

## YELLOWTAIL, *SERIOLA LALANDEI* VALENCIENNES

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### ABSTRACT

Yellowtail are highly prized by anglers. They are slow-growing fish that mature sexually by age three. Studies on food habits indicate they are opportunistic feeders, with adults consuming primarily small fish. Yellowtail migrate north as the ocean warms in the spring and return south when it cools. Recent data collected from partyboats operating off Mexico indicate a decrease in the yellowtail population.

### RESUMEN

*Seriola lalandei* (pez de limón) es muy apreciado por los pescadores de caña. Estos peces crecen con lentitud y tardan tres años en alcanzar la madurez sexual. Estudios sobre el pez de limón indican, que se alimenta de lo que encuentra, y los adultos consumen principalmente peces pequeños. *Seriola lalandei* emigra hacia el norte en la primavera, según va aumentando la temperatura oceánica, retornando hacia el sur cuando sobreviene el enfriamiento de las aguas. Datos obtenidos durante las operaciones de los barcos de pesca deportiva navegando en aguas mexicanas, indican un descenso notable en las poblaciones de *Seriola lalandei*.

### INTRODUCTION

The yellowtail is one of the most highly prized gamefishes found off southern California. It is the largest member of the family Carangidae found in the state, although the Pacific amberjack, *Seriola dumerili*, grows to a larger size off Baja California. The fish ranges from Chile on the south to southern Washington on the north (Miller and Lea 1972). Within this range, yellowtail occur in fishable quantities from Cape San Lucas, Baja California, to Los Angeles County.

### LIFE HISTORY

Yellowtail begin their lives during the summer months, June through September. During this period, adults that are about to spawn move offshore, generally to an area of shoals or islands that may be as far as 113 to 161 km (70 to 100 mi) from the mainland. The fish form spawning aggregations and broadcast their eggs and milt into the water (Walford 1937). Some two-year-olds may

spawn; all fish three years and over definitely are capable of spawning. Young fish spawn once during the season, but those over seven years of age apparently are capable of multiple spawnings.

Age and growth studies conducted on yellowtail have indicated that the fish are relatively slow growing. They gain approximately 1.36 to 1.82 kg (3 to 4 lb) a year during most of their lives, although very large individuals may gain only 0.45 to 0.90 kg (1 to 2 lb) per year (Table 1). Growth can vary considerably from year to year and also between and within geographical areas. Because of this, only a moderately good fit can be obtained when using a von Bertalanffy growth equation (Beverton and Holt 1957).

Limited knowledge exists about the food habits of yellowtail. Studies conducted during the 1950s indicated that adult fish were highly piscivorous. At that time jack mackerel (*Trachurus symmetricus*), northern anchovies (*Engraulis mordax*), and sardines (*Sardinops sagax*) were the most frequently encountered items in yellowtail stomachs. Notes on the time of day yellowtail were caught for stomach analysis suggested that they fed primarily during daylight hours: amorphous material was usually present in fish taken at night, whereas fish captured during the day contained a large percentage of undigested or partially digested food. The regular presence of amorphous material in stomachs of fish taken at night indicates that yellowtail have a rapid rate of digestion, since food was surely ingested no earlier than the previous morning.

During the early 1950s, the California Department of Fish and Game tagged over 14,000 yellowtail (Collyer 1954). Two-thirds of the fish were tagged during 1955, two years prior to a warm-water event lasting from 1957 to 1959. The distribution of these fish during the warm-water years was quite revealing, since elevated ocean temperatures accentuated their movements (Radovich 1961).

Results of the tagging study indicate that there are two groups of yellowtail off Baja California (Baxter 1960). One group occurs south of Cedros Island, while the second group occupies the area from Cedros Island northward (Figure 1). There is some interchange of fish between the two groups, but it usually takes place around Cedros Island. No fish tagged south of San Hipolito Bay were ever recovered off southern California, although a

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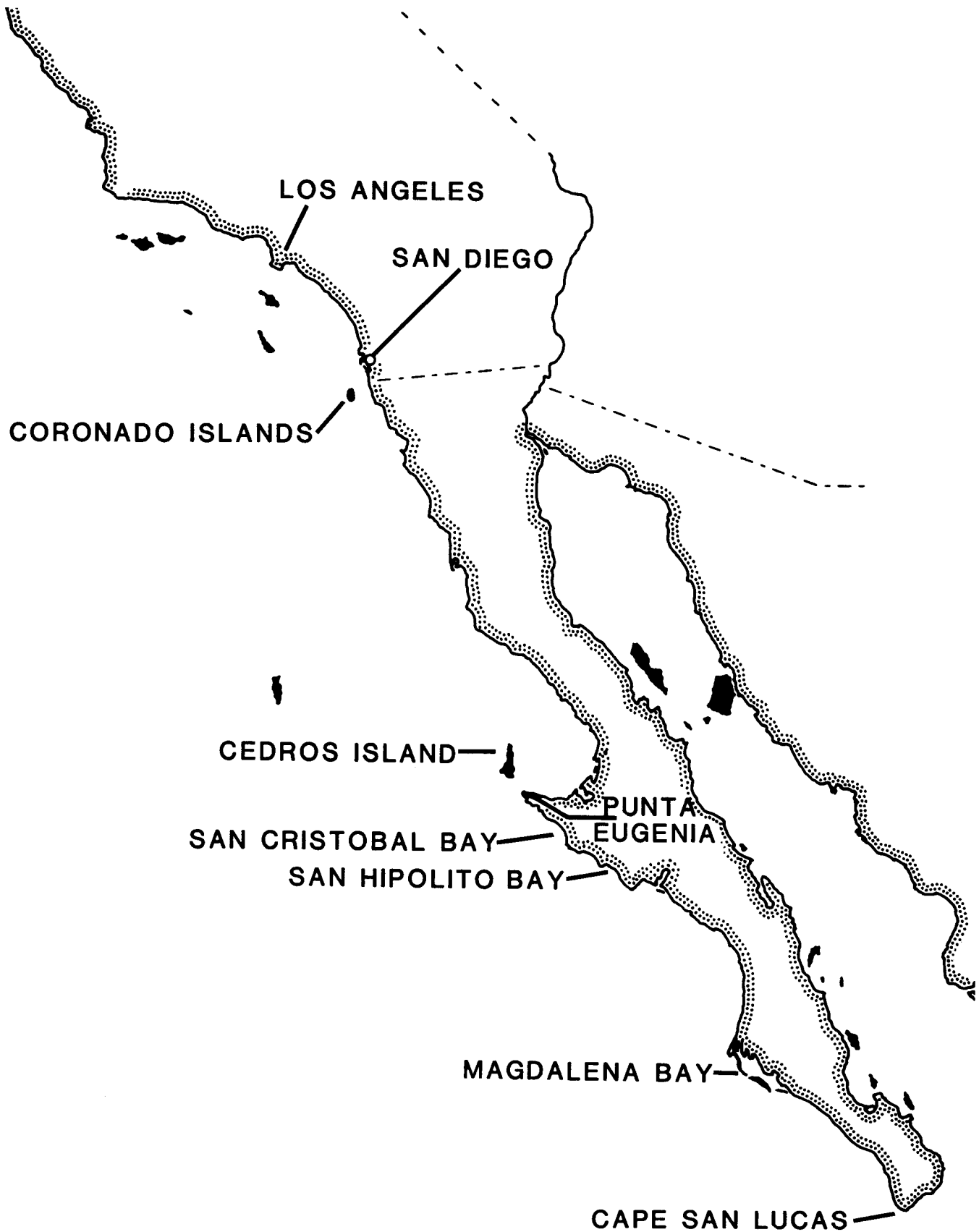


Figure 1. Outline map of southern California and Baja California.

TABLE 1  
**Observed Age, Length, and Weights of Yellowtail**

| Age | Observed length<br>TL (mm) | Observed weights |      |
|-----|----------------------------|------------------|------|
|     |                            | Kg               | Lbs  |
| 1   | 510                        | 1.72             | 3.8  |
| 2   | 640                        | 3.36             | 7.4  |
| 3   | 710                        | 4.50             | 9.9  |
| 4   | 780                        | 6.00             | 13.2 |
| 5   | 830                        | 7.23             | 15.9 |
| 10  | 1035                       | 12.36            | 27.2 |
| 12  | 1125                       | 15.90            | 35.0 |

few were taken in the mixing area around Cedros Island. Few fish were tagged off southern California or northern Baja California, and none of those recovered were taken farther south than San Cristobal Bay. This indicates that the fishery off southern California is dependent on yellowtail from the northern group.

The tagging study also helped to determine the timing of coastal migrations. Generally, tagging showed that the fish moved northward as the water warmed in the spring. During the summer they left the nearshore areas to spawn offshore, and returned in the fall. Eventually the fish moved south as the water cooled late in the year. During years when the water remained several degrees above normal through the winter, yellowtail remained in northern waters year round.

### CATCH ANALYSIS

Yellowtail fishing off southern California is highly dependent on fish moving into the area. Because of this, catches have varied considerably. During warm-water periods like 1957-59, commercial passenger fishing vessel (CPFV) catches have approached 450,000 fish per year for southern California and the Coronado islands. In years when the water is cool, catches are rare. The most recent "good" year for yellowtail fishing off southern California occurred in 1973. During that year, the water temperature was several degrees above normal throughout the spring, and over 230,000 fish were landed. The catch was dominated by two-year-old fish (1971 year class), a departure from the historic norm of four- and five-year-olds dominating. During 1981, a year in which spring water temperatures were elevated, the local yellowtail catch for CPFVs was a little over 10,000 fish. Very young fish dominated the fishery with one- and two-year-olds making up a large percentage of the catch.

Data collected from CPFVs working off Mexico may explain why yellowtail landings have declined off southern California. The data from these vessels indicate that six- to nine-year-old fish dominated the catch between 1974 and 1979 (Figure 2). The boats occasionally caught smaller fish, but usually avoided them. Beginning in

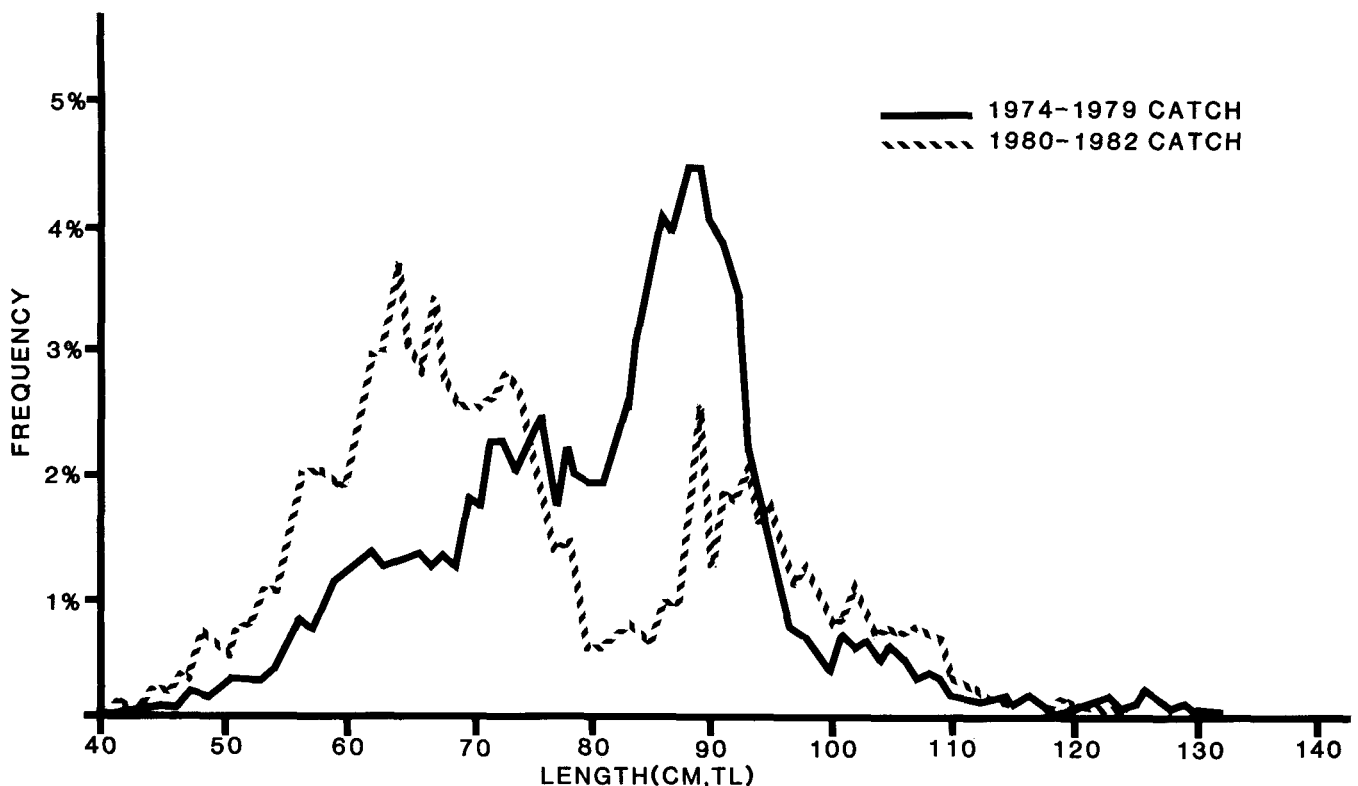


Figure 2. Length composition of the long-range partyboat yellowtail catch from Baja California, 1974-82.

1980 and continuing through 1982, large yellowtail were difficult to find, with two- and three-year-old fish making up the majority of the catch. The change in age structure of the catch was dramatic in 1980, suggesting that something had happened or was happening to the yellowtail population off Baja California. Age compositions indicate that there were a number of year-class failures starting in 1975 and continuing through 1978. Recruitment of the 1979 and 1980 year classes was relatively good, as evidenced by their recent dominance of the fishery. Why the 1975-78 year classes failed is unknown. However, their failure has had a significant effect on CPFVs operating off Baja California, and should explain why yellowtail fishing off southern California has declined rapidly in recent years. A decline in the size of yellowtail, barring an increase in abundance caused by an unusually large year class, implies a

decrease in the population off Baja California. This apparently has manifested itself as a decrease in the availability of fish off southern California.

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