BATOID FISHES

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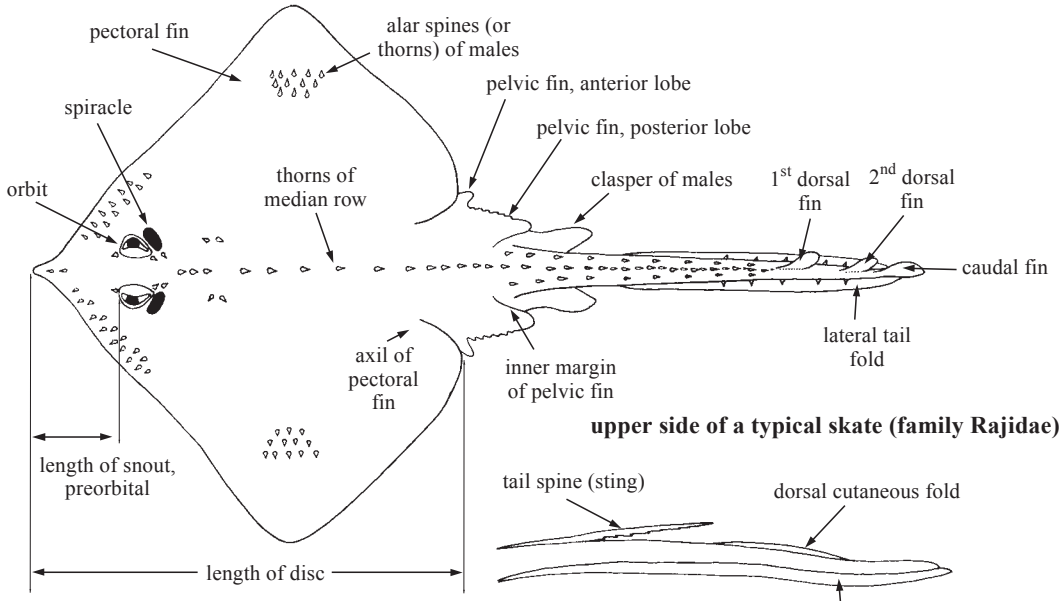
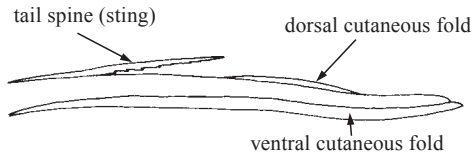
TECHNICAL TERMS AND MEASUREMENTS

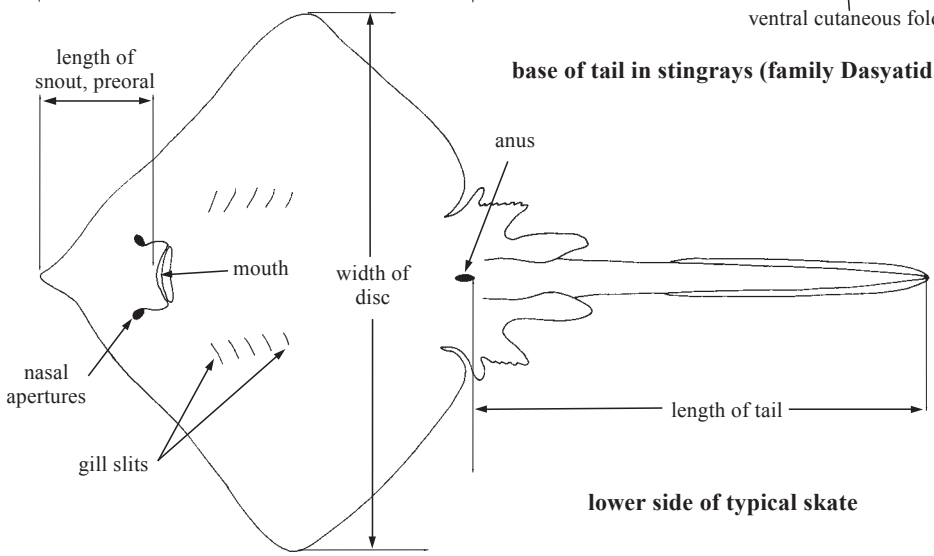
(straight-line distances)



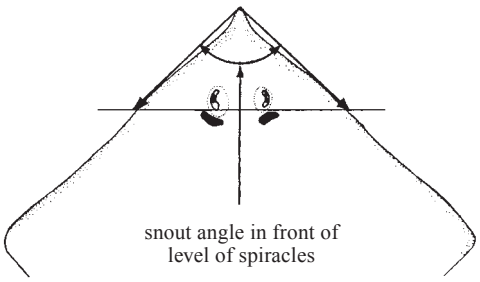
upper side of a typical skate (family Rajidae)



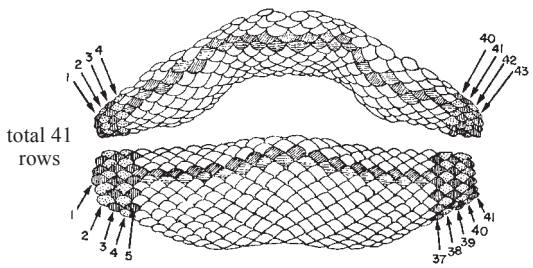
base of tail in stingrays (family Dasyatidae)



lower side of typical skate



anterior part of disc of a skate



teeth of a stingray (arrows indicate method of counting pavement pattern in batoids)

GENERAL REMARKS

Batoid fishes are moderately to greatly flattened and are distinguished from the other elamsobranchs (sharks) by their ventral gill slits, their lack of an anal fin, and by having the pectoral fins connected to the sides of the head and trunk to form a disc. The eyes and well-developed spiracles are usually located on the dorsal surface of the head, these are secondarily located on the sides of the head in the more pelagic rays, and eyes are vestigial in a few electric rays. Sawfishes and guitarfishes are shark-like, in being only moderately flattened and laterally expanded, with pectoral fins uniting anteriorly to the sides of the head. They possess relatively stout tails that are not clearly demarcated from the disc, and well-developed caudal fins. These forms, like sharks, swim by laterally undulating their trunk musculature. Electric rays, skates, and stingrays are greatly flattened and laterally expanded, with the pectoral fins united anteriorly with the sides of the snout. They possess a slender tail that is clearly demarcated from the disc, so the head and trunk thus form a circular, ovate, or rhombic disc. These forms swim by vertically undulating or oscillating their discs. The mouth and nostrils are ventrally or subterminally located in all batoids except they are terminal in *Manta*. The majority of the batoids have 2 dorsal fins, but some electric rays, skates, and stingrays have either a single dorsal fin or no dorsal fins. Jaw teeth are arranged in transverse rows, and like sharks are constantly replaced from inside the mouth; teeth are laterally fused to form large tooth plates in some of the more pelagic rays. Batoids vary from being more or less evenly covered with tooth-like placoid scales or dermal denticles (occasionally enlarged into thorns, bucklers, or spines) to completely lacking scales and scale-like structures.

Batoids, like sharks, have cylindrical copulatory organs or claspers derived from pelvic girdle cartilages that are used for internal fertilization of eggs in females. All batoids, except skates, are viviparous without placentas. Fetuses of sawfishes and guitarfishes are nourished by contents of the yolk sacs but fetuses of stingrays are furnished with histotroph or uterine milk after they exhaust the contents of their yolk sacs. Skates, on the other hand, are oviparous, and deposit the fertilized eggs in rectangular, horn-like egg capsules that are deposited on the bottom.

Batoids vary greatly in size, ranging in total length from about 13 to 20 cm, in some electric rays (Narcinidae) and skates, to over 7 m in sawfishes; some species may reach a disc width of about 6.1 m (manta rays); and ranging in weight from 10 to 20 g to between 1 and 3 t. Most batoids are small to moderate in size, below 1 m and 60 cm wide.

Most batoids are generalized benthic predators that lack specialized food capturing and processing structures. These generalists consume a wide variety of infaunal and epifaunal benthic organisms ranging from polychaetes and other soft-bodied invertebrates to relatively small ray-finned fishes. Some electric rays (Torpedinidae) use their electric organs to stun large fishes that are swallowed whole; sawfishes use their rostral saws to disable or kill schooling fishes; and eagle rays and cownose rays use their plate-like teeth to crush hard-shelled organisms such as oysters and clams. Manta rays have specialized filter plates associated with their gill arches and feed on zooplankton and nekton. Although primarily marine animals, batoids are also found in brackish estuaries and lagoons or rivers, but only 1 family of rays, the Potamotrygonidae, is confined to fresh waters (South American rivers draining into the Atlantic Ocean). Batoids are widely distributed in all oceans, from the Arctic to the Antarctic and from shallow coastal waters to great depths. Skates have the greatest latitude and depth ranges, with representatives at most latitudes and depths to about 2 000 m, but are rare in tropical shallow waters and coral reef areas. Some electric rays (Torpedinidae) are also abundant in temperate latitudes; but all remaining batoid families are restricted to tropical and warm-temperate areas, and show a preference for relatively shallow waters; moreover, some of these families are confined to particular, well-defined geographical regions. The living batoids are grouped into 20 families, 72 genera and 513 described species, about 232 of which are in the Rajidae. Batoid fishes known from the Western Central Atlantic represent 11 families, 31 genera and 74 species. Although apparently none are the object of a special fishery, many species are a regular item in the bycatch resulting from other fisheries and some are sufficiently abundant and tasty to be exploited more or less regularly in small-scale coastal fisheries. The catch of batoids reported from Area 31 ranged from 7 591 to 9 886 t between 1995 and 1999, but the actual catch is probably considerably higher. The flesh (of the disc) is usually salted, while other parts are used in the preparation of gelatin and oil.

KEY TO FAMILIES OCCURRING IN THE AREA

1a. Body shark-like, only moderately depressed; pectoral fins moderately enlarged; tail not distinctly demarcated from trunk or disc . . . . . → *2*

1b. Body distinctly depressed, pectoral fins broadly enlarged; tail more or less distinctly demarcated from trunk or disc . . . . . → *3*

2a. Snout extremely prolonged as a flat, narrow, firm blade, edges of which are armed with a single series of large tooth-like structures (Fig. 1) . . . . . **Pristidae**

2b. Snout wedge-shaped and variously prolonged (Fig. 2), but not as a blade and without lateral teeth . . . . . **Rhinobatidae**

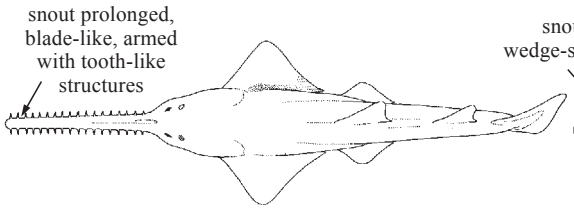


Fig. 1 Pristidae

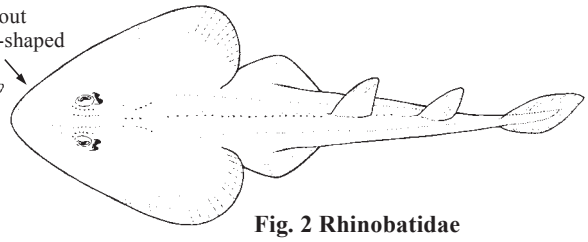


Fig. 2 Rhinobatidae

3a. Tail variable in shape and length, with or without armature of prickles, thorns, and spines; if armed, no single greatly enlarged and serrated spines; pseudobranchial folds present at anterior wall of spiracles (Fig. 3-5) . . . . . → *4*

3b. Tail variable in shape and length; in many cases very long and whip-like distally; upper surface of tail usually with 1 or more greatly enlarged and serrated spines; no pseudobranchial folds at anterior wall of spiracles . . . . . → *6*

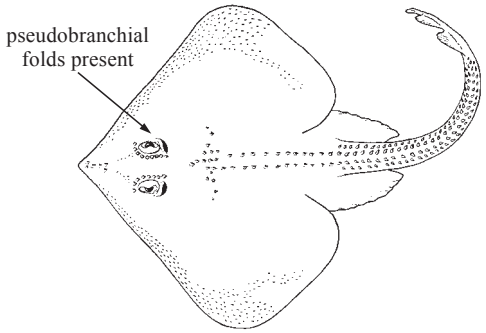


Fig. 3 Rajidae

4a. Margins of disc thick and fleshy; consistency of body soft and flabby; well-developed electric organs along sides of head within anterior part of disc, giving overlying skin honeycomb appearance (Fig. 4, 5) . . . . . → *5*

4b. Disc not fleshy toward margins; consistency of body mostly firm; electric organs, if present, in the tail region only; skin over anterior part of disc not honeycomb in appearance (Fig. 3) . . . **Rajidae**

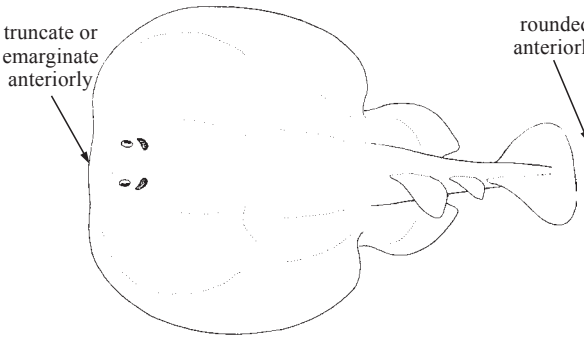


Fig. 4 Torpedinidae

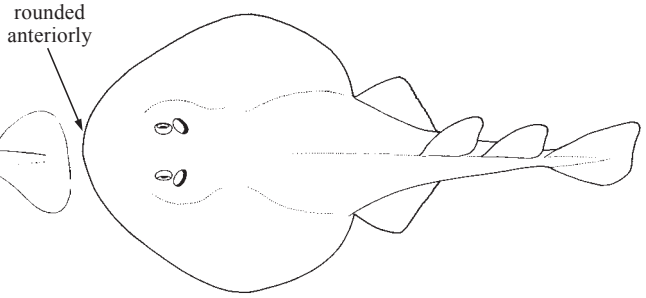


Fig. 5 Narcinidae

5a. Mouth arcuate and not entirely surrounded by a deep groove or labial folds (Fig. 6a); shape of disc truncate or emarginate anteriorly (Fig. 4) . . . . . **Torpedinidae**

5b. Mouth transverse and entirely surrounded by a deep groove or labial folds (Fig. 6b); shape of disc rounded anteriorly (Fig. 5). . . . . **Narcinidae**

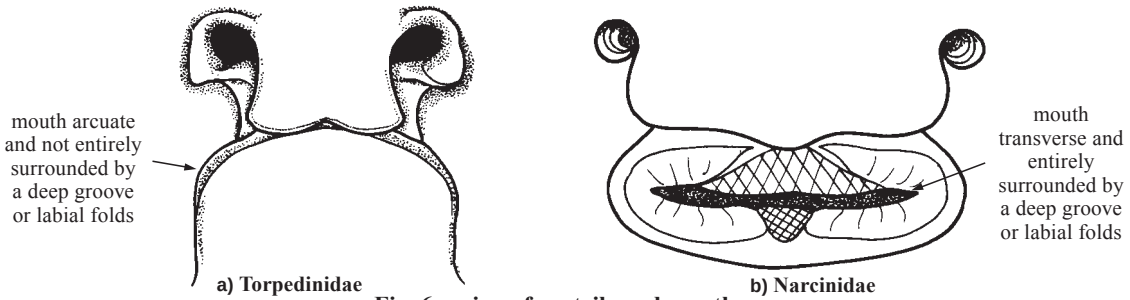


Fig. 6 region of nostrils and mouth

6a. Caudal fin well developed, supported by cartilaginous radials; tail broad and thick at base and not whip-like distally (Fig. 7) . . . . . **Urotrygonidae**

6b. Caudal fin absent, or represented by dorsal and ventral longitudinal folds; tail very slender and often whip-like distally (Fig. 8-12) . . . . . → *7*

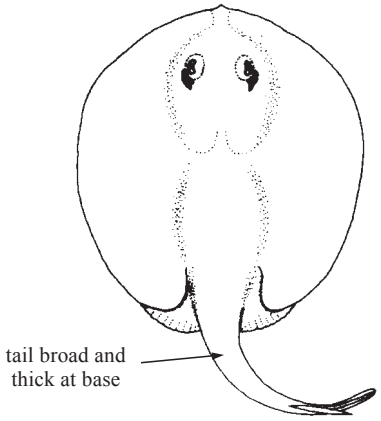


Fig. 7 Urotrygonidae

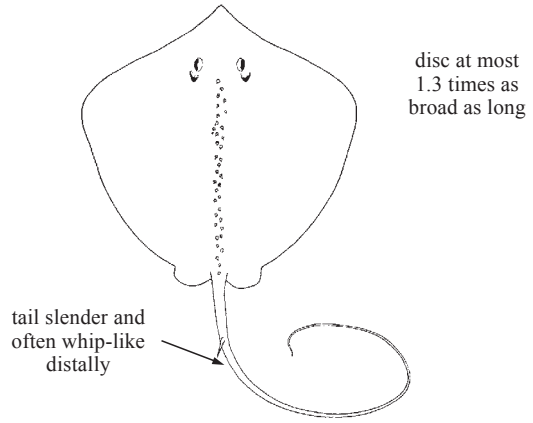


Fig. 8 Dasyatidae

7a. Eyes and spiracles on top of head; head part of disc, anterior margins of pectoral fins continuous along sides of head; no separate cephalic fins or rostral lobes . . . . . → *8*

7b. Eyes and spiracles on sides of head; head distinctly demarcated from body, or anterior margins of pectoral fins forming separate lobes or fins . . . . . → *9*

8a. Disc at most 1.3 times as broad as long (Fig. 8); tail (if complete) much longer than disc width; transverse parts of nasal curtains with fringed margins; floor of mouth with several fleshy papillae . . . . . **Dasyatidae**

8b. Disc more than 1.5 times as broad as long (Fig. 9); tail distinctly shorter than disc width; transverse parts of nasal curtains smooth-edged; no papillae on floor of mouth . . . . . **Gymnuridae**

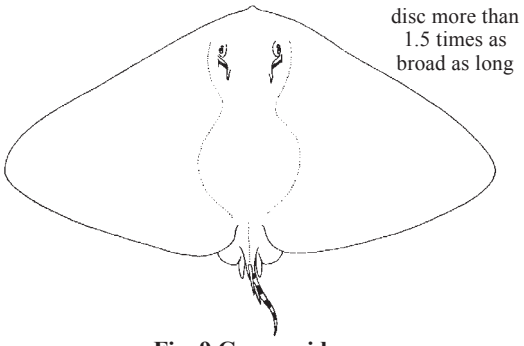


Fig. 9 Gymnuridae

9a. Anterior subdivisions of pectoral fins forming 2 thin and widely separated cephalic fins (Fig. 10); teeth minute and in bands of many series in 1 or both jaws . . . . . **Mobulidae**

9b. Anterior parts of pectoral fins forming 1 fleshy lobe extending below front of head, or this lobe with a more or less deep median notch, thus forming 2 basally connected lobes (Fig. 11,12); teeth large, flat, and in a few series only (Fig. 13) . . . . . ***→ 10***

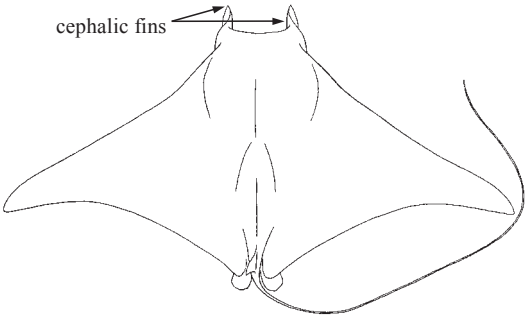


Fig. 10 Mobulidae

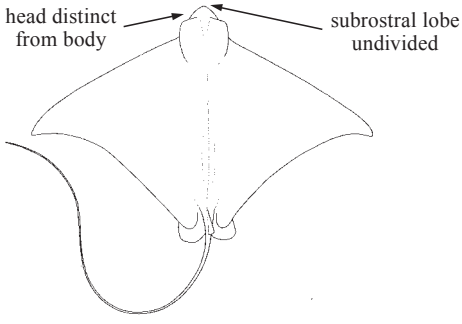


FIg. 11 Myliobatidae

10a. Subrostral lobe undivided (Fig. 11); floor of mouth with several fleshy papillae . . . . . **Myliobatidae**

10b. Subrostral lobe deeply incised at midline, thus forming 2 basally continuous lobes (Fig. 12); floor of mouth without papillae . . . . . **Rhinopteridae**

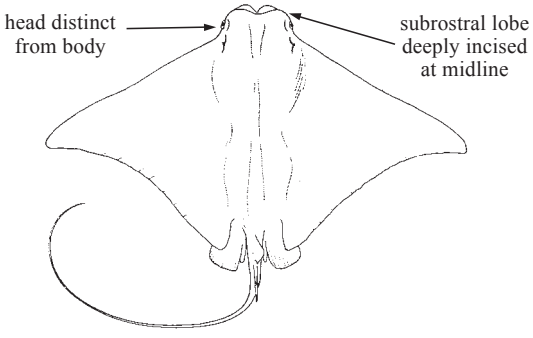


Fig. 12 Rhinopteridae

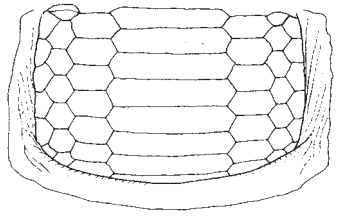


Fig. 13 Rhinopteridae upper jaw teeth

LIST OF FAMILIES AND SPECIES OCCURRING IN THE AREA

The symbol ◆ is given when species accounts are included.

TORPEDINIDAE: Electric rays, torpedoes

◆ *Torpedo andersoni* Bullis, 1962.
◆ *Torpedo nobiliana* Bonaparte, 1835.

NARCINIDAE

◆ *Benthobatis marcida* Bean and Weed, 1909.
◆ *Diplobatis colombiensis* Fechhelm and McEachran, 1984.
◆ *Diplobatis guamachensis* Martín, 1957.
◆ *Diplobatis pictus* Palmer, 1950.
◆ *Narcine bancroftii* (Griffith and Smith, 1834).
◆ *Narcine* sp.

PRISTIDAE: Sawfishes
- *Pristis pectinata* Latham, 1794.
- *Pristis pristis* (Linnaeus, 1758).

RHINOBATIDAE: Guitarfishes
- *Rhinobatos horkelii* Müller and Henle, 1841.
- *Rhinobatos lentiginosus* Garman, 1880.
- *Rhinobatos percellens* (Walbaum, 1792).

RAJIDAE: Skates
- *Anacanthobatis americanus* Bigelow and Schroeder, 1962.
- *Anacanthobatis folirostris* (Bigelow and Schroeder, 1951).
- *Anacanthobatis longirostris* Bigelow and Schroeder, 1962.
- *Amblyraja radiata* (Donovan, 1808).
- *Breviraja claramaculata* McEachran and Matheson, 1985.
- *Breviraja colesi* Bigelow and Schroeder, 1948.
- *Breviraja mouldi* McEachran and Matheson, 1995.
- *Breviraja nigriventralis* McEachran and Matheson, 1985.
- *Breviraja spinosa* Bigelow and Schroeder, 1950.
- *Cruriraja atlantis* Bigelow and Schroeder, 1948.
- *Cruriraja cadenati* Bigelow and Schroeder, 1962.
- *Cruriraja poeyi* Bigelow and Schroeder, 1948.
- *Cruriraja rugosa* Bigelow and Schroeder, 1958.
- *Dactylobatus armatus* Bean and Weed, 1909.
- *Dactylobatus clarkii* (Bigelow and Schroeder, 1958).
- *Dipturus bullisi* (Bigelow and Schroeder, 1962).
- *Dipturus garricki* (Bigelow and Schroeder, 1958).
- *Dipturus olseni* (Bigelow and Schroeder, 1951).
- *Dipturus oregoni* (Bigelow and Schroeder, 1958).
- *Dipturus teevani* (Bigelow and Schroeder, 1951).
- *Fenestraja atripinna* (Bigelow and Schroeder, 1950).
- *Fenestraja cubensis* (Bigelow and Schroeder, 1950).
- *Fenestraja ishiyamai* (Bigelow and Schroeder, 1962).
- *Fenestraja plutonia* (Garman, 1881).
- *Fenestraja sinusmexicanus* (Bigelow and Schroeder, 1950).
- *Gurgesiella atlantica* (Bigelow and Schroeder, 1962).
- *Gurgesiella dorsalifera* McEachran and Compagno, 1980.
- *Leucoraja garmani* (Whitley, 1939).
- *Leucoraja lentiginosa* (Bigelow and Schroeder, 1951).
- *Leucoraja yucatanensis* (Bigelow and Schroeder, 1950).
- *Malacoraja senta* (Garman, 1885).
- *Neoraja carolinensis* McEachran and Stehmann, 1984.
- *Pseudoraja fischeri* Bigelow and Schroeder, 1954.
- *Raja ackleyi* Garman, 1881.
- *Raja bahamensis* Bigelow and Schroeder, 1965.
- *Raja cervigoni* Bigelow and Schroeder, 1964.
- *Raja eglanteria* Bosc, 1800.
- *Raja texana* Chandler, 1921.
- *Rajella fuliginea* (Bigelow and Schroeder, 1954).
- *Rajella purpuriventralis* (Bigelow and Schroeder, 1962).

DASYATIDAE: Stingrays, whiprays
- *Dasyatis americana* Hildebrand and Schroeder, 1928.
- *Dasyatis centroura* (Mitchill, 1815).
- *Dasyatis geijskesi* Boeseman, 1948.
- *Dasyatis guttata* (Bloch and Schneider, 1801).
- *Dasyatis sabina* (Lesueur, 1824).
- *Dasyatis say* (Lesueur, 1817).
- *Himantura schmardae* (Werner, 1904).
- *Pteroplatytrygon violacea* (Bonaparte, 1832).

UROTRYGONIDAE:
- *Urobatis jamaicensis* (Cuvier, 1816).
- *Urotrygon microphthalmum* Delsman, 1941.
- *Urotrygon venezuelae* Schultz, 1949.

GYMNURIDAE: Butterfly rays
- *Gymnura altavela* (Linnaeus, 1758).
- *Gymnura micrura* (Bloch and Schneider, 1801).

MYLIOBATIDAE: Eagle rays
- *Aetobatus narinari* (Euphrasen, 1790).
- *Myliobatis freminvillii* Lesueur, 1824.
- *Myliobatis goodei* Garman, 1885.

RHINOPTERIDAE: Cownose rays
- *Rhinoptera bonasus* (Mitchill, 1815).
- *Rhinoptera brasiliensis* Müller, 1836.

MOBULIDAE: Devil rays and mantas
- *Manta birostris* (Walbaum, 1792).
- *Mobula hypostoma* (Bancroft, 1831).
- *Mobula tarapacana* (Philippi, 1893).

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Order TORPEDINIFORMES
TORPEDINIDAE

Electric rays (torpedos, AFS: torpedo electric rays)

by J.D. McEachran, Texas A & M University, USA
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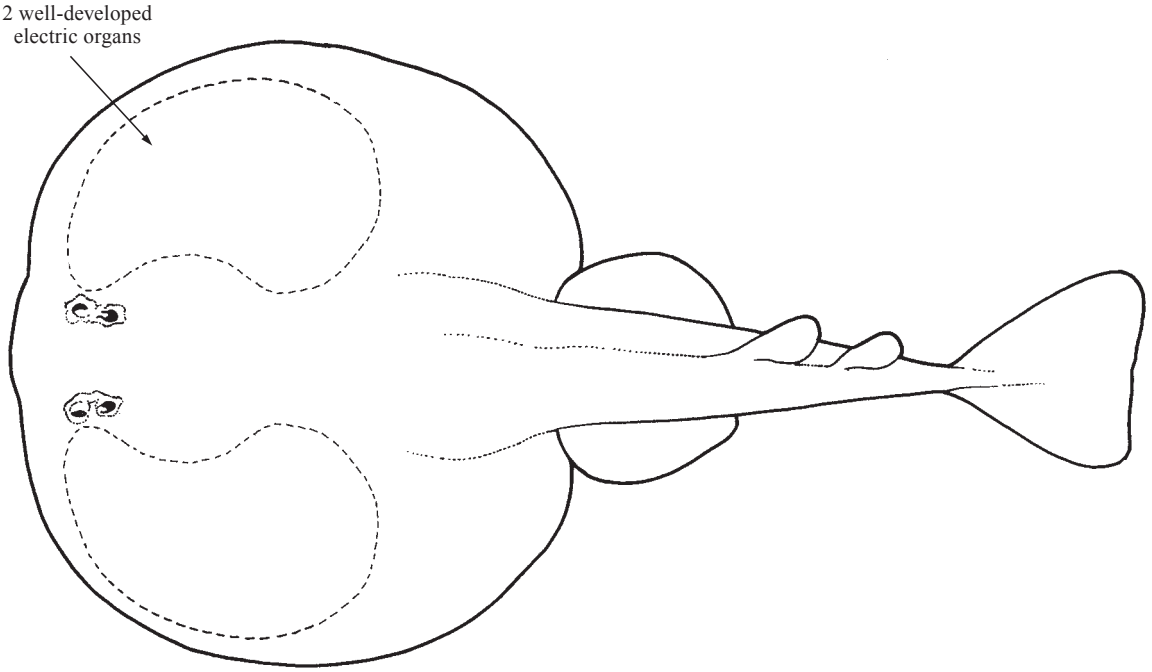
Diagnostic characters: Batoid fishes of small to moderately large size (total length to about 180 cm, but most species less than 100 cm in total length). Body very depressed, head, trunk and enlarged pectoral fins forming more or less circular disc. **Anterior contour of disc truncate or slightly arched**, snout extremely short. Eyes and spiracles small and close together on top of head. Posterior margin of spiracles smooth or with papillae; pseudobranchial folds present inside anterior spiracular border. Nostrils transverse and relatively large, closer to mouth than to snout; **anterior lobe expanded posteriorly and medially to form nasal curtain continuous in front of mouth, except for narrow isthmus, and with smooth posterior margin. Mouth of moderate size and usually arched, flanked by longitudinal furrows but without well-developed labial cartilages**; numerous monocuspid, small teeth in quincunx arrangement along each jaw. **Pectoral fins very thick near margin**, completely attached from sides of head to at least origin of pelvic fins. Tail very stout, not demarcated from disc, **distinctly shorter than disc length**, with cutaneous fold along lower lateral margin; **2 dorsal fins with first distinctly larger than second, and located partially or totally above pelvic-fin base; caudal fin large, subtriangular** and with upper and lower lobes continuous around vertebral column. **Skin very soft and naked. Two well-developed, kidney-shaped electric organs, visible externally on either side of head. Colour:** dorsal surface uniformly dark, or with various light and dark ornamentations (ocellae, spots, mottlings) on variable shades of brown; ventral surface whitish, disc and pelvic fins often with dark margin.



Habitat, biology, and fisheries: Electric rays inhabit continental shelves from tropical to temperate latitudes, to depths of 100 m, but most commonly occur in shallow water along coasts. Some, however, occur at depths to 360 m. Generally they are active on the bottom, frequently partially covering themselves with sand or mud to ambush prey. They may also be observed swimming slowly in the water column, where they may actively hunt by over swimming prey items. Some of the larger species may also make long migrations. Food consists of ray-fined fishes and invertebrates living on the bottom. The electric organs can discharge up to 45 volts, depending on the size of the ray, and are used to stun prey and to defend themselves against predators. All spe-

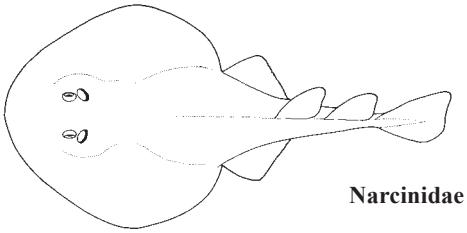
cies are viviparous without placentae. Two species occur in the area. They are caught as by-catch in trawls but have a low market acceptance and are not consumed regularly.

Similar families occurring in the area

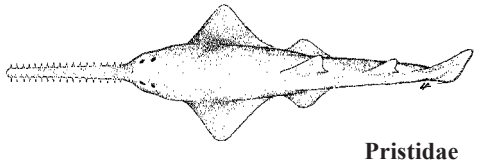
Narcinidae: mouth relatively narrow, not strongly arched, and protractile; upper and lower jaw bound together by labial cartilages; 2 equal-sized dorsal fins.

Pristidae, Rhinobatidae: body shark-like; margin of disc not thick, soft, or flaccid; pectoral fins generally only moderately expanded; partially or totally covered with scales (denticles).

Other rays: disc margin very thin; no electric organs in pectoral fins; tail slender to whip-like.



Narcinidae

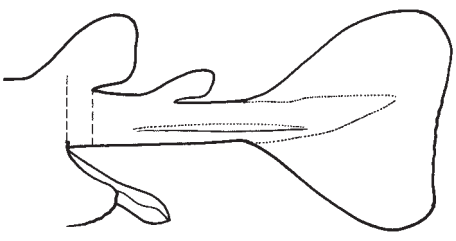


Pristidae

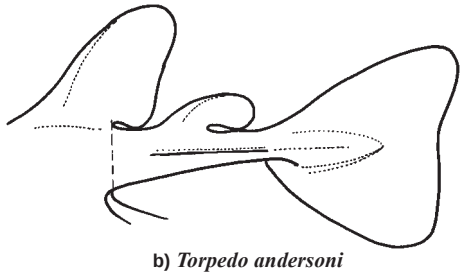
Key to the species of Torpedinidae occurring in the area

1a. First dorsal-fin base extends posterior to base on pelvic fin; upper body dark brown to purplish, either plain or with few darker, poorly defined blotches (Fig. 1a)**. . . . . *Torpedo nobiliana***

1b. First dorsal-fin base not extending posterior to pelvic-fin base; upper body light tan with small, irregular dark brown to reddish spots over disc and tail regions (Fig. 1b) **. . *Torpedo andersoni***



a) ***Torpedo nobiliana***



b) ***Torpedo andersoni***

Fig. 1 posterior fin positions

List of species occurring in the area

The symbol ✦ is given when species accounts are included.

✦ *Torpedo andersoni* Bullis, 1962.

✦ *Torpedo nobiliana* Bonaparte, 1835.

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Bigelow, H.B. and W.C. Schroeder. 1953. Fishes of the western North Atlantic. Sawfishes, guitarfishes, skates and rays, and chimaeroids. *Mem. Sears Found. Mar. Res.*, (1)Pt.2:588 p.

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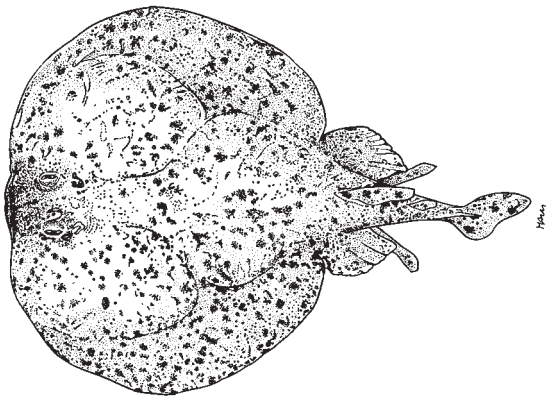
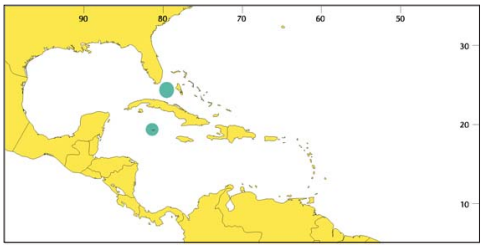
Torpedo andersoni Bullis, 1962

En - Florida torpedo.

Maximum size 31 cm total length. Benthic on coral formations (Grand Cayman) in 11 m, and along the upper slope, at 229 m (Grand Bahama Bank). Known from the two type specimens (22 cm and 16 cm total length) from the western edge of the Grand Bahama Bank and photographic record from Grand Cayman Island. Dorsal surface light tan, with small, reddish tan blotches; ventral surface light cream coloured.



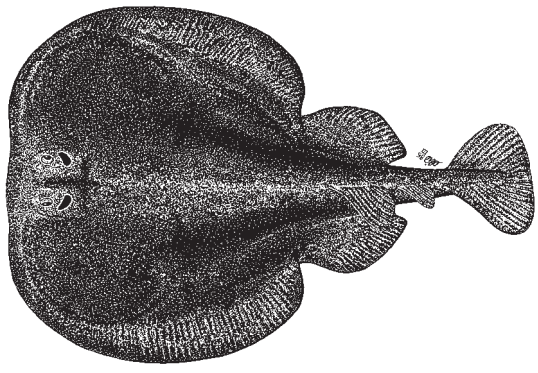


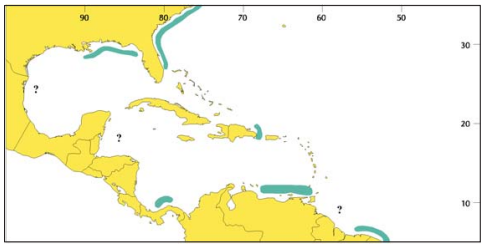
Torpedo nobiliana Bonaparte, 1835

TTO

En - Electric ray (AFS: Atlantic torpedo); **Fr** - Torpille noire; **Sp** - Tremolina negra.

Maximum size 180 cm total length; neonates 20 to 25 cm total length at birth. Up to 60 embryos in large females and gestation period about 1 year. Large female about 150 cm total length (98 cm in disc width) weighed 64 kg. Benthic, primarily on soft or muddy bottoms, along the continental shelf and upper slope, between shoreline and 530 m. Adults are frequently pelagic or semi-pelagic. Recorded from Nova Scotia to eastern Florida, northeastern Gulf of Mexico, Greater Antilles, Panama, and northern coast of South America. More abundant in temperate waters of the western North Atlantic than in area. Also recorded in eastern Atlantic and Mediterranean. Records from the Indian Ocean and South China Sea may refer to other species. Dorsal surface dark brown to purplish brown, with or without darker spots; ventral surface white. Food consists of a variety of fishes including small sharks, as well as invertebrates.



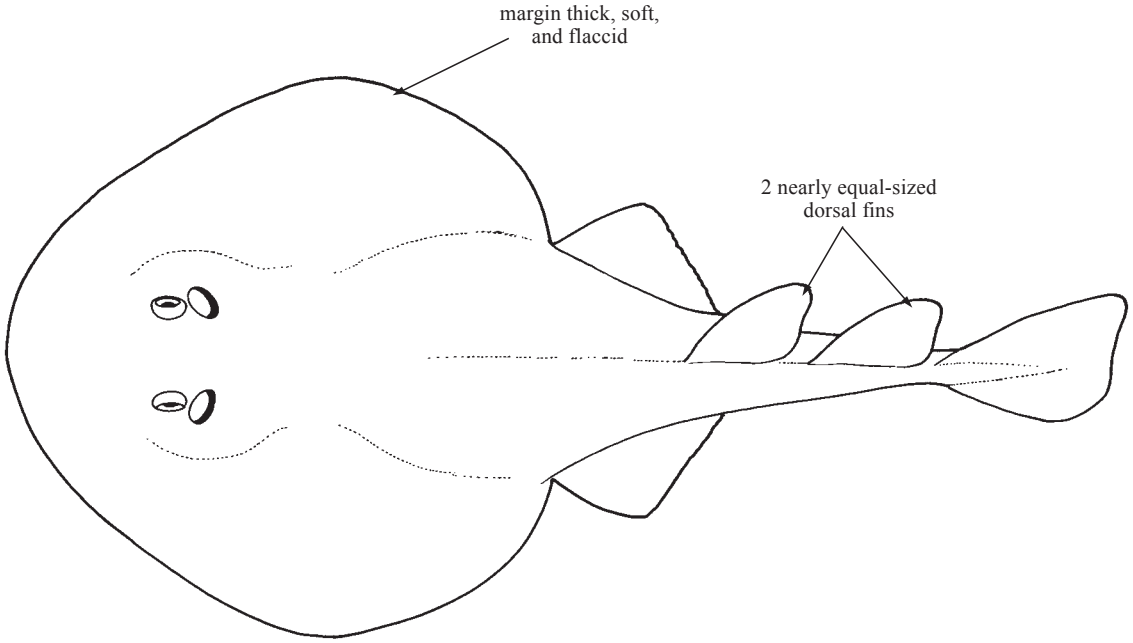


NARCINIDAE

Numbfishes (AFS: electric rays)

by J.D. McEachran, Texas A & M University, USA and
M.R. de Carvalho, American Museum of Natural History, New York, USA

Diagnostic characters: Batoids of small to moderate size (total length about 75 cm). Body very depressed, head, trunk, and enlarged pectoral fin forming elongate disc, **margin of disc moderately thick, soft, and flaccid. Anterior contour of disc rounded to obtuse**, snout moderately long, broad, and more or less evenly convex; eyes small and functional to minute and non-functional; spiracles small, close behind eyes and on top of head. Posterior spiracular margins smooth, irregular, or papillated; pseudobranchial folds inside anterior spiracular margins. Nostrils transverse and closer to mouth than to margin of snout; **anterior lobe of nostrils expanded posteriorly and medially to form nasal curtain that is continuous over narrow isthmus in front of mouth**. Mouth relatively small, **surrounded by groove, with well-developed labial cartilages and protractile into short tube**; numerous monocuspid small teeth arranged in band along each side of jaw. Pectoral fins relatively thick near margin and completely attached to sides of head to at least origin of pelvic fins. Tail moderately short, about equal to disc length. **Two large and more or less equal-sized dorsal fins, with first over or slightly posterior to base of pelvic fins**. Outer corners of pelvic fins subtriangular to broadly rounded; **caudal fin with upper and lower lobes continuous around vertebral column. Skin soft and naked. Electric organs well developed, kidney-shaped and visible on either side of head. Colour:** dorsal surface brown, olivaceous, grey, or reddish, and either plain or patterned with light or dark reticulations, vermiculations, bands, spots, or ocellae. Ventral surface whitish.



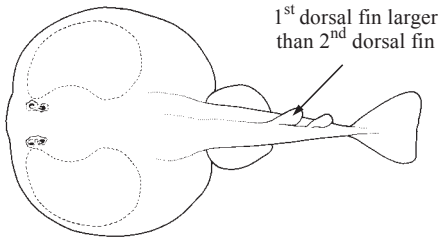
Habitat, biology, and fisheries: Numbfishes inhabit continental and insular shelves, and occasionally slopes in tropical to warm temperate latitudes, to depths of about 1 000 m (most occur below 250 m). Food consists of benthic invertebrates including polychaetes, crustaceans, and small ray-finned fishes. All species are viviparous without placentae. Six species occur in the area. None are of great commercial interest, although some are occasionally captured as bycatch in trawl fisheries for shrimp (more commonly *Narcine bancroftii*). The flesh of the tail region may be marketed after removal of the electric organs in the larger species, but is generally considered to be mediocre in quality.

Similar families occurring in the area

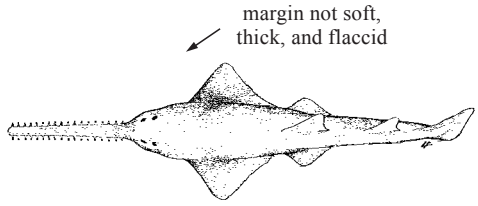
Torpedinidae: mouth is relatively wide, strongly arched, and not protractile; upper and lower jaws not bound by labial cartilage; first dorsal fin distinctly larger than second.

Pristidae, Rhinobatidae: margin of disc not thick, soft, and flaccid; pectoral fins moderately expanded, partially or totally covered with small scales.

Other batoids: disc margin very thin; no electric organs on sides of disc.



Torpedinidae

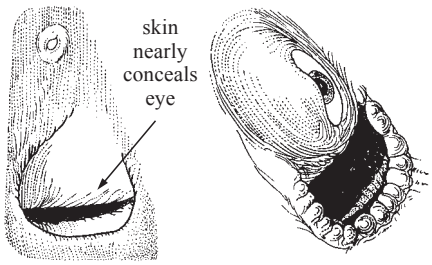


Pristidae

Key to the species of Narcinidae occurring in the area

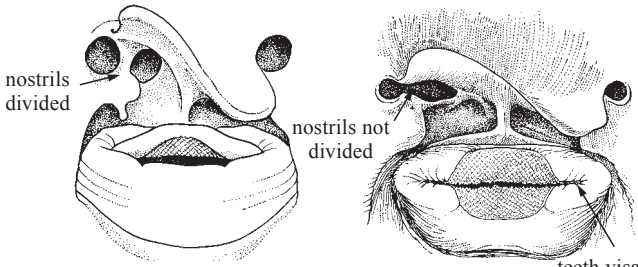
1a. Eyes minute, almost entirely concealed by skin (Fig. 1a); entire inner margin of pelvic fins connected with side of tail . . . . . ***Benthobatis marcida***

1b. Eyes normally developed, not concealed almost entirely by skin (Fig. 1b); distal section of inner margin of pelvic fins free of side of tail . . . . . → ***2***



a) ***Benthobatis marcida*** b)

Fig. 1 eye and spiracle



a) b)

Fig. 2 nasal apertures and mouth

2a. Nostrils divided into 2 separate and equal sized apertures by cross-bridge; teeth entirely enclosed in mouth when mouth is closed (Fig. 2a) . . . . . → ***3***

2b. Nostrils not divided into 2 separate apertures by cross-bridge; teeth extending onto upper and lower lips and visible when mouth is closed (Fig. 2b) . . . . . → ***5***

3a. Dorsal coloration composed of relatively thin brownish bands running perpendicular to body-axis on disc and pelvic fins, and transversely on base of tail region . . ***Diplobatis guamachensis***

3b. Dorsal coloration devoid of bands over disc, pelvic fins, and base of tail region, and composed of spots, mottlings, freckles or ocelli of varying diameter and number . . . . . → ***4***

4a. Spots over dorsal disc, pelvic fins and tail region circular, not very numerous, and roughly of same size (larger or about equal to eye diameter). . . . . ***Diplobatis colombiensis***

4b. Spots over dorsal region irregular in shape, numerous, and varying greatly in size, from small freckles to mottlings and incomplete ocelli larger than eye diameter (smaller spots and freckles are more central on disc and base of tail, larger spots are more peripheral) . . . . . ***Diplobatis pictus***

5a. Dorsal coloration with numerous small (smaller than eye diameter) dark brown spots over most of disc, base of tail, and dorsal and caudal fins . . . . . ***Narcine* sp.**

5b. Dorsal disc coloration with few, scattered incomplete ocelli, without numerous small dark brown spots over entire disc, base of tail, and dorsal and caudal fins . . . . . ***Narcine bancroftii***

List of species occurring in the area

The symbol ◆ is given when species accounts are included.

Note: New species presently being described elsewhere.

◆ *Benthobatis marcida* Bean and Weed, 1909.

◆ *Diplobatis colombiensis* Fechhelm and McEachran, 1984.
◆ *Diplobatis guamachensis* Martín, 1957.
◆ *Diplobatis pictus* Palmer, 1950.

◆ *Narcine bancroftii* (Griffith and Smith, 1834).
◆ *Narcine* sp.

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Bigelow, H.B. and W.C. Schroeder. 1953. Fishes of the western North Atlantic. Sawfishes, guitarfishes, skates and rays, and chimaeroids. *Mem. Sears Found. Mar. Res.,* (1)Pt.2:588 p.

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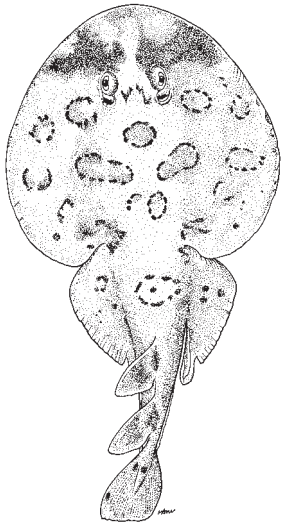
Narcine bancroftii (Griffith and Smith, 1834)

Frequent synonyms / misidentifications: None / *Narcine brasiliensis* (von Olfers, 1831).

FAO names: En - Bancroft's numbfish.

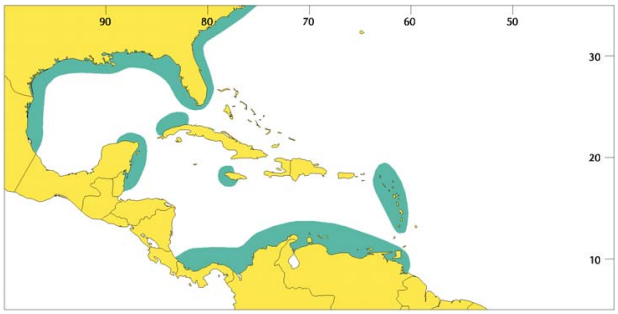


Diagnostic characters: Disc oval to rounded in outline, about as wide as long (both disc width and length somewhat variable, ranging from 43 to 60% of total length and 45 to 57% of total length, respectively); greatest disc width at about 2/3 of disc length. Snout rounded to broadly angular; preorbital snout length from 10 to 16% of total length, occupying about 1/4 of disc length. Eyes relatively large, larger than spiracles and bulging in fresh specimens; **spiracles circular to ovoid, with thick, elevated borders and warty papillae on entire spiracular margin (papillae more slender in juveniles). Electric organs bean-shaped, extending from level of eyes to posterior 1/5 of disc length; weighing up to 1/6 of total weight**. Nasal curtain wider than long, reaching to level of upper tooth band; nostrils with elevated borders. **Mouth protrusible, with strong labial cartilages**; mouth slightly wider than nasal curtain, **with exposed portions of tooth plates (7 to 9 horizontal rows) of about equal dimensions on both jaws; teeth ranging from 17/17 to 21/22 exposed vertical rows in pre-adult and adult specimens** (23 to 40 cm total length) but generally more rows on larger specimens. Pelvic fins wide and long, originating from underneath posterior disc margins; claspers elongate and relatively straight, not tapering very much. Tail strong and stout at base, tapering; **tail length less than disc width or length; lateral tail folds prominent, originating at posterior 2/3 of first dorsal-fin base and extending to caudal peduncle**. Second dorsal fin slightly larger than first; dorsal fins similar in shape; first dorsal fin originates over posterior lobes of pelvic fins; caudal fin tall, fan-shaped, with broadly rounded ventral margin, and subacute dorsal apex. Pores of lateral-line system present on anterior head region, bordering electric organs and sides of tail; ampullary pores numerous dorsally and ventrally on snout region. **Colour:** dorsal surface varying from yellowish brown to greyish brown and darker brown, with darker blotches anteriorly on snout over antorbital cartilages, and **small (less than eye diameter) dark spots forming incomplete ocelli over disc and base of tail regions**; dark cross-bands usually present on tail at bases of dorsal and caudal fins. Ventral surface white to creamy white, sometimes with grey or brown blotches on electric organs, pectoral axils, tail region or outlining disc and pelvic fins.

Size: Maximum size 58 cm total length; males mature at 23 to 25 cm; females mature at 27 to 32 cm; neonates 9 to 10 cm at birth.

Habitat, biology, and fisheries: Oviducts of female are synchronous, and may contain up to 18 embryos of various sizes. This species is relatively immobile within an area during a season, congregating on sand bars and surf zones of barrier beaches during summer, but moving to deeper offshore waters during winter months. Food consists of polychaetes and other invertebrates, as well as ray-finned fishes. Benthic on the continental shelf, between the shoreline and 37 m. Relatively common in some areas. Tail region may be consumed as food and considered of good quality, but not targeted regularly by fisheries in our area.

Distribution: Widely distributed from North Carolina to the Gulf of Mexico, Caribbean Sea and the Greater and Lesser Antilles (absent from the Bahamas).

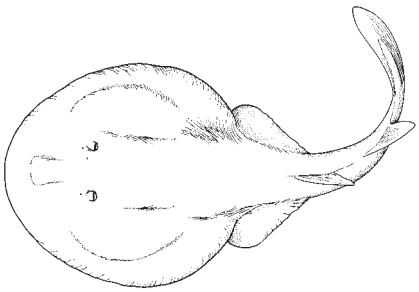


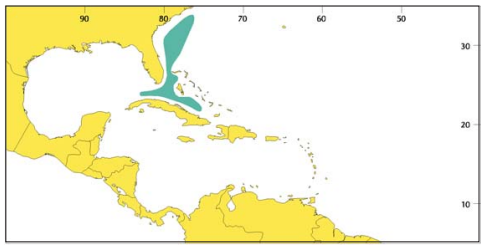
Note: This species has been almost universally referred to as *Narcine brasiliensis* (von Olfers, 1831) in our area, but recent revisions have subdivided that previously wide-ranging species, which is now restricted to the southwestern Atlantic. *Narcine bancroftii* (Griffith, 1834) is the oldest available name for specimens of *Narcine* from our area (Carvalho, 1999a).

Benthobatis marcida Bean and Weed, 1909 TNB

En - Blind torpedo; **Sp** - Raya eléctrica de profundidad.

Maximum size 49 cm total length; young are about 8 to 9 cm at birth. Uniform in colour, ranging from light tan to darker brown. Benthic along the slope, between 274 and 923 m. Recorded from North Carolina to Florida Keys and Cuba. Food consists of crustaceans and other invertebrates, and small ray-fined fishes. Dorsal surface light tan; ventral surface white to pale yellow.

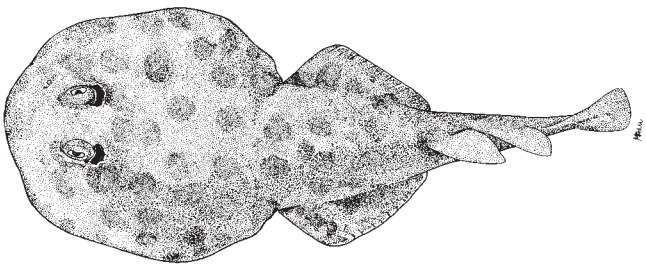


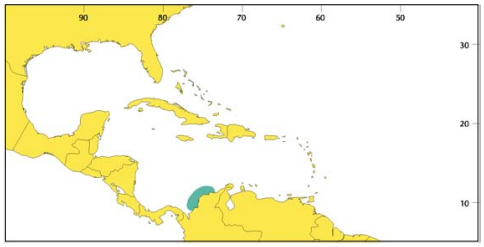


Diplobatis colombiensis Fechhelm and McEachran, 1984

En - Colombian electric ray.

Maximum size 17 cm total length. Benthic on the continental shelf from 30 to 100 m. Recorded from the northern coast of Colombia, this species apparently is replaced in the east by *Diplobatis guamachensis*. Dorsal surface golden tan, with brown spots up to size of orbit symmetrically arranged on disc and tail; ventral surface white to cream coloured.

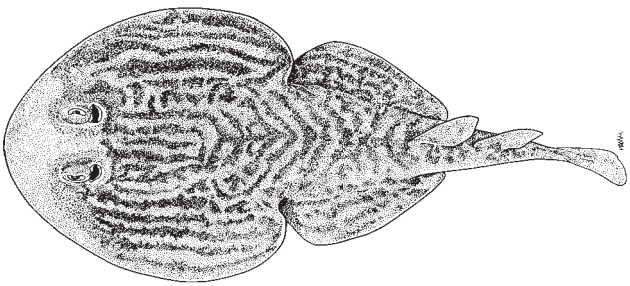


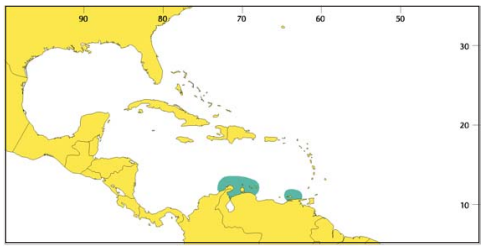


Diplobatis guamachensis Martín, 1957

En - Brownband numbfish.

Maximum size slightly less than 20 cm total length. Continental shelf between 30 and 183 m. Recorded from Gulf of Venezuela to western Trinidad. Most common in the Gulf of Venezuela region. Replaced by *Diplobatis pictus* farther eastward. Dorsal surface tan to golden tan, with darker brown wavy bands and stripes; ventral surface white to cream coloured.

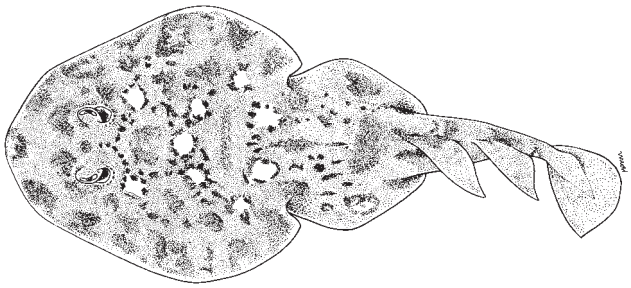


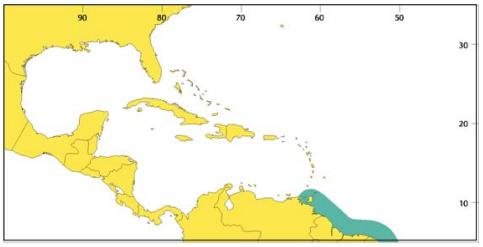


Diplobatis pictus Palmer, 1950

En - Variegated electric ray; **Sp** - Raya eléctrica variegada.

Maximum size 18 cm total length. Common over muddy and sandy bottoms, on the continental shelf, between 2 and 130 m. Recorded from southeastern Venezuela to northern Brazil. Dorsal surface highly variable in colour pattern but always with spots, mottlings, and ocelli of various sizes; ventral surface white.

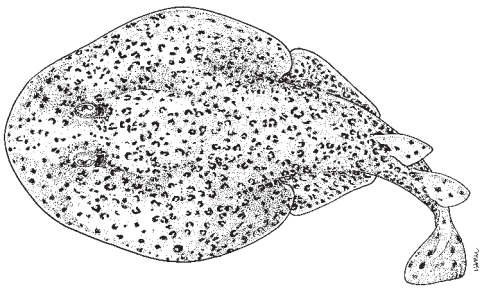


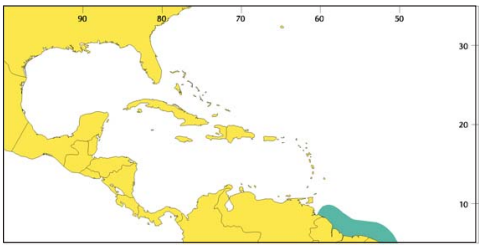


***Narcine* sp.**

En - Smallspotted numbfish.

Maximum size 62 cm total length, but common to about 56 cm. Sizes at maturity and birth similar to *Narcine bancroftii*. Benthic on the continental shelf, in depths from 15 to 43 m. Recorded from Suriname to Brazil (Maranhão state). Both oviducts are functional and synchronous, and 13 embryos were observed in one 46 cm total length female. Food consists of invertebrates, especially polychaetes and crustaceans, and ray-finned fishes.





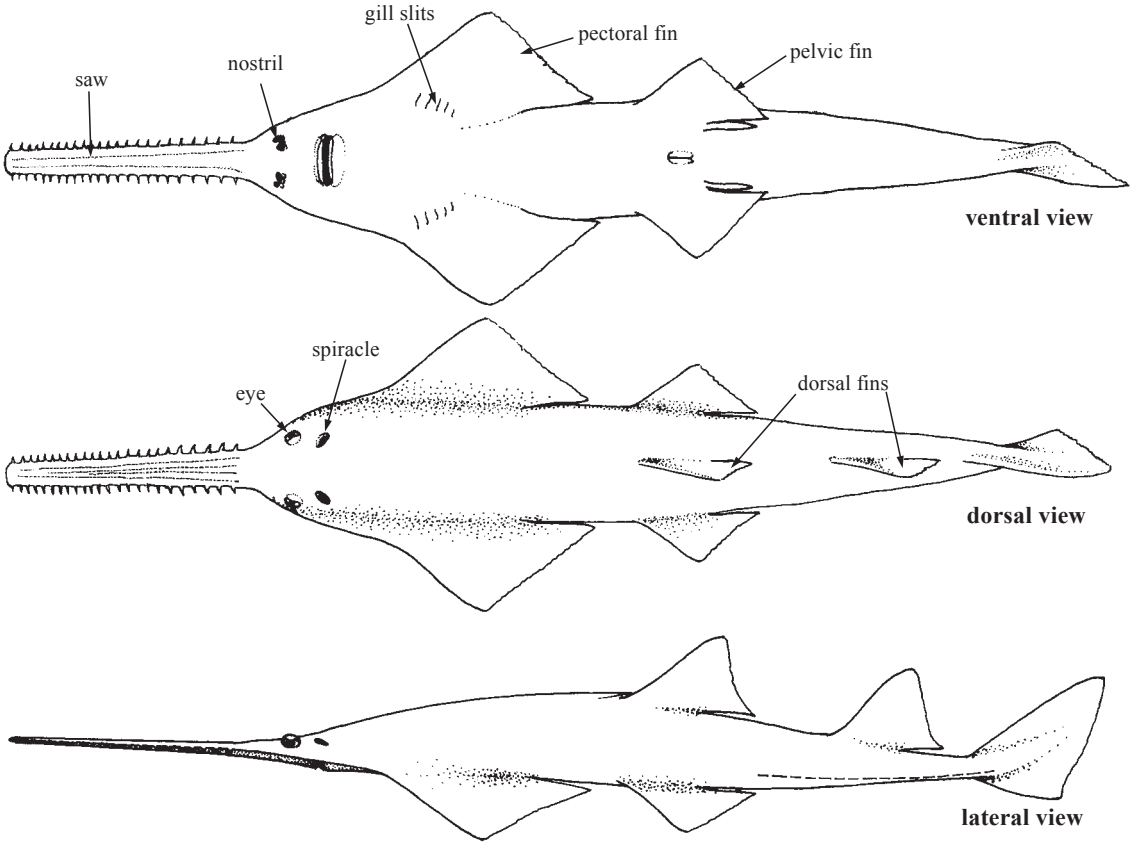
Order RAJIFORMES

PRISTIDAE

Sawfishes

by J.D. McEachran, Texas A & M University, USA
and M.R. de Carvalho, American Museum of Natural History, New York, USA

Diagnostic characters: Batoids of large size, regularly attaining 500 cm in total length. Body depressed anteriorly; posterior part of head, trunk, and slightly enlarged pectoral fins forming narrow, triangular disc. **Snout prolonged as a stout, thin, narrow blade, armed on each side with a series of pointed teeth in sockets.** Eyes and spiracles on top of head, spiracles well behind eyes; mouth transverse and straight, without barbels and grooves; teeth small, numerous, and arranged in band along jaws; nostrils distinctly anterior to and completely separate from mouth, partially covered by anterior lobe. **Two large dorsal fins widely separated, first over pelvic-fin base; caudal fin well developed**, with or without distinct ventral lobe. **Tail stout and shark-like, not demarcated from body or trunk**, with a longitudinal ridge along lower sides. **Pectoral fins little enlarged, attached to posterior part of head, not reaching mouth** and terminating anterior to origin of pelvic fins. Pelvic fins with single moderately expanded lobe. Entire body except for saw and fins densely covered with small, ovoid, flat dermal denticles; no thorns. **Colour:** dorsal surface and lateral surfaces uniform brown, olive, grey, or yellowish; ventral surface white; fins of some species darker; border of fins and lateral corner of trunk occasionally whitish.



Habitat, biology, and fisheries: Sawfishes are sluggish bottom-dwelling fishes living in coastal waters, estuaries, mouths of rivers, and in fresh waters of tropical and subtropical regions (specimens have been captured as far as 1 340 km from the mouth of the Amazon river). They occur on sandy and muddy bottoms, normally in less than 10 m. All of the species are viviparous without placenta. They feed on benthic organisms and small schooling ray-finned fishes. The saw is used to probe the bottom for benthic prey and to slash and disable schooling fishes. They are frequently captured in tropical regions by trammel nets, set nets, and trawls. Two species occur in the area, of a total of 4 to 7 in the family (identity of many nominal species needs verification).

The flesh is sold frozen and salted for human consumption. Sawfishes are quite vulnerable to overfishing and habitat alteration, and as a result are in decline in many areas.

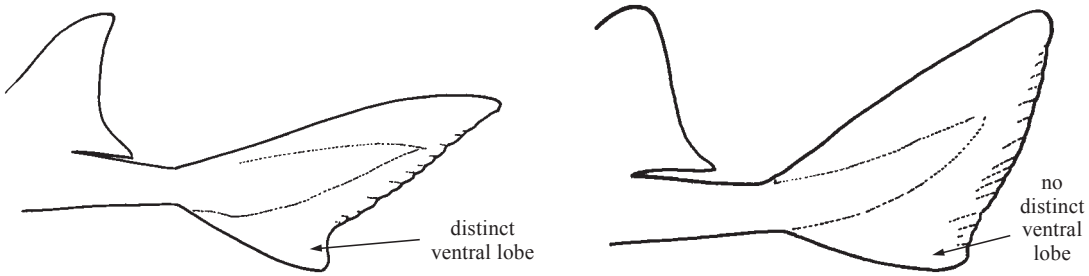
Similar families occurring in the area

No other family of rays has an enlarged snout resembling a saw, and no other family, except for Rhinobatidae, is shark-like.

Key to the species of Pristidae occurring in the area

1a. Caudal fin with a distinct ventral lobe (Fig. 1a); rostrum with 20 or fewer pairs of teeth . . ***Pristis pristis***

1b. Caudal fin without a distinct ventral lobe (Fig. 1b); rostrum with more than 23 pairs of teeth . . . . . ***Pristis pectinata***



a) ***Pristis pristis*** b) ***Pristis pectinata***

Fig. 1 caudal fin

List of species occurring in the area

The symbol ◆ is given when species accounts are included.

◆ *Pristis pectinata* Latham, 1794.

◆ *Pristis pristis* (Linnaeus, 1758).

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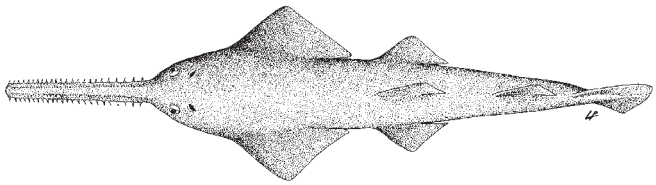
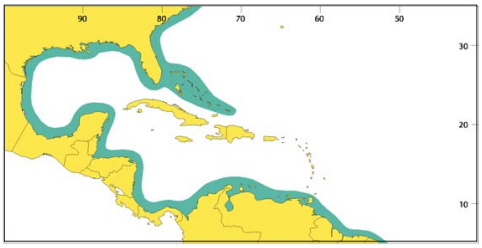
Pristis pectinata Latham, 1794 RPP

En - Smalltooth sawfish; **Fr** - Poisson-scie tident; **Sp** - Pejepeine.

Maximum size 550 cm total length; females mature at 460 cm total length; neonates 60 cm total length at birth. Specimen measuring 4.8 m weighed around 315 kg. The rostral saw may measure up to 1/4 of total length. Benthic along coast, estuaries, lagoons, and fresh-water habitats. Recorded from North Carolina and Bermuda to southern Florida, throughout the Gulf of Mexico, Bahamas, Caribbean coast of Central America, and northern coast of South America to northern Argentina. Records from the eastern Pacific, eastern Atlantic, Mediterranean, Indian Ocean and Indo-west Pacific need verification, and are possibly not of this species. Dorsal surface greyish brown to blackish brown; ventral surface white to greyish white. Food consists of benthic invertebrates and ray-finned fishes. Litters range from 15 to 20. This species is becoming increasingly rare due to over-fishing, and there are no recent records from many localities where it was once more common, including the Gulf of Mexico. Currently protected in state waters of Florida and Louisiana.

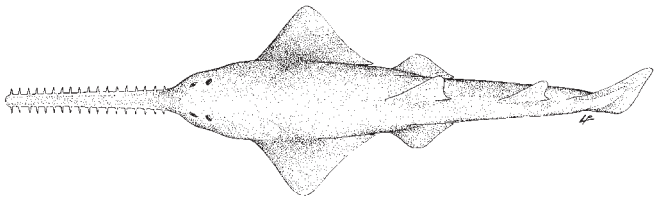


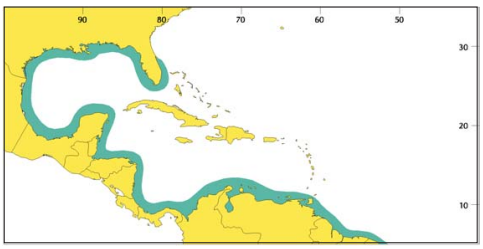


Pristis pristis (Linnaeus, 1758) RPR

En - Common sawfish (AFS: Largetooth sawfish); **Fr** - Poisson-scie commun; **Sp** - Pez sierra común.

Maximum size 610 cm total length; young are from 60 cm to 76 cm at birth (1 to 13 pups per litter, but commonly 7 to 9). Rostral saw may measure up to 1/5 of total length. A specimen may weigh 500 kg at around 500 cm in total length. Benthic in coastal areas, estuaries, lagoons, and fresh-water habitats. Recorded from southern Florida, throughout Gulf of Mexico, Caribbean coast of Central America, and northern coast of South America to Brazilian state of São Paulo. Also from tropical eastern Pacific and eastern Atlantic (frequently as *Pristis perotetti*). Food consists of benthic invertebrates and ray-finned fishes. Severely threatened by over-fishing and habitat degradation. Virtually extirpated from Lake Nicaragua, where once abundant (and has been protected for more than 10 years).



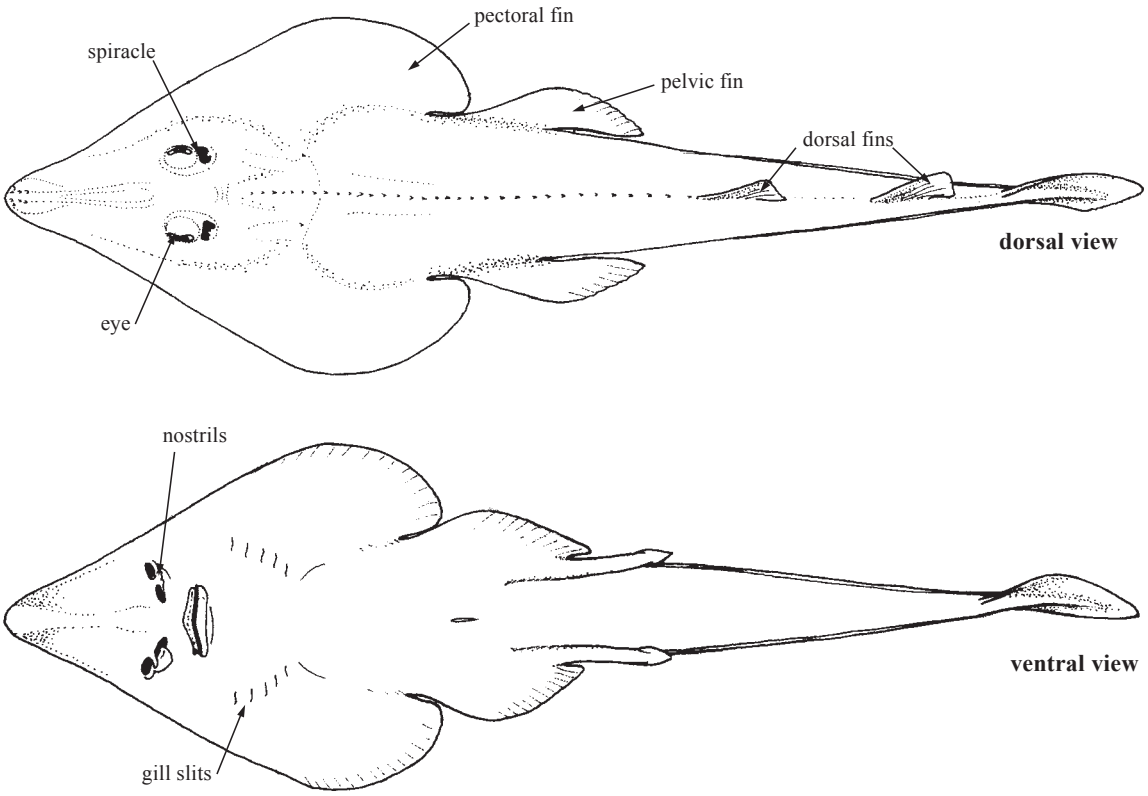


RHINOBATIDAE

Guitarfishes

by J.D. McEachran, Texas A & M University, USA
and M.R. de Carvalho, American Museum of Natural History, New York, USA

Diagnostic characters: Batoid fishes of moderately large size (total length up to 270 cm). Body moderately depressed anteriorly; head, trunk, and moderately enlarged pectoral fins forming wedge-shaped disc. Pectoral fins fused to sides of head and trunk from level of nostrils to mid-snout length to origin of pelvic fins. **Tail stout and shark-like, not demarcated from trunk or disc**, with a narrow longitudinal fold along each side. Snout moderately short and obtuse to long and acute. Eyes and spiracles on top of head; spiracles immediately behind eyes and **possessing pseudobranchial folds on anterior margin**. Nostrils are very large and separate from mouth in most species but partially connected to mouth in several species; anterior lobe of nostril narrow and extending to posterior margin of nostril in most species but is greatly expanded and extending to mouth, forming nasal curtain in species in which nostrils are partially connected to mouth. Mouth transverse and nearly straight to moderately arched; teeth numerous and small, in pavement-like bands along both jaws. **Pelvic fins with single moderately expanded lobe. Two dorsal fins, first located posterior to tips of pelvic fins, and a well-developed caudal fin**, lacking a well-defined lower lobe. Body and fins densely covered with denticles of various shapes except for interbranchial area in some species; snout, orbital region, nuchal-scapular area, and midline of back sometimes with tubercles. **Colour:** plain coloured with grey or brown, or with more or less distinct dark or light spots or bands; ventral side plain-coloured as above or pale; sometimes dark areas present on snout, head, or along fin margins.



Habitat, biology, and fisheries: Guitarfishes are sluggish bottom-living animals occurring over sandy or muddy bottoms in shallow coastal areas, including brackish water and sometimes even fresh water, in all tropical, subtropical, and warm-temperate latitudes. Their food consists of small ray-fined fishes and bottom-dwelling invertebrates. Species are viviparous without a placenta. There is no special fishery for guitarfishes in the area at the present time. They are, however, moderately abundant in some localities and caught very easily. They are often seen in local fish markets. The flesh, and especially the fins, are sold dried and salted, but are considered of mediocre quality.

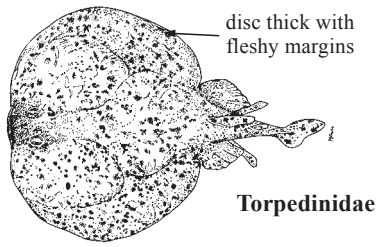
Similar families occurring in the area

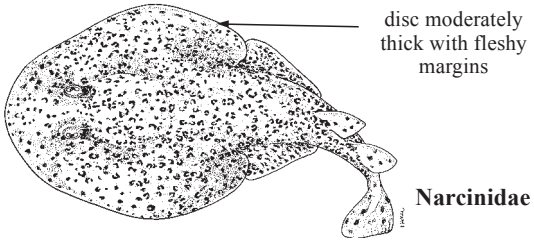
Torpedinidae: disc thick with fleshy margins; consistency of body soft and flabby; well-developed electric organs along sides of head within anterior part of disc; no scales on body.

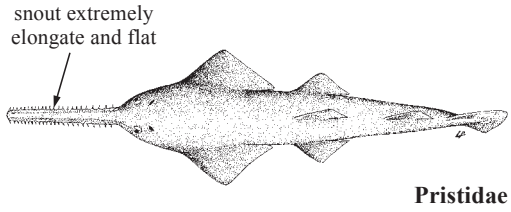
Narcinidae: disc moderately thick with fleshy margins; well-developed electric organs along sides of head within anterior part of disc; mouth surrounded by deep groove; no scales on body.

Pristidae: snout extremely prolonged as a flat, narrow, and firm blade bearing large, tooth-like structures along each edge of blade.

Other batoid fish families: tail sector not stout and shark-like but distinctly demarcated from trunk or disc; pectoral fins much more enlarged.







Key to the species of Rhinobatidae occurring in the area

1a. Rostral cartilage expanded near tip, spatulate-shaped; tip of snout with few enlarged, conical tubercles, except in small juveniles (Fig. 1a) . . . . . ***Rhinobatos lentiginosus***

1b. Rostral cartilage not expanded near tip, not spatulate-shaped; tip of snout with flat or roundish tubercles, or without tubercles (Fig. 1b) . . . . . → ***2***

2a. Nostril length equal to or slightly greater than distance between nostrils (100 to 120%), and slightly greater than 50% of mouth width; dorsal coloration usually with whitish spots about equal to eye diameter (Fig. 2a). . . . . ***Rhinobatos percellens***

2b. Nostril length nearly 1 1/2 times distance between nostrils (140%), and about 75% of mouth width; uniform olive grey to brown dorsal coloration, without spots (Fig. 2b) . . . . . ***Rhinobatos horkelii***

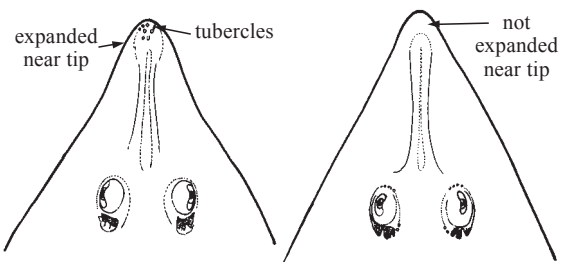


Fig. 1 dorsal view of head

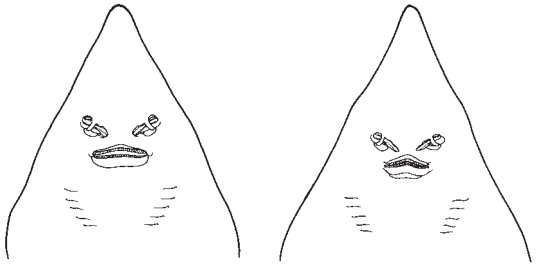


Fig. 2 ventral view of head

List of species occurring in the area

The symbol ◆ is given when species accounts are included.

◆ *Rhinobatos horkelii* Müller and Henle, 1841.
◆ *Rhinobatos lentiginosus* Garman, 1880.
◆ *Rhinobatos percellens* (Walbaum, 1792).

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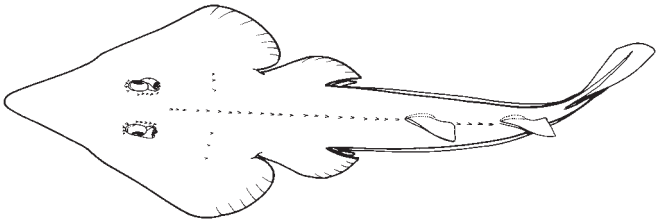
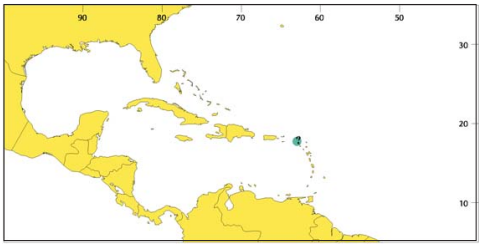
Rhinobatos horkelii Müller and Henle, 1841 RBK

En - Brazilian guitarfish.

Maximum size 120 cm total length. Benthic in coastal waters. One questionable record from West Indies (possibly St. Eustatius). More abundant farther south, off the coast of Brazil south to northern Argentina. Dorsal surface uniform olive grey or chocolate brown; ventral surface similar to dorsal surface or lighter shades of same colours. Recent studies, however, indicate drastic declines in landings off Brazil (by over 95% in a 10 year period). This species may be critically endangered.

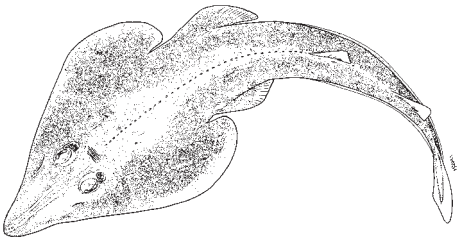


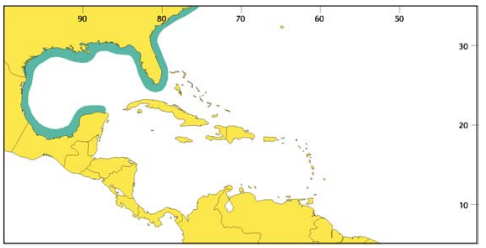


Rhinobatos lentiginosus Garman, 1880 RBT

En - Atlantic guitarfish.

Maximum size 76 cm total length. Benthic in coastal waters between the coastline and 18 m. Recorded from North Carolina to Yucatán, throughout Gulf of Mexico. Dorsal surface ash grey to chocolate brown, with numerous, small white spots over most of dorsal surface (some specimens from the northern Gulf of Mexico without spots); ventral surface pale yellowish. Enlarged tubercles dorsally on snout.





Rhinobatos percellens (Walbaum, 1792) GUD

En - Chola guitarfish; **Fr** - Poisson-guitare chola; **Sp** - Guitarra chola.

Maximum size about 100 cm total length. Benthic in coastal water to depths of 110 m. Recorded from Panama, Jamaica, Lesser Antilles, and northern coast of South America to northern Argentina. Dorsal surface olive grey to brown or reddish, with darker brown blotches occasionally present, and cream coloured spots about equal to eye diameter (spots larger and less numerous than in *Rhinobatos lentiginosus*); ventral surface pale yellowish. Generally lacking enlarged tubercles on the snout.