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Seasonal Changes in Spatial Distribution and Activity of Two Species of Pacific Rockfishes, *Sebastes flavidus* and *S. ciliatus*, in Lynn Canal, Southeastern Alaska

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ABSTRACT–Mixed aggregations of rockfishes near Auke Bay, Alaska, were observed by divers over all months of the year. The patterns of activity and distribution differed greatly between warmer months (May-October), when the fish were actively feeding and distributed above the substrate, and colder months (November-April), when the fish were partially or completely hidden between or beneath the substrate and were relatively sluggish and inactive. Selection probably favors this mode of behavior which renders the fish nearly inaccessible to predators when they would be most vulnerable and when food is scarce.

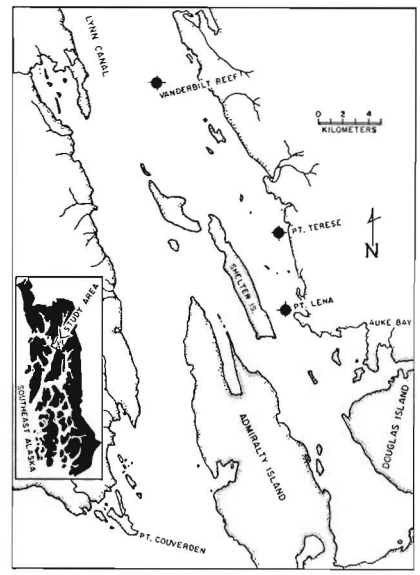

Figure 1.—Lower Lynn Canal, southeastern Alaska, showing three sites where rockfishes were observed by divers, 1965-75.

Seasonal changes in the spatial distribution and activity of Pacific rockfishes are sparsely documented. In a study of Puget Sound rockfish, *Sebastes emphaeus*, Moulton (1975) made 61 scuba diving observations of large populations over a 12-month period and noted that the number of fish sighted "declined dramatically" in the fall, and "most of the individuals seen by November were huddled in caves." Patten (1973) found that copper rockfish, *Sebastes caurinus*, in Puget Sound moved into a rock pile in the winter and during winter and spring, "only one or two of the largest fish were seen outside the rock pile and the others were well within the interstices." Miller and Geibel (1973) concluded that blue rockfish, *Sebastes mystinus*, in the Monterey Bay area spent the summer in kelp beds but overwintered in nearby but different habitat in order to avoid heavy swell action in the kelp beds caused by winter storms. Trawl catch records usually supply only general information on species occurrence, depth range, and month.

From 1965-75, divers from the Auke Bay Fisheries Laboratory of the Northwest and Alaska Fisheries Center observed in daylight mixed aggregations of rockfishes composed mostly of two species—*S. flavidus*, the yellowtail rockfish, and *S. ciliatus*, the dusky rockfish. The aggregations were located at depths of 13-28 m at the sites of sunken vessels at Point Lena and Vanderbilt Reef and at the base of a boulder-strewn slope at Point Terese (Fig. 1). The sites are in lower Lynn Canal, from 21 to 43 km north and west of Juneau, Alaska.

The rockfish aggregations we observed all appeared to have very restricted home ranges. In fact, yellowtail rockfish from Point Lena have been shown to have a keen ability to return to their home site even when displaced by as much as 22 km (Carlson and Haight, 1972).

The spatial distribution and activity of the rockfishes differed markedly between two periods of each year. From May through October, the rockfishes were generally active at all three sites (Table 1), and unless disturbed, they were distributed in the water column from one to several meters above (but apparently always retaining sight of) the substrate. The fishes hovered or milled slowly; if a current was present, they swam slowly into the current, maintaining their position in relation to the substrate. They were apparently feeding actively because they were vulnerable to capture on baited hooks. Also, they chased and bit small objects dislodged from the substrate by divers.

During November the aggregations disappeared from sight. At Point Terese the rockfishes moved back into crevices between boulders (Fig. 2) and for the remainder of the winter and early spring, we saw them only in such crevices—never above the substrate as in summer and early fall. When in the crevices during the November-April period, the fishes were inactive when undisturbed and sluggish in response to disturbance. Occasionally we could even touch them, something they would not allow at other times.

Although we were generally unable to find any rockfishes on the sunken vessel at Point Lena during the November-April period (no dives were made at the Vanderbilt Reef site in these months), we believe that the fishes at this site also seek cover in winter by going deeper into the wreckage both laterally and vertically beyond our

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normal diving excursions. Through the fall period, before disappearing from sight, the fishes at Point Lena move progressively deeper into the vessel. In the spring, when the fishes are first seen, they are still partly within the vessel (e.g., in funnels and under beams), further indicating that they are at that time gradually emerging after overwintering within the wreckage. Apparently the period of emergence is in April, and by May the fishes are again active and distributed in the water column above the substrate of the home range.

The seasonal change in distribution and activity of these rockfishes is probably a result of changing metabolic levels and is therefore related to periods of changing water temperature. Typical annual minimum and maximum water temperatures recorded at a depth of 20 m near the study sites at Auke Bay are 3°C in February and 9°C in August[1]. In October-November and April-May, when the distribution and activity of the fishes are changing, water temperatures average about 6°C and change relatively rapidly. The change in activity and distribution of the fishes between the warm and cold seasons is probably an essential survival mechanism that combines the conservation of energy during a period of apparent food scarcity with the inaccessibility of the fishes during the period when they would be least able to avoid predators, such as seals and sea lions, which are common in the area.

Figure 2.—Dusky rockfish, *Sebastes ciliatus*, at Point Terese, Lynn Canal, southeastern Alaska. The fish is in a position typical of the warmer months when they remain above the boulder-rubble substrate. During the colder months the fish retreat into crevices between the boulders.

Table 1.—Monthly spatial distribution and relative level of activity of the rockfishes *Sebastes flavidus* and *S. ciliatus* observed by divers on 81 separate diving days from 1965 to 1975 at three sites[1] in lower Lynn Canal, southeastern Alaska.

Month	Number of diving days in which rockfishes were: Present and active above the substrate	Present and inactive in contact with the substrate	Not seen	Total number of observations
January	—	1	—	1
February	—	1	7	8
March	—	1	4	5
April	—	1	1	2
May	4	1	—	5
June	16	—	—	16
July	11	—	—	11
August	11	—	—	11
September	4	—	—	4
October	7	—	—	7
November	—	4	2	6
December	—	2	3	5
Total	53	11	17	81

[1]The sites are Point Lena, Point Terese, and Vanderbilt Reef (Fig. 1).

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