



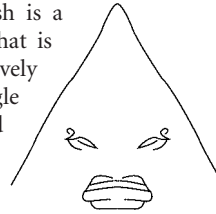
Rays

SHOVELNOSE GUITARFISH

*Rhinobatos productus*



**DESCRIPTION:** The Shovelnose Guitarfish is a guitar-shaped ray with a broad disc that is greater in length than width; a relatively smooth dorsal surface except for a single row of thorns around the eyes and extending along the back and tail; a long, pointed snout with a rounded tip; small, rounded, pebblelike teeth; a first dorsal fin that originates closer to the pelvic fin base than to the caudal fin origin; a thick tail; and a moderately large caudal fin without a distinct lower lobe. The color ranges from an olive to sandy brown above, but without prominent dark bars across the back, and white below. Tooth counts: 102–112/ 98–117. Vertebral counts: 171–179. Spiral valve counts: 8–10.



**HABITAT AND RANGE:** Shovelnose Guitarfishes are a shallow-water species commonly found at a depth of 1 to 13 m, although they may be found at depths down to 91 m. They usually lie partially buried on sandy or mud bottoms but occasionally are observed in sea grass beds. These rays will at times congregate in large numbers in shallow bays and estuaries.

The Shovelnose Guitarfish is endemic to the eastern Pacific, ranging from San Francisco southward at least to the Gulf of California, and possibly to Mazatlan, Mexico.

**NATURAL HISTORY:** Viviparous, without a yolk sac placenta, with litters ranging from 6 to 28, although 9 to 11 is the average. The number of embryos per litter increases as the female grows in size. The size at maturity varies regionally among subpopula-



tions along the coast. In southern California males mature at 90 to 100 cm and grow to a maximum length of 119 cm. Southern Baja subpopulations of males mature at a slightly smaller size, usually 80 cm. Females mature at 99 cm and grow to at least 145 cm, but are reputed to reach a maximum length of 170 cm. The size at birth is 15 to 23 cm.

Several shallow bays and estuaries in southern California and Baja are important areas for mating and pupping, and they also serve as a nursery ground for newborns. Females enter these bays during spring to complete gestation with birth occurring shortly thereafter in early summer. During the summer pupping season females may outnumber males by as much as 53 to 1 in these bays and estuaries. However, by midsummer, after the pupping season is nearly complete, males begin migrating into these same areas to mate and the sex ratio becomes about equal. After mating, adult rays of both sexes leave the area and are usually absent during fall and winter months. Gestation lasts about 12 months. Interestingly, the exceptionally warm waters that occur during El Niño years induce these rays to begin their reproductive cycle as much as a month or more earlier.

Males mature in eight years and live at least 11 years. Females mature in seven years and live at least 16 years.

Shovelnose Guitarfish feed on a variety of benthic invertebrates including polychaete worms, clams, amphipods, crabs, and shrimps. They crush clam shells with their jaws, spit out the prey item, and then consume the soft fleshy portions. Adults feed on bony fishes, which form a minor portion of their diet.

**HUMAN INTERACTIONS:** Shovelnose Guitarfish are taken incidentally in commercial and recreational fisheries, mostly in southern California. In Baja the Shovelnose Guitarfish is fished commercially. They are good eating and are readily sold in markets as food for human consumption. Coastal Native Americans in southern California consumed Shovelnose Guitarfish as a regular part of their diet.

Although considered harmless to humans there is one record of a scuba diver being bitten by an amorous male guitarfish that was following a female guitarfish in La Jolla Cove.

**NOMENCLATURE:** *Rhinobatos productus* (Girard, 1854). The genus name comes from the Greek *rhine*, meaning shark, and the Latin *batis*, meaning ray, in reference to its body form being intermediate between that of a shark and a ray. The species name comes



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from the Latin, meaning produced, in reference to its pointed snout. The common name refers its guitar-shaped body and broad, shovel-shaped disc. Locally it has also been referred to as the Guitarfish, Pointed-nose Guitarfish, or Shovel-nose Shark.

**REFERENCES:** Salazar-Hermosa and Villavicencio-Garayzar (1999); Talent (1982, 1985); Timmons and Bray (1997); Villavicencio-Garayzar (1993a); Zorzi and Martin (1995).

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### BANDED GUITARFISH

*Zapteryx exasperata*



**DESCRIPTION:** The Banded Guitarfish is a guitarfish-shaped ray with a broad disc that is about as wide as it is long; a dorsal surface covered with numerous, small to large, scattered, stellate prickles; a single median row of enlarged thorns running along the mid-back; a broad, short snout; small, blunt, pebblelike teeth; a first dorsal fin that originates closer to the pelvic fins bases than to the caudal fin origin; a thick tail; and a moderately large, rounded caudal fin without a distinct lower lobe. The dorsal surface is a sandy brown to dark gray, with several prominent black bars, and lighter below with dark spots on the posterior edge of the pectoral fins. Tooth counts: 60–75/60–75. Vertebral counts: 149–150. Spiral valve counts: 8–10.

**HABITAT AND RANGE:** This warm-temperate to tropical guitarfish is usually found on rocky reefs from the intertidal zone to a depth of 69 m.





The Banded Guitarfish is found from southern California to at least Mazatlán, Mexico and possibly Peru. Whether the Banded Guitarfish is actually found in Central and South American waters is uncertain. A second species, the Spotted Guitarfish (*Z. xyster*), is very common from Mexico to Peru and is often misidentified as the Banded Guitarfish.

**NATURAL HISTORY:** Viviparous, without a yolk sac placenta, with litters of 4 to 11 pups. Males mature at 64 to 70 cm and grow to a maximum size of 83 cm. Females mature at 57 to 77 cm and reach a maximum size of 97 cm. The size at birth is between 15 and 22 cm. Mating takes place around March and birth occurs three to four months later, usually in July, in the Pacific waters of Baja California. Males and females appear to be highly segregated, with females tending to congregate in the shallower waters of bays and lagoons. Mixed schools of adults are found only in March and April when mating occurs. Several lagoons along the Pacific coast of Baja serve as important nursery grounds.

Banded Guitarfish feed on crustaceans, including shrimps and crabs, and other benthic invertebrates. During the day they are usually found resting in caves or under ledges, but at night they become quite active as they forage for food on and around rocky reefs.

**HUMAN INTERACTIONS:** Banded Guitarfish are occasionally taken as a by-catch in commercial and recreational fisheries but are of no commercial importance in California waters. They are a commercially important species in Mexican waters, particularly in the Gulf of California. These are relatively docile, harmless rays that are easily approached by divers.

**NOMENCLATURE:** *Zapteryx exasperata* (Jordan and Gilbert, 1880). The genus name comes from the Greek *za*, meaning intensive, and *pteryx*, meaning fin, in reference to the vertical fins being larger than those of skates. The species name comes from the Latin, meaning made rough, in reference to the numerous stellate prickles on its back. Its common name refers to the prominent dark bars on its back and its overall guitar-shaped body. Locally it has also been referred to as the Mottled Guitarfish, prickly skate, or striped guitarfish.

When first described by Jordan and Gilbert (1880b) the Banded Guitarfish was placed in the genus *Platyrrhina*. However, Jordan and Gilbert later erected the genus *Zapteryx* and moved this species into it. The Spotted Guitarfish (*Z. xyster*), although



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distinct, is often confused with the Banded Guitarfish. The Spotted Guitarfish can be distinguished from the Banded Guitarfish by the presence of several very prominent yellow spots on its back.

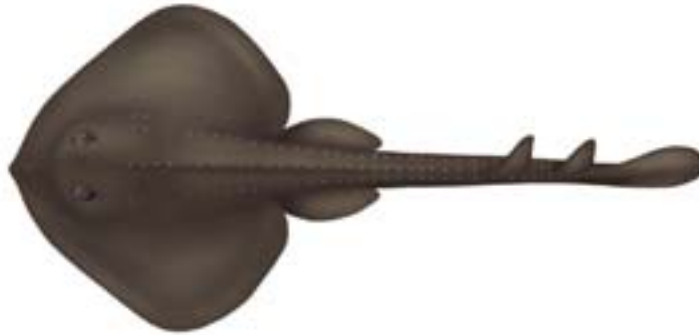
**REFERENCES:** Villavicencio-Garayzar (1995a).

## Thornback Rays (Platyrrhinidae)

The thornback rays are represented by two genera and at least three species. Only one species inhabits California waters. The head, pectoral fins, and trunk of members of this family form a heart-shaped disc. They have from one to three prominent rows of small to large thorns on their back and predorsal tail. The first dorsal fin midbase is closer to the caudal fin origin than to the pelvic fin bases. These are warm-temperate rays found on soft sediment bottoms of continental shelves. Very little is known about their general biology.

### THORNBAC RAY

*Platyrrhinoidis triseriata*



**DESCRIPTION:** The head, pectoral fins, and trunk of these rays form a heart-shaped disc; they have a short, broadly rounded snout; between one and three large, hooked-shaped thorns extending across the midback to the tail; small, pebblelike teeth; a first dorsal fin originating closer to a caudal origin than to the pelvic fin free rear-tips; a thin tail; and a caudal fin without a distinct lower lobe. The dorsal surface is a light olive to gray brown without any distinct markings;





the lower surface is a cream white. Tooth counts: 68–82/64–78. Vertebral counts: 130–133. Spiral valve counts: 6–8.

**HABITAT AND RANGE:** The Thornback Ray is a common inshore species usually found in water less than 6 m deep, although they have been taken down to a depth of 137 m. They are usually found on the mud and sandy bottoms of bays, sloughs, and coastal beaches and around kelp forests. At times of the year they will concentrate in large numbers in coastal bays and sloughs.

Thornback Rays range from Tomales Bay to the Gulf of California, although they are uncommon north of Monterey Bay. They are endemic to the eastern Pacific.

**NATURAL HISTORY:** Viviparous, without a yolk sac placenta, with litters between 1 and 15. Males mature at 37 cm and females at 48 cm. The maximum recorded size is 91 cm. Size at birth is about 11 cm. Mating takes place in late summer and birth occurs the following summer, usually in August.

Thornback Rays feed on polychaete worms, crabs, shrimps, squids, and small bony fishes including anchovies, gobies, sardines, sculpin and surfperch. Sharks and Northern Elephant Seals are known predators.

**HUMAN INTERACTIONS:** Thornback Rays are occasionally caught in commercial and recreational fisheries but are of no commercial importance.

These are fairly docile rays and are easily approached by divers.

**NOMENCLATURE:** *Platyrhinoidis triseriata* (Jordan and Gilbert, 1880). The genus name comes from the Greek *platys*, meaning broad, and *rhinos*, meaning snout. The species name comes from the Latin *tres*, meaning three, and *series*, meaning row, in reference to the three rows of hooklike thorns extending along its back and tail. Its common name refers to the numerous sharp, enlarged spines on its back. Locally it has also been referred to as the Round Skate, Thornback Guitarfish, or Thornback.

The Thornback Ray was originally placed in the genus *Platyrhina* by Jordan and Gilbert (1880c) but was subsequently placed in *Platyrhinoidis* by Garman (1881), who erected the new genus.

**REFERENCES:** Feder et al. (1974); Plant (1989).

## Torpedo Rays (Torpedinidae)

The torpedo rays consist of a single genus with at least 27 known species. A single species occurs in California waters. These rays are



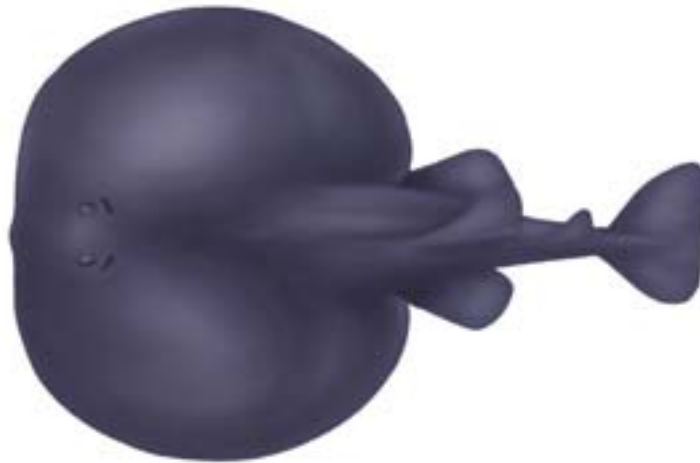
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characterized by a rounded disc; short truncated snout; two moderately large dorsal fins; a short, stout tail; and a large caudal fin. These are temperate to tropical rays found on continental shelves, usually in shallow water, but sometimes at depths down to 550 m. They feed mostly on fishes. There is a small commercial fishery for these rays, which are used in biological and medical studies.

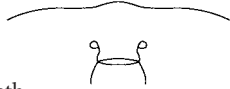
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### PACIFIC TORPEDO RAY

*Torpedo californica*



**DESCRIPTION:** The Pacific Torpedo Ray is a soft, flabby-bodied ray, with an oval disc; a smooth dorsal surface, with a visible kidney-shaped electric organ; small teeth with a single smooth-edged cusp; a first dorsal fin that is nearly twice the size of the second; a short, stocky tail; and a large caudal fin. Electric rays are a uniform dark gray to bluish or brown above, occasionally with small black spots, and lighter below. Tooth counts: 25–28/19–26. Vertebral counts: 98–105. Spiral valve count: 10–12.



**HABITAT AND RANGE:** The Pacific Torpedo Ray is found on sandy bottoms, around rocky reefs, and near kelp beds. They are commonly found at a depth of 3 to 30 m in California waters but along the Baja coast are most commonly observed from 100 to 200 m deep. A Pacific Torpedo Ray was once videotaped 17 km



west of Point Pinos, Monterey County, swimming at a depth of 10 m over water 3,000 m deep. Similar observations along the coast suggest that these torpedo rays periodically will move offshore into an epipelagic habitat. They prefer water temperatures between 50 and 55 degrees F.

The Pacific Torpedo Ray is endemic to the eastern North Pacific ranging from Magdalena Bay, Baja California, to northern British Columbia, possibly with one or more discrete populations north of Point Conception.

**NATURAL HISTORY:** Viviparous, without a yolk sac placenta, with litters of 17 to 20. Males mature at about 65 cm and reach a maximum length of 92 cm. Females mature at about 73 cm and grow to a maximum size of 137 cm. Size at birth is 18 to 23 cm. There is no defined birthing season. Their reproductive cycle is believed to be annual in males and biannual in females.

Males mature in about seven years and females in about nine years. They live to at least 16 years and possibly up to 24 years. Pacific Torpedo Rays nearly double their size in the first year of life, growing about 25 cm during this time.

Pacific Torpedo Rays feed mainly on fishes, including anchovies, hake, herring, mackerel, flatfishes, and Kelp Bass, but also will feed on invertebrates including cephalopods. Pacific electric rays forage for food using two main strategies, depending on whether they are hunting at night or during the day. At night or in turbid conditions they actively forage in the water column searching for fish and other potential prey items. Because their vision is somewhat limited at night or in turbid water, they rely on electrical cues or stimuli given off by prospective prey items. This gives these rays a hunting advantage over their prey. During the day Pacific Torpedo Rays will quietly rest on the bottom, partially buried in the sand, lying in wait to ambush an unsuspecting prey item that swims within striking distance. Prey captured during the day happens more by chance, as these rays are resting, as opposed to at night when they are actively foraging.

**HUMAN INTERACTIONS:** Pacific Torpedo Rays are taken in a small commercial fishery in southern California for the purposes of biological and medical research. They are taken as a by-catch in commercial and recreational fisheries but are of no commercial value.

Caution should be exercised by anglers and divers who may encounter these rays as they can discharge a powerful electric shock of 45 volts or more, strong enough to knock down a grown



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adult. At night, torpedo rays are extremely active and will swim directly at divers if confronted or harassed. There are no known confirmed fatalities by these rays in California waters, although there are several suspicious, unexplained, fatal scuba diving accidents that may have involved these rays.

**NOMENCLATURE:** *Torpedo californica* (Ayres, 1855). The genus name comes from the Latin *torpidus*, meaning numbness, in reference to the numbing effect from its electric organs. The species name comes from where it was first described. Locally it is also known as the California Torpedo Ray, Torpedo Ray, or Electric Ray.

The Pacific Torpedo Ray was first described as *T. californica* by Ayres (1855b), but was subsequently placed in the genus *Tetronarce* by Gill (1861), who stated that the genus had been preoccupied by another species, thus invalidating it. Subsequent taxonomic research validated *Torpedo* as the proper genus for this species.

**REFERENCES:** Bray and Hixon (1978); Feder et al. (1974); Lowe et al. (1994); Neer and Cailliet (2001).

## Softnose Skates (Arhynchobatidae)

The softnose skates are composed of 11 genera and 81 to 85 species. A single genus and six or seven species, one of which may be undescribed, are found in California waters. These skates are distinguished by their short, flexible snout. Most of the members of this family are found in deep water, usually on the outer continental shelf and upper slopes. All of the California species are deep living, with some known from only a few individual specimens. Most are taken in deepwater fisheries as a by-catch, but little else is known about their occurrence in California waters. Little is known about the taxonomic placement and distribution for many of these skates as they exhibit a high degree of morphological variation throughout their range and, in fact, may actually represent several species.

- 1a Scapular thorns present . . . . . 2
- 1b Scapular thorns absent . . . . . 3
  - 2a Dorsal surface with a continuous row of median thorns; ventral surface is white except for snout, posterior disc margins, pelvic fins, anal area, and underside of tail, which are a prominent dark brown or gray . . . . . Aleutian Skate (*Bathyraja aleutica*)
  - 2b Dorsal surface with a noncontinuous row of median thorns; ventral surface, including tail, is white without