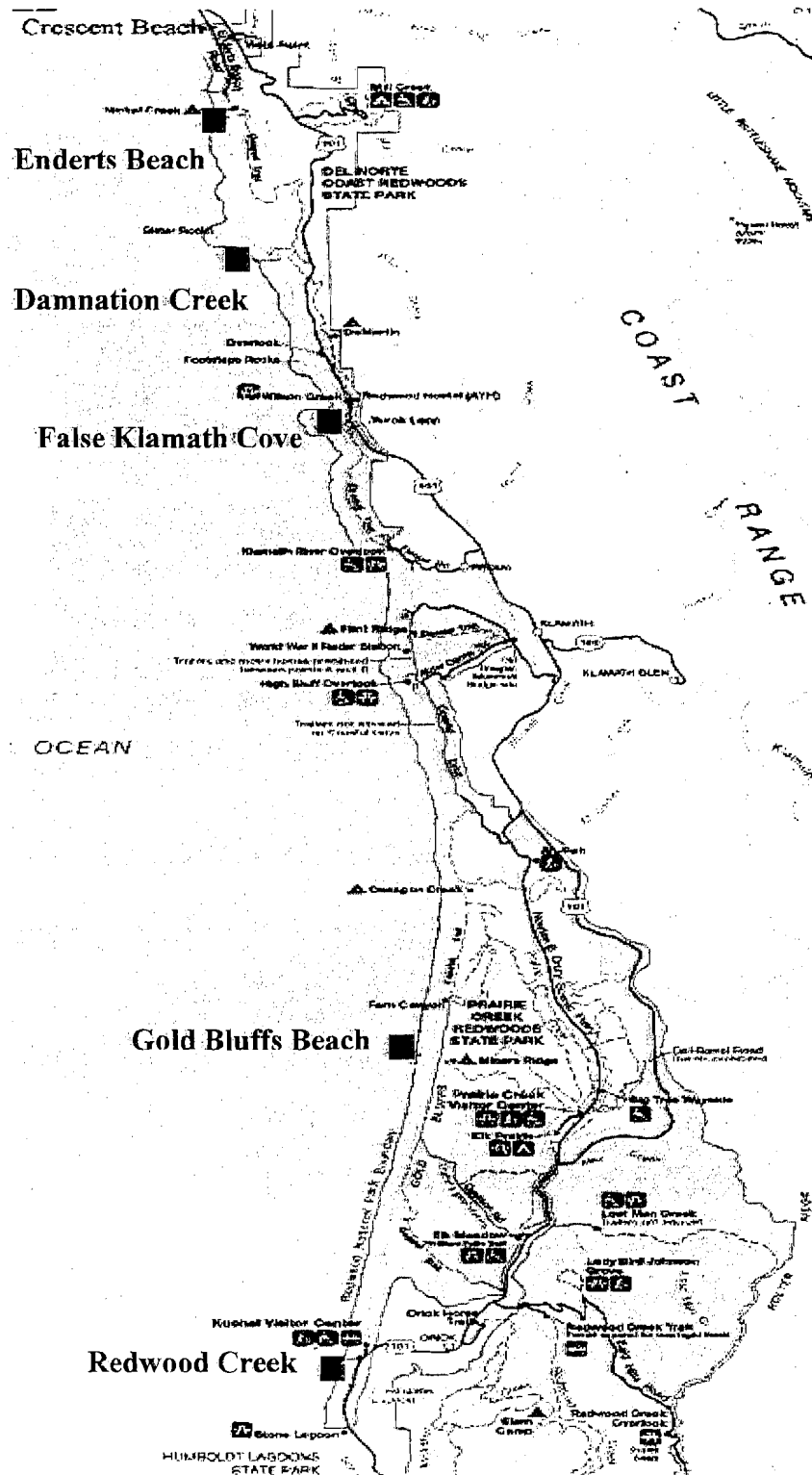
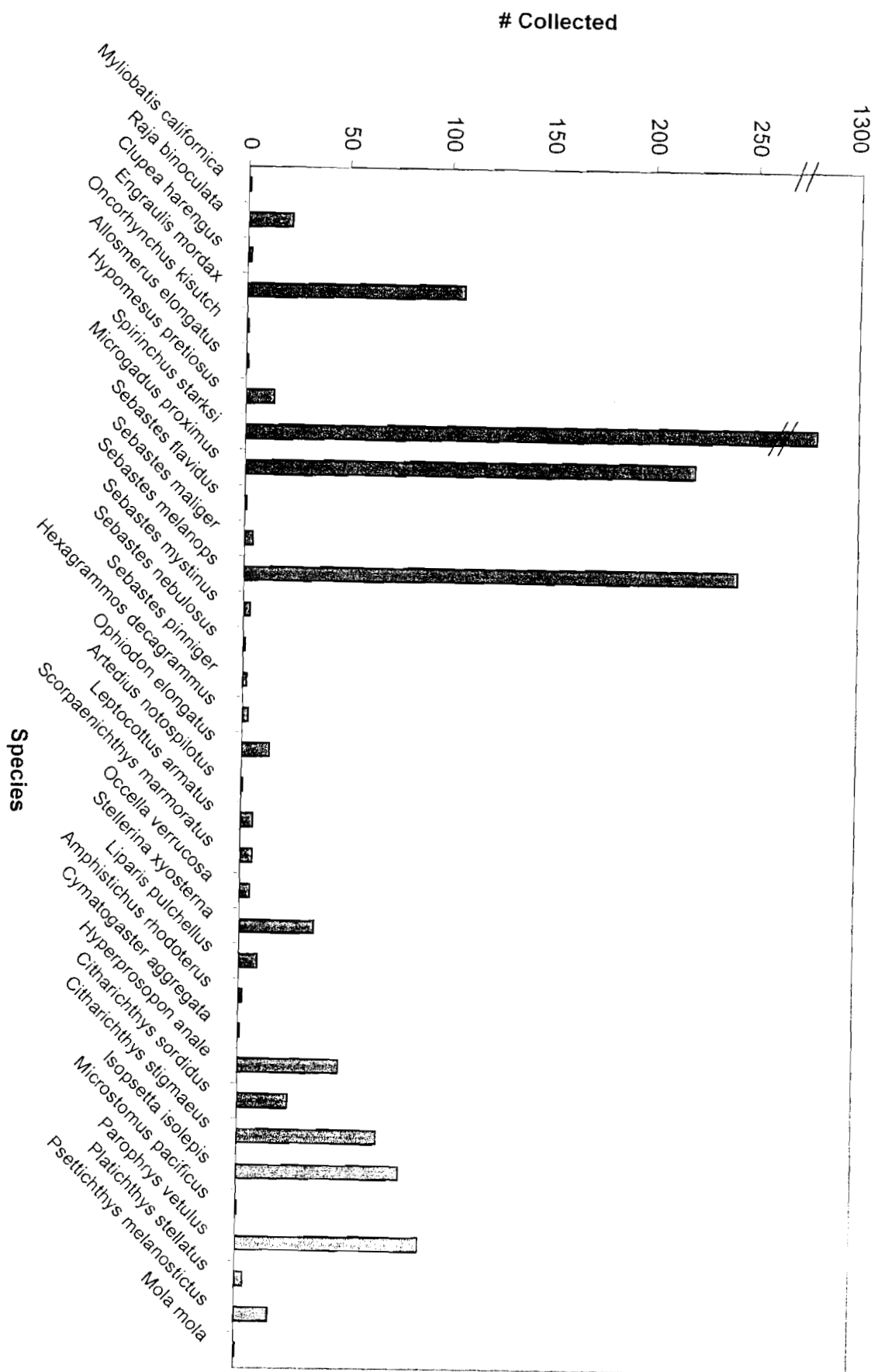


Figure 1. Map of Redwood National and State Parks, Humboldt and Del Norte Counties, CA. showing significant landmarks and the five sampling sites, 25 June to 18 September 2005.

Figure 2. Abundances of fishes collected within Redwood National and State Parks, Humboldt and Del Norte Counties, CA, 25 June to 18 September 2005.



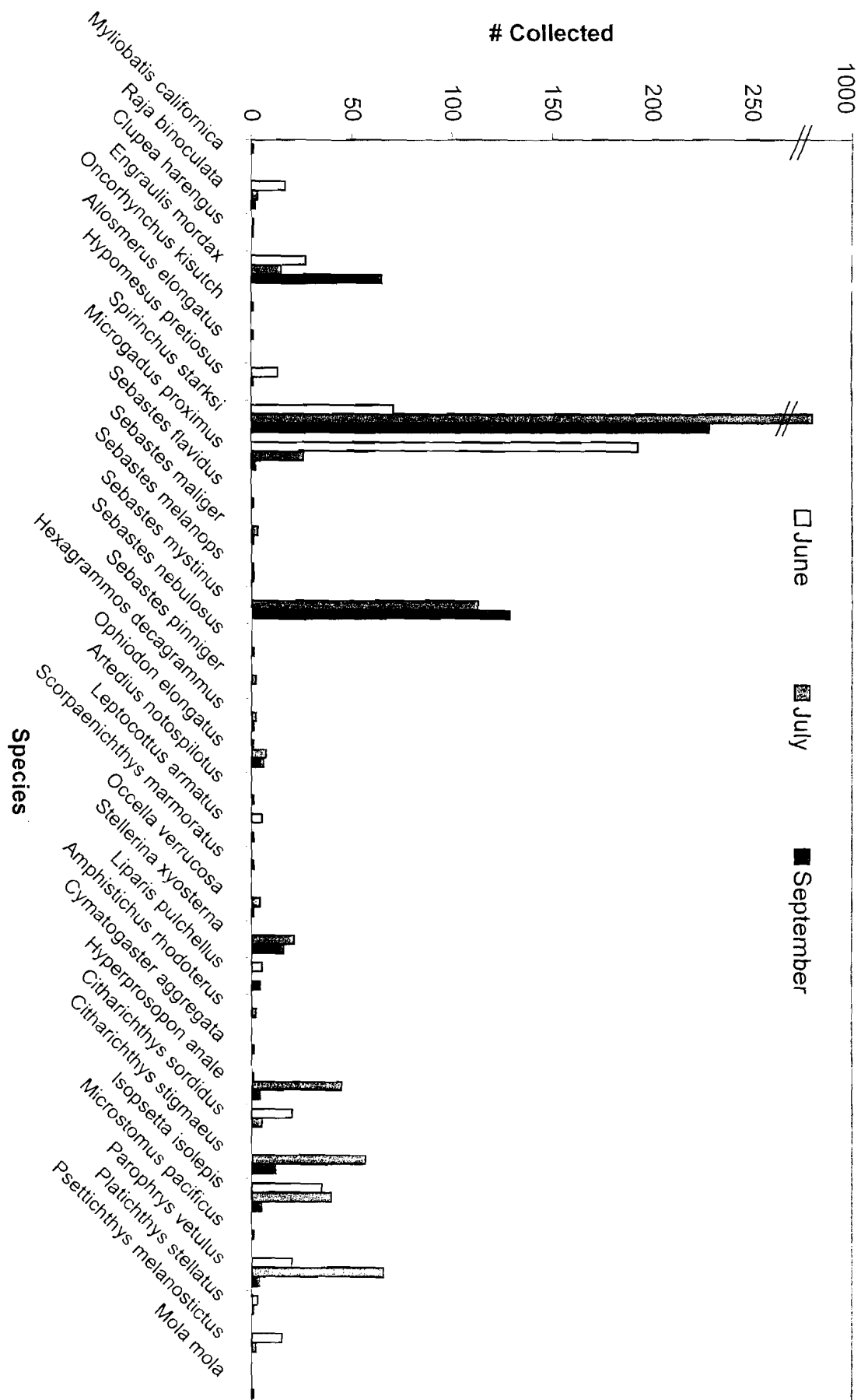


Figure 3. Abundances of fishes collected, by month, within Redwood National and State Parks, Humboldt and Del Norte Counties, CA, 25 June to 18 September 2005.