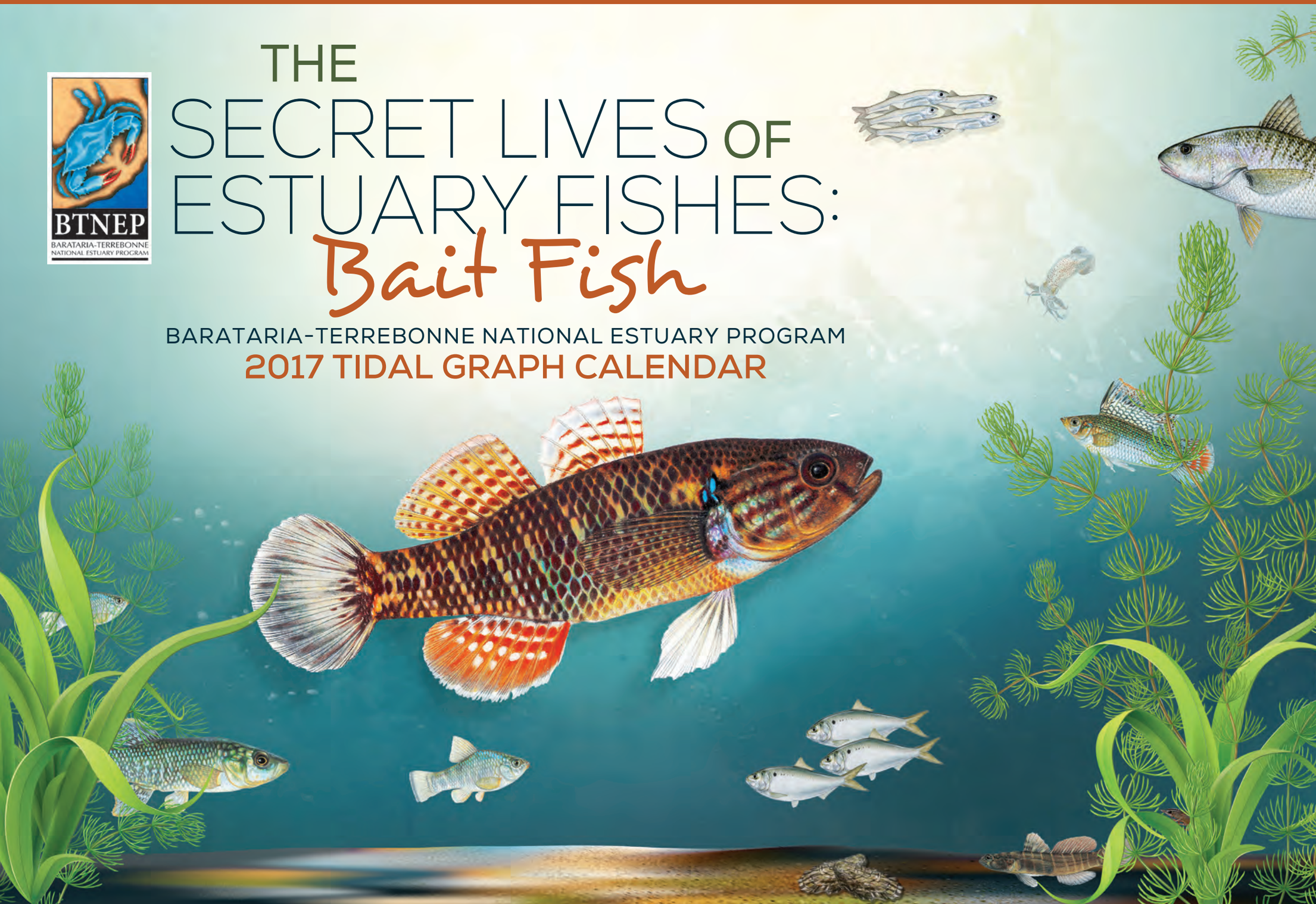
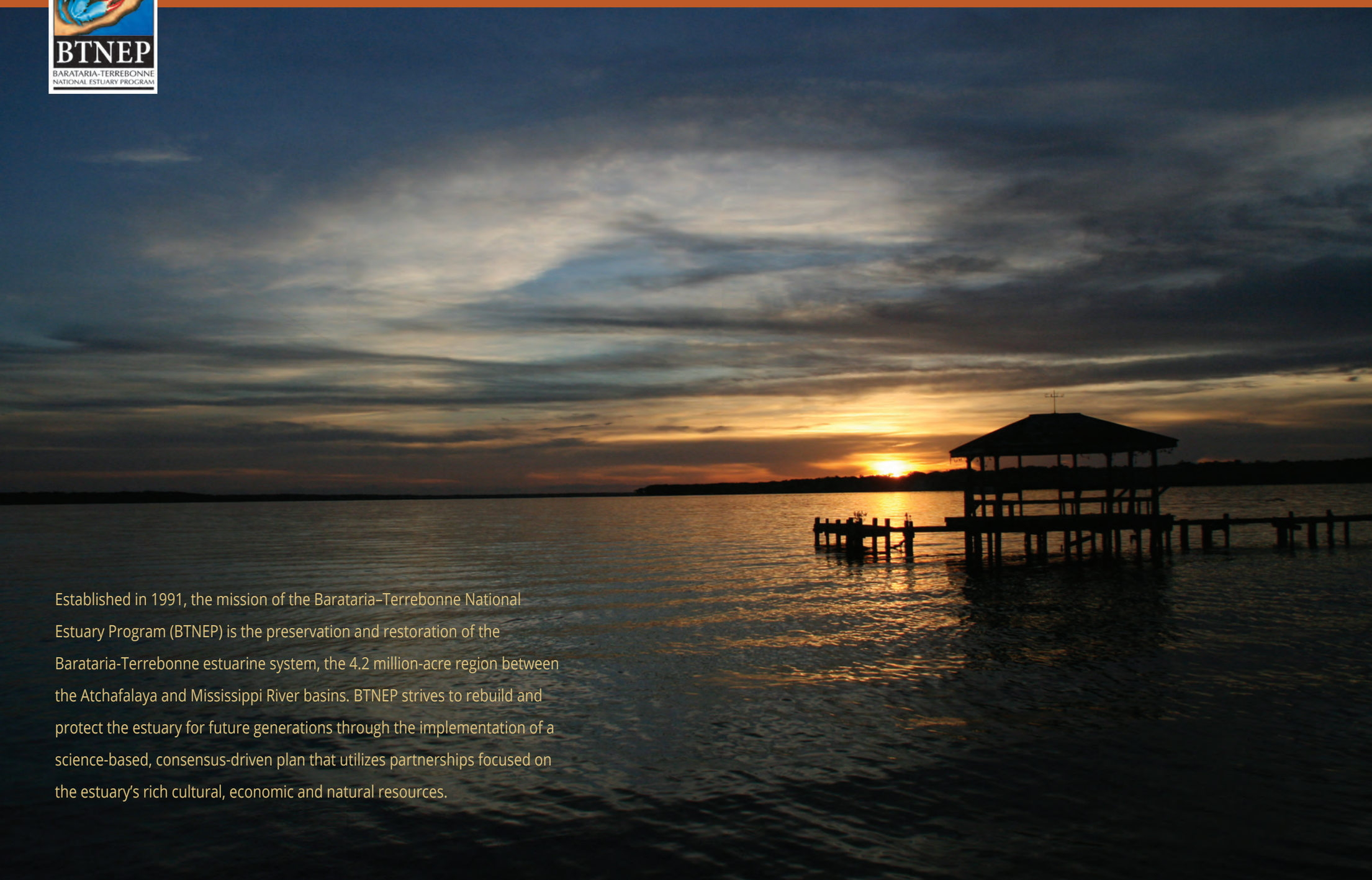
THE SECRET LIVES OF ESTUARY FISHES: Bait Fish

BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

2017 TIDAL GRAPH CALENDAR

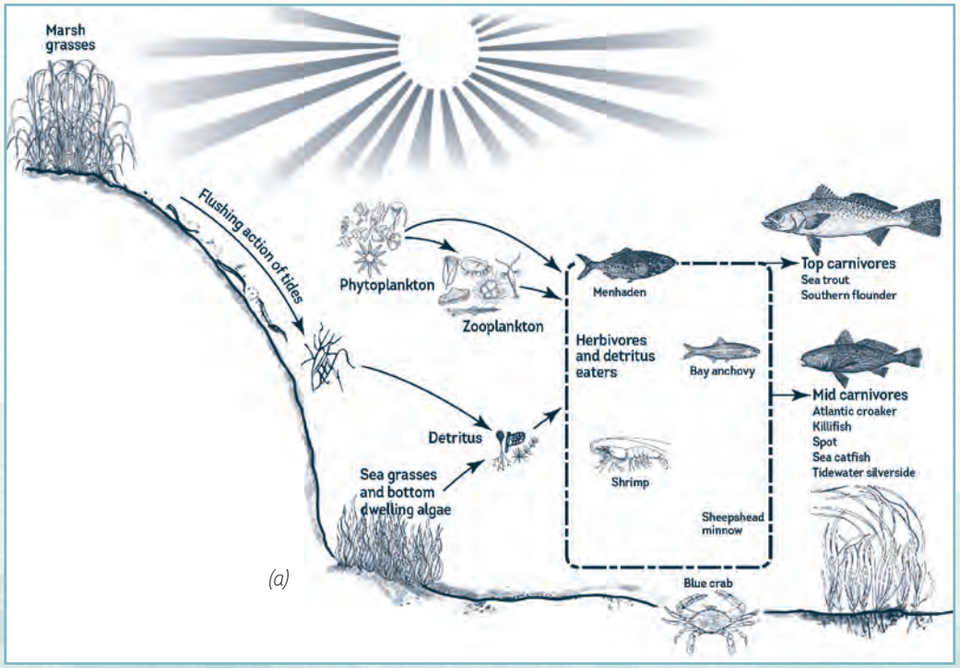


Barataria-Terrebonne
National Estuary Program

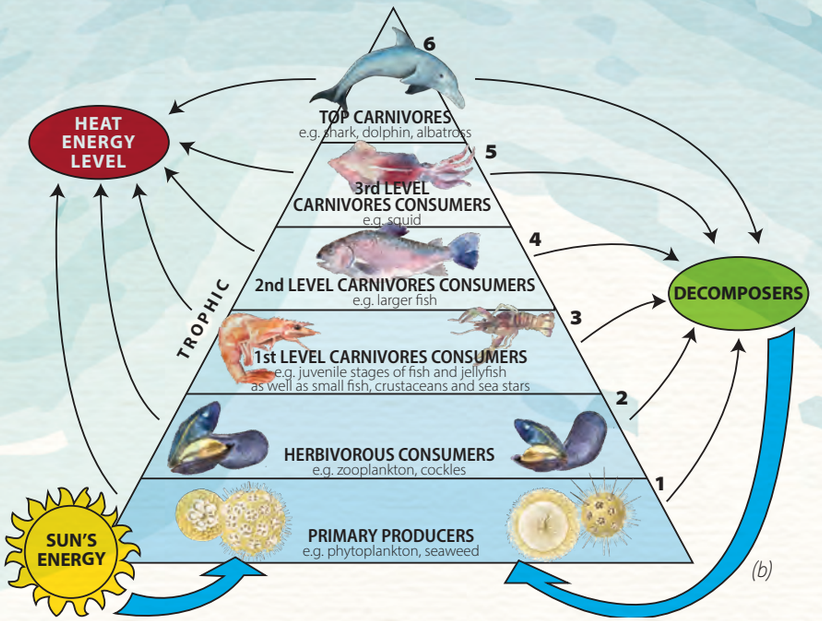


Established in 1991, the mission of the Barataria–Terrebonne National Estuary Program (BTNEP) is the preservation and restoration of the Barataria-Terrebonne estuarine system, the 4.2 million-acre region between the Atchafalaya and Mississippi River basins. BTNEP strives to rebuild and protect the estuary for future generations through the implementation of a science-based, consensus-driven plan that utilizes partnerships focused on the estuary's rich cultural, economic and natural resources.

Bait Fish,
FOOD CHAINS AND TROPHIC LEVELS



(a)



(b)

The trophic level of an organism is the position it occupies in a food chain. Trophic is a Greek word that means food or feeding. A food chain is the sequence of organisms that eat other organisms and are, in turn, eaten themselves. The number of steps an organism is from the start of the chain is a measure of its trophic level. For the purpose of this calendar and for simplicity, food chains can be organized into four trophic levels as follows: 1) primary producers such as sea grasses and algae; 2) plant, algae and detritus eaters, such as mullet, menhaden and grass shrimp; 3) lower predators, such as cocahoes and sheepshead minnows; and 4) top predators, such as redfish, spotted sea trout and bottlenose dolphins. The path along the chain can form either as a one-way flow as a food chain or a network of organisms called a "food web." Ecological communities with higher biodiversity form more complex trophic paths. Food chains can also represent the flow of energy carried by different species from a lower trophic level to a higher trophic level or from one location to another. For example, filter feeding striped mullet move from interior basin freshwater systems to lower basin saline marshes and the Gulf of Mexico. The bait fishes discussed in this calendar are very important to the function of the estuary ecosystem and food chain, as they transfer energy from plants and algae up to top predators and humans.

https://en.wikipedia.org/wiki/Trophic_level

(a) Marsh tropic food web, USGS, NWRC, FWS Biological Services, (b) Marine Tropic Pyramid, The University of Waikato, sciencelearn.org.nz

THE SECRET LIFE OF THE Sailfin Molly


(a)


(b)


(c)


(d)


(e)

Sailfin Molly Illustration: © Joseph R. Tomelleri, americanfishes.com

Scientific Name: Poecilia latipinna
Scientific Meaning: Wide-finned multi-colored fish

The sailfin molly, *Poecilia latipinna*, is a species of fish in the Poeciliidae or "live bearer" family. They range throughout fresh, brackish, and coastal waters from North Carolina to Mexico. The live-bearer family predates the split between Africa and South America 100 million years ago, and live-bearing subsequently evolved in South America. Mollies are able to tolerate a huge range of salinities (euryhaline species) from freshwater up to 87 ppt. They prefer brackish marsh-edge habitats where they also breed. They are able to survive in low oxygen waters by breathing the thin film of oxygen-rich surface waters with their upturned mouths. Sailfin mollies feed primarily upon plant materials, algae and aquatic invertebrates, such as mosquito larvae. Parasites of mollies include a trematode (*Saccocoelioides sogandaresi*) and a ciliated protozoan (*Ichthyophthirius multifiliis*), which causes freshwater "ick" disease. Male mollies are colorful and sport a greatly enlarged and conspicuous dorsal fin or "sailfin," which is a sexual feature used for attracting females. In contrast, females are generally larger and plainly colored. When mature at one year of age, males typically range in size between 0.5 – 2.5 inches, while females range in size between 0.5 - 3 inches. Males use a modified anal fin called a "gonopodium" to achieve internal fertilization of females. Females can store sperm for a long time after fertilization and produce broods of 10-140 live young at multiple times during the year. Adult populations tend to be largely female, as males have higher predation rates due to their showy appearance and time spent attracting females. Sailfin mollies are at the lower end of the food chain. Therefore, they are prey for various animals, including aquatic insects (giant water bug), fishes (largemouth bass), reptiles (American alligator), amphibians (bullfrog), birds (snowy egret) and mammals (raccoon).

https://en.wikipedia.org/wiki/Sailfin_molly

Photos: (a) Sailfin Molly, Creative Commons, www.ncfishes.com, Scott Smith. (b) IMG_3886 Sailfin Molly - Poecilia latipinna, Flickr.com, Creative Commons, Jon. D. Anderson. (c) Sailfin Molly Fish 03, Flickr.com, Creative Commons, K H. (d) Poecilia latipinna female, Creative Commons, www.ncfishes.com. (e) Poecilia latipinna male, Creative Commons, www.ncfishes.com

January 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 New Year's Day 10:32a -0.5 11:49p 0.7	**2** 11:01a -0.4	**3** 12:19a 0.6 11:17a -0.3	**4** 12:21a 0.4 11:09a -0.1 8:40p 0.3	**5** 10:04a 0.0 6:45p 0.3	**6** 5:52a -0.1 6:16p 0.5	**7** 5:08a -0.3 6:24p 0.7
8 5:38a -0.4 6:52p 0.8	**9** 6:20a -0.6 7:31p 0.9	**10** 7:07a -0.7 8:17p 1.0	**11** 7:56a -0.7 9:05p 1.0	**12** 8:44a -0.7 9:55p 0.9	**13** 9:29a -0.6 10:44p 0.8	**14** 10:08a -0.5 11:31p 0.7
15 10:37a -0.4	**16** Martin Luther King Day 12:13a 0.5 10:48a -0.2	**17** 12:45a 0.4 10:33a -0.1	**18** 12:13a 0.2 9:43a 0.0 5:58p 0.3	**19** 7:58a 0.0 5:37p 0.4	**20** Louisiana Arbor Day 4:51a -0.1 5:48p 0.5	**21** 4:53a -0.2 6:12p 0.6
22 5:22a -0.3 6:43p 0.6	**23** 5:55a -0.4 7:17p 0.7	**24** 6:33a -0.4 7:54p 0.7	**25** 7:12a -0.5 8:32p 0.8	**26** 7:51a -0.5 9:12p 0.8	**27** 8:30a -0.5 9:52p 0.8	**28** 9:08a -0.5 10:33p 0.7
29 9:42a -0.4 11:15p 0.6	**30** 10:08a -0.3 11:55p 0.5	**31** 10:19a -0.2				

Photo: Poecilia latapinna, Fishbase, Noel Burkhead

DECEMBER 2016

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

FEBRUARY 2017

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

High Tide:
January 11
9:05 pm • 1.0 ft.

Low Tide:
January 11
7:56 am • -0.7 ft.

BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

Barataria-Terrebonne National Estuary Program:
P.O. Box 2663, NSU Campus, N. Babington Hall,
Room 105, Thibodaux, LA 70310
1.800.259.0869 • www.btnep.org

Tides from Barataria Bay, Grand Isle, East Point,
29d 15'48" N 89d 57' 24" W
Tides & Currents by Jeppesen Marine
www.nobeltec.com
Tide adjustment table can be found on the back cover

THE SECRET LIFE OF THE Gulf Menhaden, Pogy

Scientific Name: *Brevoortia patronus*

Scientific Meaning: Brevoort's donor (refers to tongue parasite)

Gulf Menhaden Illustration: © Diane Rome Peebles

Gulf menhaden, *Brevoortia patronus*, is a small, marine, filter-feeding fish in the Clupeidae family (sardines) that is both economically and ecologically important. The Clupeidae family evolved about 55 million years ago during the Eocene Epoch. They range throughout the Gulf of Mexico. By weight they are the second largest commercial fishery in the U.S. and are used as feed for livestock and aquaculture. The body is silvery-green with a dark spot behind the gill plates, followed by a line of spots leading to a forked tail fin with a dark margin. Menhaden live 3 to 4 years. Both immature and adult fish use gill rakers to filter feed. Gill rakers are evolutionary modifications of gill arches into a sieve-like structure that the fish uses to capture tiny plankton for food. Plankton comes from the same root word as planets, meaning wanderer, because plankton cannot swim. Immature menhaden feed on phytoplankton, while adults feed on larger zooplankton. Menhaden reach maturity at about 4 inches in length. They feed with their mouths open and their lower jaw thrust forward as they swing their bodies side to side. Menhaden are parasitized by the organism, *Olencira praegustator*, which is a type of isopod that attaches itself to the fish's tongue, causing the tongue to fall off. The parasite then functions as the tongue of the fish. Spawning migrations occur from mid-June through winter as they travel from estuaries into the open Gulf of Mexico, spawning from October through March. The floating fertilized eggs hatch and the larvae are carried into the estuaries on the incoming tides. Once in the estuaries, larvae collect in marsh grasses for protection. Becoming juveniles near 1 inch in length, they begin to travel in dense schools near the surface to filter feed on phytoplankton and the cycle begins again.

https://en.wikipedia.org/wiki/Menhaden

Photos: (a) Menhaden fishing, closing the net and trapping the fish, NOAA NMFS, Bob Williams, (b) Purse seine boats "pursing" nets to capture school of menhaden, NOAA NMFS, Bob Williams, (c) Menhaden fishing, beginning to set out the nets in purse seining operation, NOAA NMFS, Robert K Brigham, (d) Menhaden Fishing Boat, NOAA Department of Commerce, Bob Williams, (e) Gulf Menhaden, B.patronus, Wikimedia Commons, (f) Olencira praegustator, parasite of fish tongue, A Monograph on the Isopods of North America Issue 54, Harriet Richardson


(a)


(b)


(c)

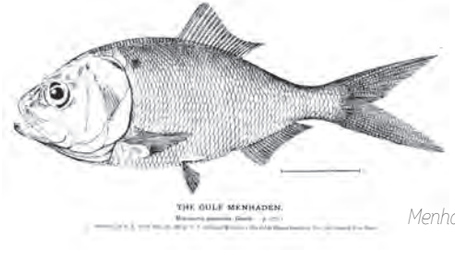

(d)


(e)


(f)

February 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
6 n 6	6 n 6	6 n 6	6 n 6	6 n 6	6 n 6	6 n 6
			1 12:29a 0.3 9:56a 0.0 6:00p 0.2	**2** 8:04a 0.1 4:41p 0.4 World Wetlands Day	**3** 2:46a -0.1 4:35p 0.5	**4** 3:25a -0.2 4:59p 0.7
5 4:14a -0.4 5:38p 0.8	**6** 5:06a -0.5 6:24p 0.9	**7** 5:59a -0.5 7:15p 1.0	**8** 6:52a -0.5 8:08p 1.0	**9** 7:44a -0.5 9:02p 0.9	**10** 8:32a -0.4 9:56p 0.8	**11** 9:14a -0.3 10:50p 0.7
12 9:45a -0.2 11:44p 0.6	**13** 9:54a 0.0	**14** 12:44a 0.4 9:28a 0.1 4:33p 0.2 8:09p 0.2 Valentine's Day	**15** 2:10a 0.3 8:18a 0.2 3:23p 0.4 11:54p 0.1	**16** 3:30p 0.5	**17** 1:29a 0.0 3:56p 0.6	**18** 2:29a 0.0 4:31p 0.7
19 3:21a -0.1 5:10p 0.7	**20** 4:11a -0.2 5:53p 0.8 President's Day	**21** 5:01a -0.2 6:37p 0.8	**22** 5:50a -0.2 7:23p 0.9	**23** 6:38a -0.2 8:11p 0.9	**24** 7:24a -0.2 8:59p 0.9	**25** 8:07a -0.2 9:51p 0.8
26 8:46a -0.1 10:49p 0.7	**27** 9:15a 0.1	**28** 12:03a 0.6 9:18a 0.2 4:23p 0.3 6:10p 0.3 Mardi Gras				



Menhaden line drawing, NOAA NMFS Photo Library

JANUARY

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

MARCH

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

High Tide:
February 7
7:15 pm • 1.0 ft.

Low Tide:
February 8
6:52 am • -0.5 ft.

BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

Barataria-Terrebonne National Estuary Program:
P.O. Box 2663, NSU Campus, N. Babington Hall,
Room 105, Thibodaux, LA 70310
1.800.259.0869 • www.btnep.org

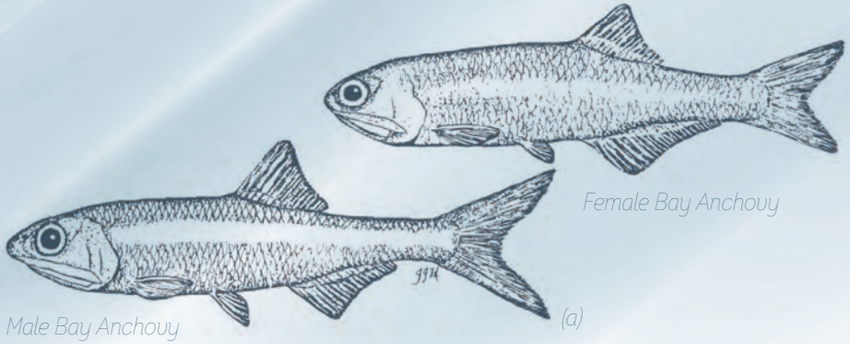
Tides from Barataria Bay, Grand Isle, East Point,
29d 15'48" N 89d 57' 24" W
Tides & Currents by Jeppesen Marine
www.nobeltec.com

Tide adjustment table can be found on the back cover

THE SECRET LIFE OF THE Bay Anchovy

Scientific Name: *Anchoa mitchilli*

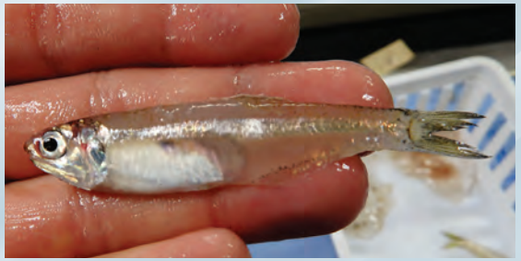
Scientific Meaning: Mitchel's Anchovy



Female Bay Anchovy

Male Bay Anchovy

(a)



Bay anchovy, Anchoa mitchilli, NOAA Teacher At Sea

The bay anchovy, *Anchoa mitchilli*, is a species of fish in the family Engraulidae (anchovies) that forms large schools and range along the eastern coast of North America and the Gulf of Mexico. It is a small, slender, filter-feeding fish with a greenish translucent body, silver stripe along the lateral line, long jaw and white belly. Adult males average 2.5 inches long and can reach 4.3 inches. Bay anchovy occurs in a wide range of water temperatures and salinities but do not tolerate low-oxygen waters. Virtually all of their time is spent filter-feeding in the upper water column on zooplankton, including copepods, mysids, and crab larvae. Bay anchovy are important prey for a variety of larger fish, including spotted seatrout (*Cynoscion nebulosus*) and birds such as royal terns (*Thalasseus maximus*) and Sandwich terns (*T. sandvicensis*). Bay anchovies become sexually mature at about 1.5 inches in length; spawn in the water column at various depths and in the Gulf of Mexico year round. A female can spawn 50 times in one season, producing over 1,000 eggs each time. Eggs hatch in 24 hours and larvae mature in about 45 days. This species is very important in the food web of estuarine ecosystems and is a major pathway for zooplankton biomass to be converted into the biomass of larger fish. Humans use bay anchovy as a bait fish and to make fish oil and anchovy fish paste.

https://en.wikipedia.org/wiki/Anchoa_mitchilli

(a) Male and female bay anchovy, USGS, NWRC, USFWS

March 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
6 n 6	6 n 6	6 n 6	6 n 6	6 n 6	6 n 6	6 n 6

ft 1.2 1.0 0.8 0.6 0.4 0.2 -0.0 -0.2

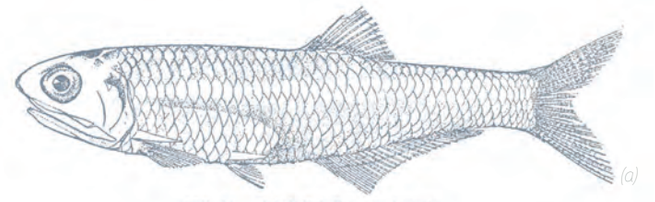


FIG. 46. — Adult fish 7 cm. in length.

(a)

1 — Ash Wednesday
2:16a 0.4 · 8:02a 0.4 · 1:54p 0.5 · 10:24p 0.2

2
1:52p 0.6

3
12:08a 0.1 · 2:23p 0.8

4
1:20a -0.1 · 3:09p 0.9

5
2:25a -0.2 · 4:01p 1.0

6
3:27a -0.2 · 4:57p 1.1

7
4:27a -0.2 · 5:56p 1.1

8
5:27a -0.2 · 6:56p 1.1

9
6:23a -0.1 · 7:58p 1.0

10
7:16a 0.0 · 9:01p 0.9

11
8:02a 0.1 · 10:11p 0.8

12 — Daylight Saving Time Begins
9:35a 0.3

13
12:35a 0.7 · 9:26a 0.4 · 1:25p 0.4 · 6:22p 0.4

14
8:03a 0.5 · 2:43a 0.6 · 12:52p 0.5 · 9:13p 0.3

15
1:16p 0.7 · 10:54p 0.3

16
1:51p 0.8

17 — St. Patrick's Day
12:06a 0.2 · 2:33p 0.8

18
1:07a 0.1 · 3:17p 0.9

19
2:04a 0.1 · 4:05p 0.9

20 — First Day of Spring
3:00a 0.1 · 4:56p 1.0

21
3:57a 0.1 · 5:49p 1.0

22
4:53a 0.1 · 6:45p 1.0

23
5:48a 0.1 · 7:42p 1.0

24
6:41a 0.1 · 8:44p 1.0

25
7:30a 0.2 · 9:55p 0.9

26
8:14a 0.3 · 11:31p 0.8

27
8:41a 0.5 · 1:10p 0.5 · 5:35p 0.5

28
7:25a 0.6 · 2:22a 0.7 · 11:27a 0.7 · 8:35p 0.4

29
11:44a 0.8 · 10:15p 0.2

30
12:27p 1.0 · 11:31p 0.1

31
1:19p 1.1

FEBRUARY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

APRIL

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

High Tide:
March 31
1:19 pm • 1.1 ft

Low Tide:
March 7
4:27 am • -0.2 ft

BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

Barataria-Terrebonne National Estuary Program:
P.O. Box 2663, NSU Campus, N. Babington Hall,
Room 105, Thibodaux, LA 70310
1.800.259.0869 • www.btnep.org

Tides from Barataria Bay, Grand Isle, East Point,
29d 15'48" N 89d 57' 24" W
Tides & Currents by Jeppesen Marine
www.nobeltec.com

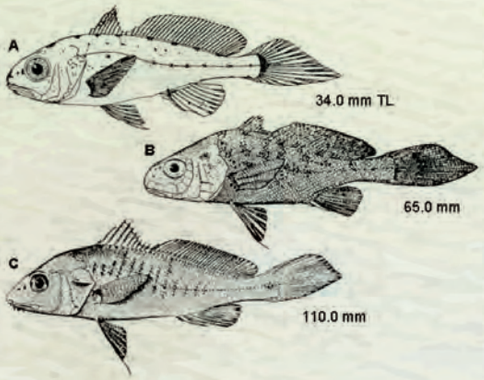
Tide adjustment table can be found on the back cover

(a) Kuntz_Albert_1915_ Bulletin of the United States Bureau of Fisheries_vol 33

THE SECRET LIFE OF THE Atlantic Croaker

Scientific Name: *Micropogonias undulatus*

Scientific Meaning: Wavy, Small Beard



Larvae of Atlantic Croaker, Fishbase.org, by Biological Services Program, U.S. Fish and Wildlife Services, G. D. Johnson

Atlantic Croaker Illustration: © Diane Rome Peebles

The Atlantic croaker, *Micropogonias undulatus*, is a fish in the Sciaenidae or drum family and is closely related to red drum (*Sciaenops ocellatus*) and spotted seatrout (*Cynoscion nebulosus*). It ranges from Massachusetts to the Gulf of Mexico. They are usually found in bays and estuaries over sandy or muddy bottoms where they use their chin barbels to locate food, such as polychaete worms, crustaceans and small fish. The common name "croaker" comes from the noise males make by vibrating strong muscles against their swim bladder, which acts as a resonating chamber, to attract females during mating. The Atlantic croaker is referred to as the loudest member of the drum family. Croakers turn a deep golden color during spawning season when they begin to leave bays and estuaries in the fall for deeper spawning habitat. Larvae move back into the freshwater of the estuary in the winter and early spring to grow and develop. They are fully grown when they reach between 1-1/2 feet long and 4-5 pounds, but on average are 1/2-2 pounds. They can reach as much as 8 pounds, 11 ounces and measure 27 inches long. Archaeologists find their remains in the shell middens of Native Americans confirming that they were used as food by prehistoric people. Croakers are an important species in the food chain along the Gulf Coast as they are prey species for larger predatory fish such as spotted seatrout and red drum.

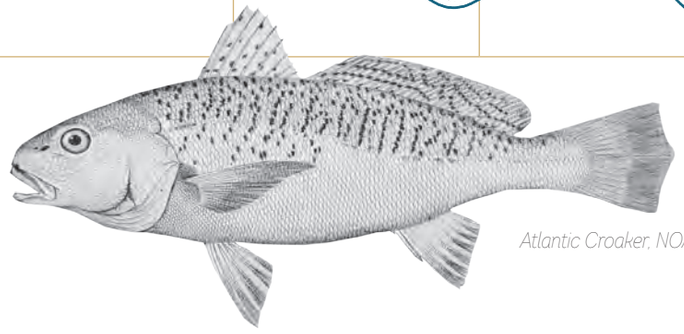
https://en.wikipedia.org/wiki/Atlantic_croaker

Micropogonias undulatus, Creative Commons, www.ncfishes.com

Atlantic Croaker, Creative Commons, manayunkia.wordpress.com

April 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1 12:38a 0.0, 2:14p 1.2
2 1:40a -0.1, 3:12p 1.3	**3** 2:41a -0.1, 4:13p 1.3	**4** 3:39a 0.0, 5:15p 1.2	**5** 4:35a 0.1, 6:20p 1.1	**6** 5:27a 0.2, 7:28p 1.0	**7** 6:10a 0.3, 8:45p 0.9	**8** 6:31a 0.5, 10:27p 0.8
9 6:06a 0.6, 10:53a 0.6, 5:36p 0.5 — Palm Sunday	**10** 2:10a 0.7, 10:33a 0.8, 3:30a 0.7, 7:43p 0.4	**11** 10:52a 0.9, 9:00p 0.3	**12** 11:23a 1.0, 9:57p 0.3	**13** 11:57a 1.0, 10:46p 0.2	**14** 12:34p 1.1, 11:33p 0.2 — Good Friday	**15** 1:15p 1.1
16 12:20a 0.1, 2:00p 1.1 — Easter Sunday	**17** 1:09a 0.1, 2:49p 1.1	**18** 2:00a 0.1, 3:41p 1.1	**19** 2:51a 0.1, 4:36p 1.1	**20** 3:40a 0.2, 5:36p 1.0	**21** 4:26a 0.3, 6:42p 0.9	**22** 5:02a 0.4, 8:14p 0.8 — Earth Day
23 5:17a 0.5, 12:02p 0.6, 4:39p 0.6, 11:28p 0.7	**24** 4:00a 0.7, 10:13a 0.8, 7:06p 0.4	**25** 9:57a 0.9, 8:24p 0.3	**26** 10:21a 1.1, 9:28p 0.1	**27** 11:02a 1.2, 10:26p 0.0	**28** 11:50a 1.3, 11:23p -0.1 — National Arbor Day	**29** 12:43p 1.4
30 12:18a -0.1, 1:38p 1.4						



Atlantic Croaker, NOAA Historical Fish Library

MARCH

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

MAY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

High Tide:
April 29
12:43 pm • 1.4 ft.

Low Tide:
April 30
12:18 am • -0.1 ft.

BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

Barataria-Terrebonne National Estuary Program:
P.O. Box 2663, NSU Campus, N. Babington Hall,
Room 105, Thibodaux, LA 70310
1.800.259.0869 • www.btnep.org

Tides from Barataria Bay, Grand Isle, East Point,
29d 15'48" N 89d 57' 24" W
Tides & Currents by Jeppesen Marine
www.nobeltec.com

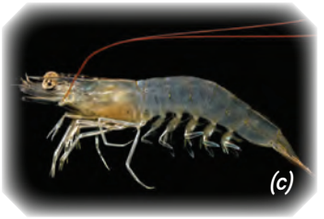
Tide adjustment table can be found on the back cover

THE SECRET LIFE OF THE Brown Shrimp

Scientific Name: *Farfantepenaeus aztecus*

Scientific Meaning: Farfante – a shrimp scientist; penaeus – a river in northern Greece; aztecus – Northern Mexico

Brown Shrimp Illustration: Carol Mosley



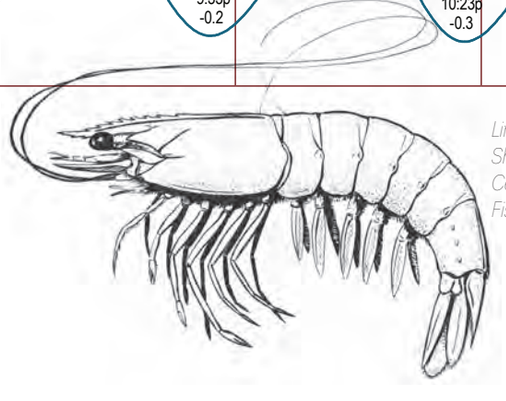
Brown shrimp, *Farfantepenaeus aztecus*, are crustaceans in the Penaeidae family (shrimp having rostrums or horns) that evolved during the Triassic Period around 250 million years ago. They range from Massachusetts to Mexico and are shrimp with relatively long grooves along the horn on their head. Brown shrimp make up most of the shrimp fishery in the Gulf of Mexico, constituting one of the most valuable fisheries in the U.S. Spawning occurs offshore from September through May. After spawning, eggs are released into the water and hatch within 24 hours into the first larval stage. Shrimp larvae feed on plankton and in one month go through three major larval stages before moving into estuaries during the late winter and early spring. Within estuaries, they transform into juveniles, living near marsh edges for protection and food. Salt marsh plants, or *Spartina alterniflora*, make up some of the most productive ecosystems on the planet. Similar to Iowa cornfields, salt marshes are monocultures, but produce more organic matter per acre than corn. This organic matter, or detritus, is eaten by brown shrimp creating an ecologically-important addition to food webs across the Gulf Coast, because they can convert organic matter into biomass at a growth rate of about 0.04 inch per day. In turn, brown shrimp become food for most predatory species, including red drum and spotted seatrout. By the early summer, the warm estuary waters have produced shrimp that have reached a size large enough to migrate out into the Gulf where they become sexually mature. High tidal ranges associated with new and full moons during the months of May, June and July beckon the shrimp to migrate to the Gulf and begin the cycle over again.

Photos: (a) Brown Shrimp, Texas Parks and Wildlife, (b) Shrimp in baskets, Kerry St Pé, (c) Farfantepenaeus aztecus, Creative Commons, ncfishes.com, Illustration: The Lifecycle of shrimp, Louisiana Sea Grant

The Lifecycle of Shrimp

May 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1 1:11a -0.1 2:34p 1.3	**2** 2:01a 0.0 3:30p 1.2	**3** 2:46a 0.1 4:26p 1.1	**4** 3:19a 0.2 5:23p 0.9	**5** 3:32a 0.4 6:24p 0.8 Cinco De Mayo	**6** 3:05a 0.5 10:24a 0.7 5:27p 0.6 8:44p 0.6
7 1:14a 0.6 9:33a 0.8 7:09p 0.4	**8** 9:35a 0.9 7:58p 0.3	**9** 9:54a 1.0 8:40p 0.2	**10** 10:21a 1.1 9:18p 0.1	**11** 10:50a 1.1 9:55p 0.1	**12** 11:22a 1.2 10:32p 0.0	**13** 11:57a 1.2 11:11p 0.0
14 12:34p 1.2 11:53p 0.0 Mother's Day	**15** 1:13p 1.2	**16** 12:34a 0.0 1:56p 1.1	**17** 1:16a 0.0 2:39p 1.1	**18** 1:55a 0.1 3:21p 1.0	**19** 2:26a 0.2 3:56p 0.8	**20** 2:41a 0.3 1:17p 0.7
21 2:14a 0.4 10:07a 0.7 7:10p 0.5	**22** 9:10a 0.8 7:16p 0.3	**23** 9:04a 1.0 7:56p 0.1	**24** 9:25a 1.2 8:44p -0.1	**25** 10:02a 1.3 9:33p -0.2	**26** 10:46a 1.4 10:23p -0.3	**27** 11:35a 1.4 11:13p -0.3
28 12:25p 1.4	**29** 12:02a -0.3 1:16p 1.3 Memorial Day	**30** 12:45a -0.2 2:05p 1.2	**31** 1:20a 0.0 2:49p 1.0			



Line Drawing of Brown Shrimp, NOAA Photo Library, Central Library Historical Fisheries Collection

APRIL

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

JUNE

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

High Tide:
May 27
11:35 am • 1.4 ft.

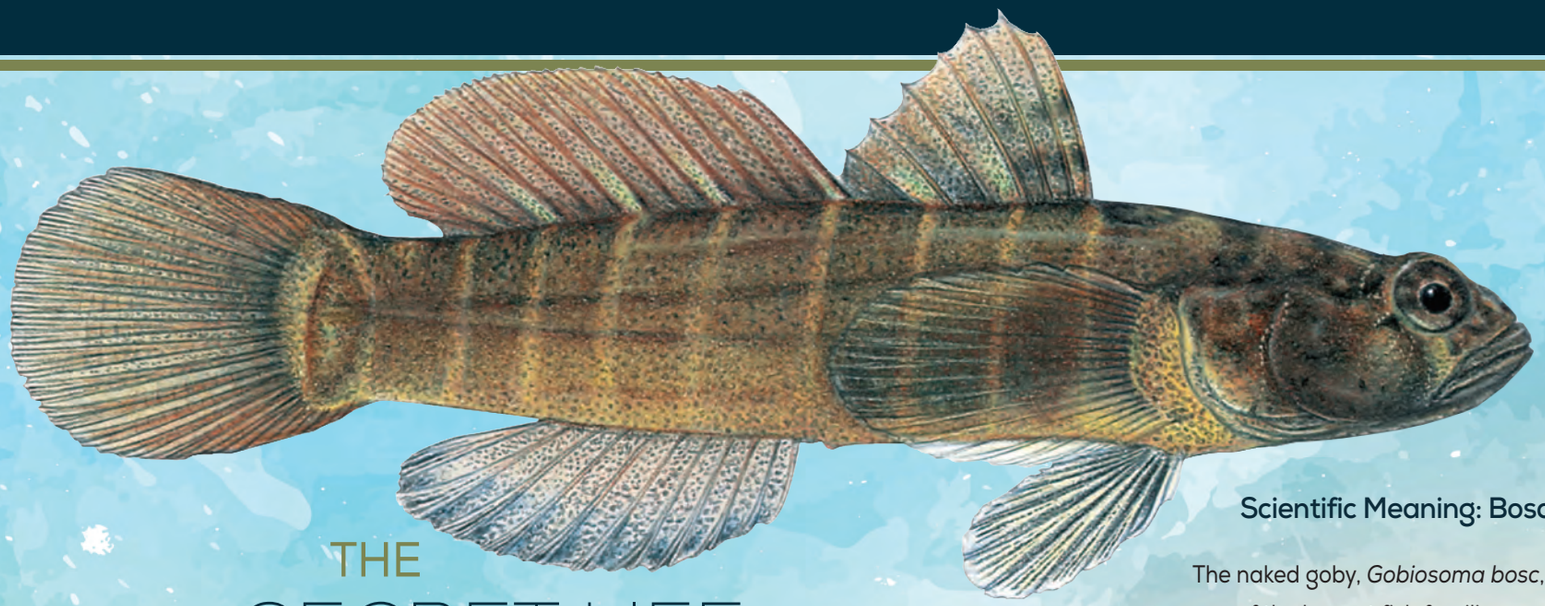
Low Tide:
May 27
11:13 pm • -0.3 ft.

BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

Barataria-Terrebonne National Estuary Program:
P.O. Box 2663, NSU Campus, N. Babington Hall, Room 105, Thibodaux, LA 70310
1.800.259.0869 • www.btnep.org

Tides from Barataria Bay, Grand Isle, East Point, 29d 15'48" N 89d 57' 24" W
Tides & Currents by Jeppesen Marine
www.nobeltec.com

Tide adjustment table can be found on the back cover



THE SECRET LIFE OF THE Naked Goby

Naked Goby Illustration: © Joseph R. Tomelleri, americanfishes.com

Scientific Name: *Gobiosoma bosc*

Scientific Meaning: Bosc's (French Naturalist) goby-bodied fish

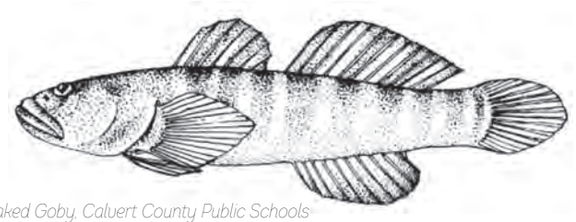
The naked goby, *Gobiosoma bosc*, is a fish in the Gobiidae or goby family. This is one of the largest fish families containing over 2,000 species, including some of the smallest fish in the world, species that can change sexes during their lifecycles and species that have symbiotic relationships with shrimp and larger fish. The naked goby has no scales and is usually less than 2 inches in length. Its pelvic fins are fused together by a membrane, forming a disk that functions like a sucker, used for attachment to oysters, coral reefs, hard bottoms and vegetation. Their color varies from yellow to brown with bars along the body. Naked gobies inhabit estuaries and coastal waters from Connecticut to Mexico and can live approximately four years. They live almost exclusively in brackish wetland vegetation, bottom burrows, oyster reefs or coral reefs and feed on invertebrates, worms and crustaceans. During reproduction, males become territorial and often use oyster shells as nests for females to lay eggs. They maintain the nest by digging with their mouth and fanning away sand and debris with their fins. The females lay their eggs and males guard the eggs until they hatch, protecting them from predators. The male also fans the eggs, thereby providing the eggs with oxygen and keeping the nest free from detritus. The eggs hatch after a few days and produce transparent larvae that are free swimming and school over the oyster reef. They develop coloration after dispersing and finding suitable habitat. Naked gobies are important prey fish for larger predators such as spotted seatrout and redfish.

https://en.wikipedia.org/wiki/Gobiosoma_bosc

Photos: (a) Gobiosoma bosc #7, Creative Commons, Brett Albanese, Georgia DNR-Wildlife Resources, Creative Commons, (b) Goby, Creative Commons, Klaus Stiefel, (c) Gobiosoma bosc, Creative Commons, ncfishes.com

June 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY



Naked Goby. Calvert County Public Schools

1
1:40a 0.1
3:19p 0.8

2
1:34a 0.3
1:13p 0.6

3
12:46a 0.4
9:07a 0.7
10:33p 0.4

4
8:37a 0.8
7:34p 0.3

5
8:43a 0.9
7:43p 0.1

6
9:03a 1.0
8:09p 0.0

7
9:30a 1.1
8:40p 0.0

8
10:00a 1.1
9:12p -0.1
World Oceans Day

9
10:31a 1.1
9:45p -0.1

10
11:03a 1.1
10:20p -0.2

11
11:37a 1.1
10:56p -0.2

12
12:13p 1.1
11:33p -0.1

13
12:48p 1.1

14
12:07a -0.1
1:23p 1.0

15
12:38a 0.0
1:52p 0.9

16
1:00a 0.1
1:55p 0.8

17
1:02a 0.2
10:55a 0.6

18
12:17a 0.3
8:52a 0.7
8:03p 0.3
Father's Day

19
8:10a 0.8
6:47p 0.1

20
8:09a 1.0
7:14p -0.1

21
8:32a 1.1
7:55p -0.2
First Day of Summer

22
9:08a 1.3
8:41p -0.4

23
9:51a 1.4
9:30p -0.4

24
10:39a 1.4
10:18p -0.4

25
11:28a 1.3
11:04p -0.3

26
12:17p 1.3
11:45p -0.2

27
1:04p 1.1

28
12:16a -0.1
1:45p 0.9

29
12:30a 0.1
2:09p 0.8

30
12:16a 0.2
11:23a 0.6
11:21p 0.3

MAY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

JULY

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

High Tide:
June 24
10:39 am • 1.4 ft.

Low Tide:
June 23
9:30 pm • -0.4 ft.

BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

Barataria-Terrebonne National Estuary Program:
P.O. Box 2663, NSU Campus, N. Babington Hall,
Room 105, Thibodaux, LA 70310
1.800.259.0869 • www.btnep.org

Tides from Barataria Bay, Grand Isle, East Point,
29d 15'48" N 89d 57' 24" W
Tides & Currents by Jeppesen Marine
www.nobeltec.com

Tide adjustment table can be found on the back cover

THE SECRET LIFE OF THE Grass Shrimp, Ghost Shrimp

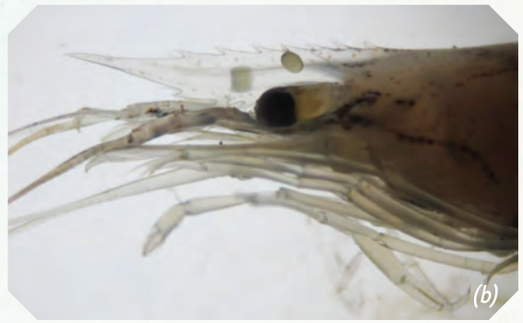
Scientific Name: *Paleomonetes pugio*

Scientific Meaning: Dagger-bladed old individual

Shrimp Illustration: Natalia Hubbert

Grass shrimp or ghost shrimp, *Palaemonetes pugio*, are small, transparent shrimp with a well-developed rostrum or horn, a smooth shell and abdomen, two pairs of claw-bearing walking legs and well-developed compound eyes. They inhabit estuaries from Maine to Texas. Males reach a length of one inch. Females reach a maximum of two inches. Copulation and mating occurs within 7 hours of a female molting when the male transfers a sperm packet onto the external part of the female genital aperture. The female's eggs are fertilized when they are extruded externally. The female holds the eggs until the larvae are ready to hatch in about 15-20 days. The life span of grass shrimp is 6 to 13 months. Their habitats include small tidal creeks, tidal passes, and ditches with low salinity. They move to deeper waters during cold weather. Grass shrimp live in seagrass beds and oyster reefs, which helps to hide them from predators. They feed on decomposed plant matter and microalgae growing on seagrass surfaces and are predators on zooplankton, small invertebrates (mosquito larvae), crustaceans (mysid shrimp) and worms. Grass shrimp are hosts for a number of parasites, including coccidians, microsporidians, trematodes, isopods and leeches. They are very important in the diets of a large number of estuarine species, including killifishes, bait fishes, commercial and recreational fish species. As a result, they play an important role in cycling energy through the estuarine food web. *P. pugio* is also very important for humans and ecosystems as a bioassay or test organism used in research about the toxicity of various chemical pollutants in the environment.

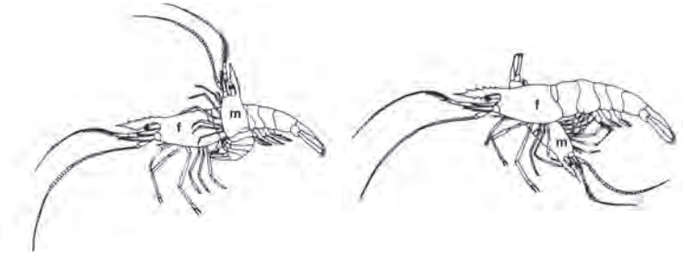
Encyclopedia of Life.org



Photos: (a) Grass Shrimp Palaemonetes pugio, Wikimedia Commons, Brian Gratwicke, (b) Palaemonetes pugio, daggerblade, Meredith McKoin

July 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1 7:54a 0.7, 9:20p 0.3
2 7:30a 0.8, 6:56p 0.2	**3** 7:41a 0.9, 6:56p 0.1	**4** 8:05a 1.0, 7:21p 0.0 — Independence Day	**5** 8:35a 1.1, 7:53p -0.1	**6** 9:07a 1.1, 8:25p -0.1	**7** 9:42a 1.1, 8:59p -0.1	**8** 10:16a 1.1, 9:33p -0.1
9 10:52a 1.1, 10:08p -0.1	**10** 11:27a 1.1, 10:42p -0.1	**11** 12:02p 1.1, 11:13p -0.1	**12** 12:37p 1.0, 11:40p 0.0	**13** 1:06p 0.9, 11:56p 0.1	**14** 1:14p 0.8, 11:49p 0.3	**15** 9:13a 0.6, 10:47p 0.4
16 7:20a 0.7, 6:06p 0.3	**17** 6:51a 0.9, 5:35p 0.2	**18** 6:59a 1.0, 6:09p 0.0	**19** 7:28a 1.2, 6:54p -0.2	**20** 8:08a 1.3, 7:43p -0.2	**21** 8:54a 1.4, 8:33p -0.3	**22** 9:44a 1.4, 9:23p -0.3
23 10:35a 1.4, 10:10p -0.2	**24** 11:27a 1.3, 10:52p -0.1	**25** 12:16p 1.2, 11:23p 0.1	**26** 1:04p 1.0, 11:36p 0.3	**27** 1:46p 0.8, 11:15p 0.4	**28** 2:04p 0.7, 10:08p 0.5	**29** 6:03a 0.7, 7:11p 0.5
30 5:55a 0.9, 4:47p 0.4	**31** 6:16a 1.0, 5:20p 0.3					



Grass Shrimp Mating.
NOAA, Louisiana Sea Grant, Bauer & Caskey

JUNE

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

AUGUST

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

High Tide:
July 22
9:44 am • 1.4 ft.

Low Tide:
July 21
8:33 pm • -0.3 ft.

BTNEP
BARATARIA-TERREBONNE
NATIONAL ESTUARY PROGRAM

Barataria-Terrebonne National Estuary Program:
P.O. Box 2663, NSU Campus, N. Babington Hall,
Room 105, Thibodaux, LA 70310
1.800.259.0869 • www.btnep.org

Tides from Barataria Bay, Grand Isle, East Point,
29d 15'48" N 89d 57' 24" W
Tides & Currents by Jeppesen Marine
www.nobeltec.com

Tide adjustment table can be found on the back cover

THE SECRET LIFE OF THE The Fat Sleeper, Storm Minnow

Scientific Name: *Dormitator maculatus*

Scientific Meaning: Spotted sleeper

Fat Sleeper Illustration: © Joseph R. Tomelleri, americanfishes.com

The fat sleeper, *Dormitator maculatus*, is a species of fish in the Eleotridae family, or "sleeper gobys," known for their goby-like behavior. They are small fish with scales that have two distinct dorsal fins, flat heads, rounded tails, dark brown bodies, red dorsal and anal fins, and a dark blue spot around their gill covers. They range from North Carolina to Brazil, living in muddy-bottomed freshwater ditches and estuarine areas with a salinity range of 0 to 21 ppt. They become sexually mature after one year with an average size of 1.8 inches for females and 2 inches for males. They use soft, muddy bottoms and seagrass beds as places to feed and retreat from predators. They are omnivorous, feeding mainly on plants, detritus attached to sediments and invertebrates. During reproduction, males undergo color changes and carry out a complex nuptial parade at the surface of the water body that is timed with fall frontal storm events, hence the name "storm minnows." After spawning, the adults create a nest and guard it until the eggs hatch in 11 to 16 hours. Once the eggs are hatched, the larvae move out to sea through passes, feed and grow there for a few months, then return to fresh and brackish areas in the spring to finish growing until they are mature. They provide an important ecosystem function called energy cycling: they eat detritus and invertebrates and then get eaten by larger predators such as spotted seatrout. They are popular as aquarium fish and their meat and eggs are used as food in some countries. Fat sleepers are also able to live out of water for long periods of time if they are kept moist making them ideal for recreational fish bait.

www.fishbase.org
Encyclopedia of Life

Photos: (a) Dormitator maculatus, Creative Commons, www.ncfishes.com. (b) Dormitator maculatus, Creative Commons, www.ncfishes.com, (c) Fat Sleeper, Fishbase, (d) Fat Sleeper, Encyclopedia of Life, University of Washington Libraries Digital Collections, (e) Fat Sleeper, Encyclopedia of Life, University of Washington Libraries Digital Collections

August 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1 6:47a 1.1 5:59p 0.2	**2** 7:24a 1.2 6:39p 0.1	**3** 8:03a 1.2 7:19p 0.1	**4** 8:43a 1.2 7:59p 0.1	**5** 9:22a 1.3 8:38p 0.1
6 10:03a 1.3 9:15p 0.1	**7** 10:42a 1.2 9:51p 0.1	**8** 11:23a 1.2 10:22p 0.2	**9** 12:06p 1.1 10:48p 0.3	**10** 12:52p 1.0 10:59p 0.4	**11** 1:46p 0.9 10:37p 0.6	**12** 6:04a 0.8 12:56p 0.7 4:17p 0.7 8:29p 0.7
13 4:58a 0.9 2:40p 0.5	**14** 4:57a 1.1 3:39p 0.3	**15** 5:24a 1.2 4:35p 0.2	**16** 6:05a 1.4 5:30p 0.1	**17** 6:54a 1.5 6:27p 0.1	**18** 7:46a 1.5 7:23p 0.0	**19** 8:42a 1.5 8:17p 0.1
20 9:39a 1.5 9:09p 0.2	**21** 10:36a 1.4 9:55p 0.3	**22** 11:36a 1.3 10:31p 0.5	**23** 12:41p 1.1 10:42p 0.6	**24** 2:03p 1.0 10:00p 0.8	**25** 3:28a 0.8 9:34a 0.8 4:37p 0.9 7:49p 0.8	**26** 3:09a 1.0 12:16p 0.7
27 3:35a 1.1 1:48p 0.6	**28** 4:13a 1.2 2:54p 0.5	**29** 4:57a 1.3 3:52p 0.5	**30** 5:43a 1.3 4:45p 0.4	**31** 6:32a 1.4 5:37p 0.4		

ft 1.6 1.2 0.8 0.4 -0.0

JULY

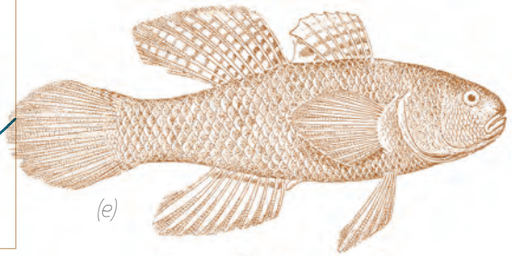
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

SEPTEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

High Tide:
August 19
8:42 am • 1.5 ft.

Low Tide:
August 18
7:23 pm • 0.0 ft.



BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

Barataria-Terrebonne National Estuary Program:
P.O. Box 2663, NSU Campus, N. Babington Hall,
Room 105, Thibodaux, LA 70310
1.800.259.0869 • www.btnep.org

Tides from Barataria Bay, Grand Isle, East Point,
29d 15'48" N 89d 57' 24" W
Tides & Currents by Jeppesen Marine
www.nobeltec.com

Tide adjustment table can be found on the back cover

THE SECRET LIFE OF THE Striped Mullet

Striped Mullet Illustration: © Diane Rome Peebles

Scientific Name: *Mugil cephalus*

Scientific Meaning: Mullet Head

The striped mullet, *Mugil cephalus*, is a fish in the Mugilidae family (mullets). The genus *Mugil* evolved during the Oligocene Epoch 34 million years ago. Mullet range throughout warm tropical to temperate fresh and saline waters. They have silvery-green and white torpedo-shaped bodies. Large eyes top off a wide flat head and a triangular mouth. They thrive in both fresh and salt water environments, reaching up to 47.2 inches, 17.6 lbs. and 16 years of age. It is thought that jumping is an evolutionary adaptation of mullet to escape from predators and to fill their pharyngobrachial organ or modified gill arches with air, which increases their survival in low oxygen water. Immature and adult fish feed on tiny vegetable matter and plankton. They suck up mud and sand with food, which is used to grind food in a gizzard-like organ before digestion. During the first year of life, mullet stay in saltier estuarine waters, growing about two times faster during warm months. Mullet mature when they are 8 to 10 inches in length within their third year of life, with females maturing at slightly larger sizes than males. Males and females migrate offshore to spawn during November and December in large schools. Females scatter their eggs on the bottom, which are fertilized and hatch within a few days. Adults, eggs and larvae become important prey for a large variety of predatory species and humans, because females are fat and full of eggs at this time. Humans use gill nets, trammel nets, and commercial seines to capture the fish. Spawning takes a heavy toll on individuals as they return to fresher areas with less fat, damaged fins and lesions, migrating between 20 and 100 miles during each spawning migration. Juveniles are carried by currents and tides into estuaries when they reach 6-12 inches to repeat the cycle again.

Photos: (a) Striped Mullet, NOAA Photo Library, Estuarine Research Reserve Collection. (b) Striped Mullet, Hawaii, NOAA NMFS Photo Library, Commander John Bortniak, NOAA Corps, (c) Striped Mullet, Mugil cephalus, Minorca, Creative Commons

September 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
6 n 6	6 n 6	6 n 6	6 n 6	6 n 6	6 n 6	6 n 6

Line Drawing, Striped Mullet, Mugil cephalus, Wikimedia Commons

ft 1.6 1.2 0.8 0.4 -0.0

1
7:20a 1.4
6:27p 0.4

2
8:08a 1.4
7:15p 0.4

3
8:56a 1.4
8:00p 0.5

4
9:46a 1.4
8:42p 0.5
Labor Day

5
10:40a 1.3
9:20p 0.6

6
11:43a 1.2
9:48p 0.7

7
1:12p 1.1
9:47p 0.9

8
2:57a 0.9
8:07a 0.9
4:10p 1.0
8:04p 1.0

9
1:48a 1.0
10:51a 0.7

10
2:01a 1.2
12:25p 0.6

11
2:38a 1.4
1:38p 0.5

12
3:27a 1.5
2:43p 0.4

13
4:21a 1.6
3:46p 0.3
BTNEP'S BIRTHDAY

14
5:19a 1.6
4:48p 0.3

15
6:19a 1.6
5:48p 0.4

16
7:21a 1.6
6:46p 0.4

17
8:26a 1.5
7:40p 0.5

18
9:35a 1.4
8:29p 0.7
World Water Monitoring Day

19
10:55a 1.3
9:03p 0.8

20
12:43p 1.1
11:40p 1.0
8:34p 1.0

21
7:08a 0.9
11:48p 1.1

22
9:18a 0.8
First Day of Autumn

23
12:26a 1.2
10:43a 0.7

24
1:09a 1.3
11:48a 0.6

25
1:56a 1.4
12:46p 0.6

26
2:44a 1.4
1:40p 0.6

27
3:36a 1.4
2:34p 0.6

28
4:28a 1.4
3:28p 0.6

29
5:23a 1.4
4:21p 0.6

30
6:19a 1.4
5:12p 0.6
National Estuaries Day

AUGUST

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

OCTOBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

High Tide:
September 15
6:19 am • 1.6 ft.

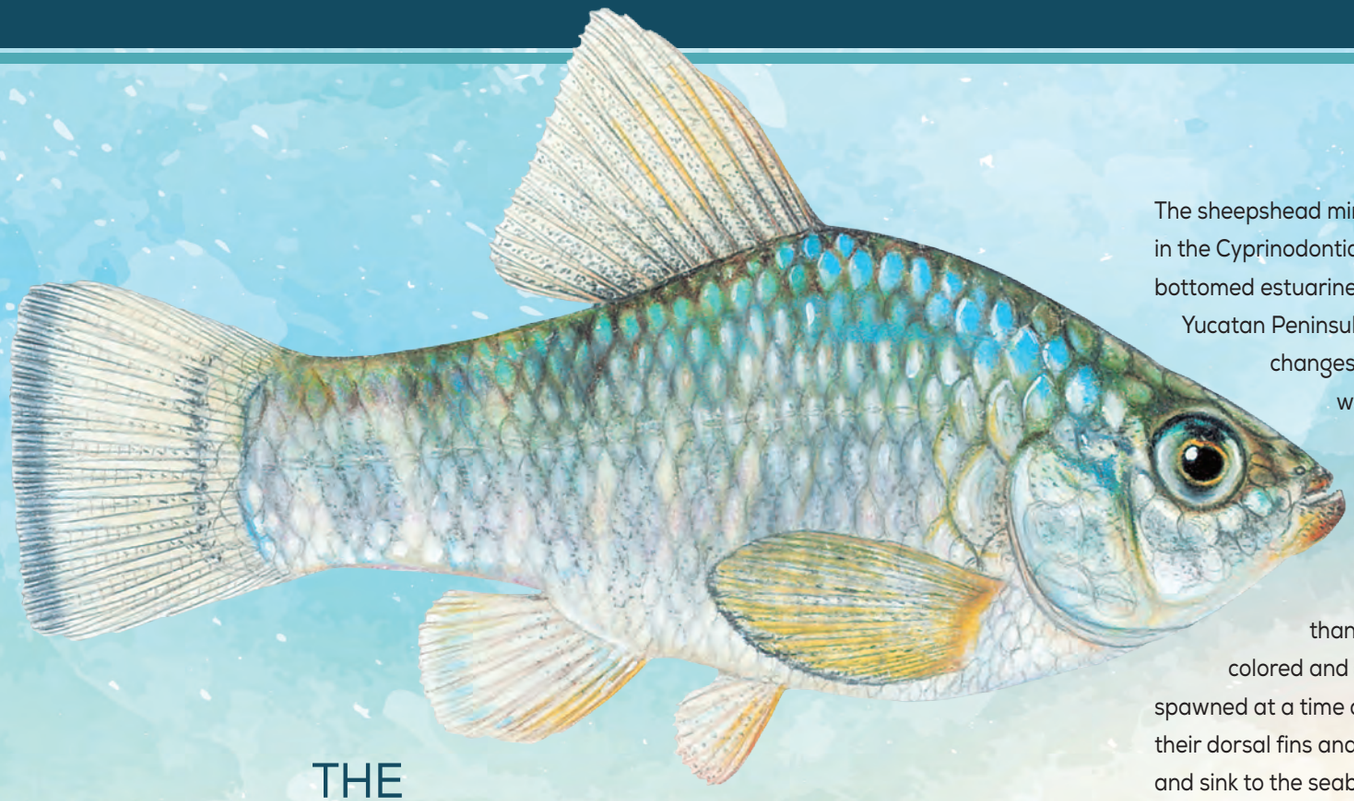
Low Tide:
September 14
4:48 pm • 0.3 ft.

BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

Barataria-Terrebonne National Estuary Program:
P.O. Box 2663, NSU Campus, N. Babington Hall,
Room 105, Thibodaux, LA 70310
1.800.259.0869 • www.btnep.org

Tides from Barataria Bay, Grand Isle, East Point,
29d 15'48" N 89d 57' 24" W
Tides & Currents by Jeppesen Marine
www.nobeltec.com

Tide adjustment table can be found on the back cover



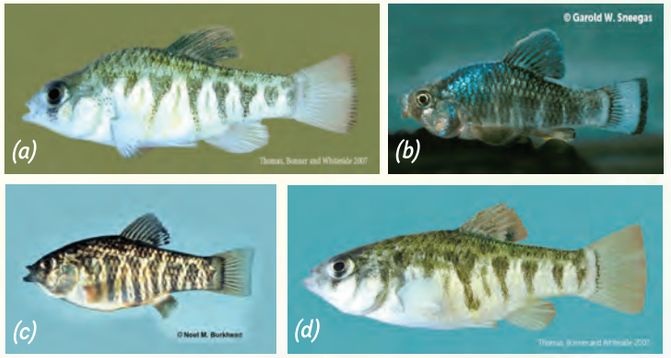
THE SECRET LIFE OF THE Sheepshead Minnow

Scientific Name: *Cyprinodon variegatus*

Scientific Meaning: Variously-colored, carp-toothed minnow

The sheepshead minnow, *Cyprinodon variegatus*, is a species of small ray-finned fish in the Cyprinodontidae or pupfish family. They inhabit low energy, sandy- or muddy-bottomed estuarine environments from Cape Cod through the Gulf of Mexico to the Yucatan Peninsula and the West Indies. They are very tolerant of environmental changes and can live in salinities from 0- 36 ppt or fresh to hypersaline water. During cold weather they bury themselves in mud and become dormant. They are a deep-bodied fish that reaches 3 inches in length with a small flat head with large, wedge-shaped, three-cusp teeth. They are olive green above and yellowish below. Juveniles and adult females have transverse dark vertical bars along their sides. The male is generally larger and more deep-bodied than the female. Between April and September males become brightly colored and compete fiercely to attract females in order to breed. A few eggs are spawned at a time and these are fertilized by the males which grasp the females with their dorsal fins and fertilize the eggs as they are extruded. The eggs clump together and sink to the seabed, connected by sticky threads. They hatch after five or six days. Sheepshead minnows are omnivorous. They often feed by "plowing" the sediment to pick up detritus, microalgae, crustaceans and small invertebrates. They will even attack, kill and eat fish larger than themselves. In turn, they become prey for larger predator fish. As a result, sheepshead minnows cycle nutrients and transfer energy up the food chain in estuaries from plants that harvest energy from sunlight all the way up to top predators like redfish and spotted seatrout.

https://en.wikipedia.org/wiki/Sheepshead_minnow
Fishes of Texas



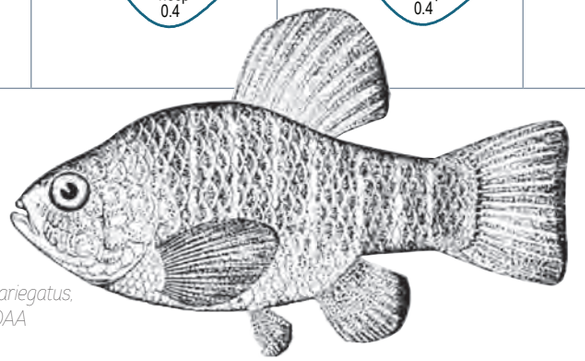
Photos: (a) Sheepshead minnow male, Fishes of Texas, Thomas Bonner Whiteside, (b) Sheepshead Minnow, Fishbase, Garold W. Sneegas, (c) Cyprinodon variegatus, USGS, Noel M. Burkhead, (d) Sheepshead minnow female, Fishes of Texas, Thomas Bonner Whiteside

Sheepshead Minnow Illustration: © Joseph R. Tomelleri, americanfishes.com

October 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 7:17a 1.4 6:01p 0.6	**2** 8:20a 1.3 6:45p 0.7	**3** 9:36a 1.2 7:21p 0.8	**4** 11:29a 1.1 7:25p 1.0 11:44p 1.0	**5** 6:30a 0.9 10:54p 1.1	**6** 8:34a 0.7 11:13p 1.3	**7** 9:56a 0.6 11:54p 1.4
8 11:04a 0.5	**9** 12:43a 1.5 12:07p 0.4 Columbus Day	**10** 1:37a 1.6 1:07p 0.3	**11** 2:34a 1.7 2:05p 0.3	**12** 3:33a 1.6 3:02p 0.3	**13** 4:34a 1.6 3:56p 0.4	**14** 5:37a 1.5 4:43p 0.5
15 6:44a 1.3 5:21p 0.6	**16** 8:01a 1.2 5:34p 0.8	**17** 10:00a 1.0 4:45p 0.9 10:20p 1.0	**18** 6:13a 0.8 10:06p 1.1	**19** 7:54a 0.7 10:27p 1.2	**20** 8:59a 0.6 10:59p 1.3	**21** 9:51a 0.5 11:35p 1.4
22 10:37a 0.4	**23** 12:14a 1.4 11:22a 0.4	**24** 12:56a 1.4 12:06p 0.4	**25** 1:39a 1.4 12:51p 0.4	**26** 2:25a 1.4 1:36p 0.4	**27** 3:14a 1.3 2:21p 0.4	**28** 4:03a 1.3 3:04p 0.4
29 4:56a 1.2 3:42p 0.5	**30** 5:55a 1.1 4:09p 0.6	**31** 7:23a 0.9 4:05p 0.7 11:03p 0.9 Halloween				

ft 1.6 1.2 0.8 0.4 -0.0



Cyprinodon variegatus variegatus, Wikimedia Commons, NOAA

SEPTEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

NOVEMBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

High Tide:
October 11
2:34 am • 1.7 ft.

Low Tide:
October 11
2:05 pm • 0.3 ft.

BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

Barataria-Terrebonne National Estuary Program:
P.O. Box 2663, NSU Campus, N. Babington Hall,
Room 105, Thibodaux, LA 70310
1.800.259.0869 • www.btnep.org

Tides from Barataria Bay, Grand Isle, East Point,
29d 15'48" N 89d 57' 24" W
Tides & Currents by Jeppesen Marine
www.nobeltec.com

Tide adjustment table can be found on the back cover

THE SECRET LIFE OF THE Atlantic Brief Squid

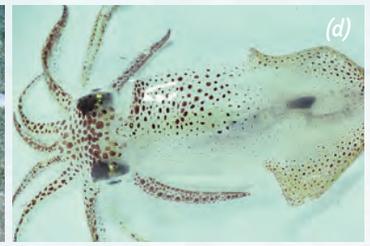
Scientific Name: *Lolliguncula brevis*

Scientific Meaning: Short, flexible-mantled squid

Squid Image: Lolliguncula brevis, Creative Commons, www.ncfishes.com

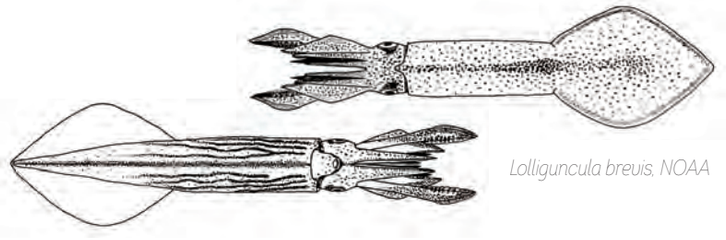
The Atlantic brief squid, *Lolliguncula brevis*, is a small squid species in the Loliginidae family, which ranges from Maryland to Brazil. They are brownish-yellow in color. The female reaches 4.3 inches and the male reaches 3.5 inches in size. They are intelligent and have three hearts that pump copper-rich hemocyanin-containing (for transporting oxygen) blood through their body. Squid can change color using chromatophores, which are pigment-containing and light-reflecting cells on the outer part of their body for camouflage. Squid can fill their mantle with water and jet it out through their siphon to move through the water to capture food or escape from predators. They can also shoot out a cloud of ink to disorient predators. The mantle contains a clear, feather-shaped chitinous structure called a pen, used for rigidity. The Atlantic brief squid is tolerant of low salinity levels and prefers warm, shallow waters near river mouths where it feeds on small fish and crustaceans. After the food is captured with their tentacles, it is transferred to its arms and then the mouth for consumption. They have large eyes, which are similar to vertebrate eyes, and a chitinous beak and a radula or "tongue" for tearing and eating food. They have five pairs of appendages: three pairs are arms with two rows of suckers; one pair is specialized arms called hectocotylus, which males use to transfer spermatophores (sperm packets) into a female's reproductive organ; and the last pair is very long, contractible tentacles with clubs at the ends, used for capturing food. After breeding, the fertilized eggs are deposited and attached to the sea floor in a gelatinous capsule by the female. Once hatched, the larval squid resembles fully-formed miniature versions of adult squid. Larvae and adults are preyed upon by sea mammals and predatory fish. They are also used extensively as bait for offshore recreational fishing.

https://en.wikipedia.org/wiki/Lolliguncula_brevis



Photos: (a) Lolliguncula brevis, Wikimedia Commons, (b) Squid, Creative Commons, Andrew David, NOAA/NMFS/SEFSC Panama City; Lance Horn, UNCW/NURC - Phantom II ROV operator (c) Lolliguncula brevis, Encyclopedia of Life Cephbase, John Forsythe, (d) Lolliguncula brevis, Encyclopedia of Life Cephbase, John Forsythe

November 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
 *Lolliguncula brevis*, NOAA			**1** 5:49a 0.8 12:08p 0.8 1:35p 0.8 9:53p 1.0	**2** 7:16a 0.6 9:41p 1.1	**3** 8:17a 0.4 10:03p 1.3	**4** 9:12a 0.2 10:40p 1.4
5 9:06a 0.1 10:26p 1.5 Daylight Saving Time Ends	**6** 10:00a 0.0 11:15p 1.5	**7** 10:52a -0.1	**8** 12:08a 1.5 11:44a 0.0	**9** 1:02a 1.5 12:33p 0.0	**10** 1:55a 1.4 1:15p 0.1	**11** 2:47a 1.2 1:46p 0.3 Veteran's Day
12 3:34a 1.0 1:55p 0.4	**13** 4:08a 0.8 9:05p 0.8 1:22p 0.5	**14** 8:14p 0.9 11:08a 0.6	**15** 8:15p 1.0 6:24a 0.4 America Recycles Day	**16** 6:58a 0.3 8:36p 1.1	**17** 7:35a 0.2 9:04p 1.2	**18** 8:12a 0.1 9:36p 1.2
19 8:49a 0.0 10:10p 1.2	**20** 9:25a 0.0 10:45p 1.2	**21** 10:02a 0.0 11:21p 1.2	**22** 10:39a 0.0 11:59p 1.1	**23** 11:17a 0.0 Thanksgiving Day	**24** 12:36a 1.1 11:54a 0.0	**25** 1:14a 1.0 12:27p 0.1
26 1:46a 0.9 12:52p 0.1	**27** 1:58a 0.8 1:01p 0.2 10:45p 0.6	**28** 12:28p 0.3 8:41p 0.6	**29** 6:55a 0.4 7:54p 0.7	**30** 6:10a 0.2 7:48p 0.9		

ft 1.6 1.2 0.8 0.4 -0.0

OCTOBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

DECEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

High Tide:
November 6
11:15 pm • 1.5 ft.

Low Tide:
November 7
10:52 am • -0.1 ft.

BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

Barataria-Terrebonne National Estuary Program:
P.O. Box 2663, NSU Campus, N. Babington Hall,
Room 105, Thibodaux, LA 70310
1.800.259.0869 • www.btnep.org

Tides from Barataria Bay, Grand Isle, East Point,
29d 15'48" N 89d 57' 24" W
Tides & Currents by Jeppesen Marine
www.nobeltec.com

Tide adjustment table can be found on the back cover

THE SECRET LIFE OF THE Gulf Killifish, Cocahoe, Mud Fish, Bull Minnow

Scientific Name: *Fundulus grandis*

Scientific Meaning: Large, bottom minnow

Gulf Killifish Illustration: © Joseph R. Tomelleri, americanfishes.com

The cocahoe, *Fundulus grandis*, is one of the largest members of the genus *Fundulus* in the Fundulidae or topminnow family. They have a blunt head and short snout with a lower jaw that slightly projects outward to form its mouth. Cocahoes can reach 7 inches in length, with females being larger than males. They are dull green above and yellow below with bars along their sides that grade into spots towards the tail. Cocahoes can survive in a variety of environments, including a high range of salinities, variable temperature and low dissolved oxygen levels. Adults are omnivorous, feeding on algae, vascular plants, grass shrimp, zooplankton, invertebrates and mosquito larvae. They prefer to live and breed in muddy, soft-bottomed, saline estuary habitats occupied by seagrasses, as the eggs will have low survival in freshwater. During breeding season from March to October, males tend to be more brightly colored to attract females. The male forces the female into a clump of grass or a nook in an oyster reef, clasping her with his fins and fertilizing her eggs as they are extruded and drop to the muddy bottom. Females can produce up to 12,000 eggs annually. Larvae mature within one year and their lifespan usually does not exceed one year. Cocahoes have a direct benefit to humans as an extensively-studied model fish species in research that examines the effect of toxic substances, such as oil spills on vertebrate physiology. Cocahoes are one of the largest prey species preyed upon by larger predatory fish, such as flounder, speckled trout, and red drum and is commonly sold as bait for these species.

https://en.wikipedia.org/wiki/Gulf_killifish
Fishbase.org
FishesofTexas.org

Photos: (a) Male Gulf Killifish, USGS, Noel Burkhead, (b) Killifish, Louisiana Department of Wildlife and Fisheries, (c) Fundulus grandis, Dr. David Schultz

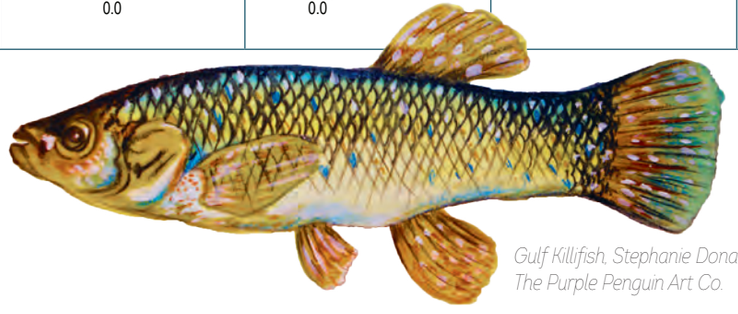

(a)


(b)


(c)

December 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1 6:43a 0.0 8:09p 1.0	**2** 7:27a -0.2 8:43p 1.2
3 8:15a -0.4 9:26p 1.3	**4** 9:04a -0.5 10:14p 1.3	**5** 9:53a -0.5 11:03p 1.3	**6** 10:41a -0.4 11:52p 1.2	**7** 11:24a -0.4	**8** 12:39a 1.0 11:59a -0.2	**9** 1:22a 0.9 12:19p -0.1
10 1:49a 0.7 12:11p 0.1 11:28p 0.5	**11** 11:19a 0.2 7:46p 0.5	**12** 9:01a 0.2 7:14p 0.6	**13** 6:25a 0.0 7:22p 0.7	**14** 6:33a -0.1 7:45p 0.8	**15** 7:00a -0.2 8:14p 0.9	**16** 7:32a -0.3 8:47p 0.9
17 8:06a -0.3 9:21p 0.9	**18** 8:39a -0.4 9:55p 0.9	**19** 9:13a -0.4 10:29p 0.9	**20** 9:46a -0.4 11:03p 0.8	**21** 10:19a -0.4 11:36p 0.8 First Day of Winter	**22** 10:50a -0.3	**23** 12:07a 0.7 11:17a -0.3
24 12:32a 0.6 11:36a -0.2	**25** 12:27a 0.5 11:36a -0.1 9:20p 0.4 Christmas Day	**26** 10:51a 0.0 7:29p 0.4	**27** 6:55a 0.0 6:50p 0.5	**28** 5:28a -0.2 6:49p 0.7	**29** 5:54a -0.4 7:12p 0.8	**30** 6:34a -0.5 7:48p 0.9
31 7:21a -0.6 8:31p 1.0 New Year's Eve						



Gulf Killifish, Stephanie Donaldson, The Purple Penguin Art Co.

NOVEMBER 2017

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

JANUARY 2018

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

High Tide:
December 4
10:14 pm • 1.3 ft.

Low Tide:
December 31
7:21 am • -0.6 ft.

BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

Barataria-Terrebonne National Estuary Program:
P.O. Box 2663, NSU Campus, N. Babington Hall,
Room 105, Thibodaux, LA 70310
1.800.259.0869 • www.btnep.org

Tides from Barataria Bay, Grand Isle, East Point,
29d 15'48" N 89d 57' 24" W
Tides & Currents by Jeppesen Marine
www.nobeltec.com
Tide adjustment table can be found on the back cover

TIDE CORRECTIONS

To find the best time to fish your favorite locations, find a location that is closest to your area and add or subtract the time from the corresponding daily prediction.

AREA	LOW (Hours:Minutes)	High (Hours:Minutes)
Shell Beach, Lake Borgne	+5:10	+4:01
Chandeleur Lighthouse	+0:38	+0:05
Venice, Grand Pass	+1:28	+1:06
Southwest Pass, Delta	-0:29	-1:29
Empire Jetty	-1:35	-2:03
Bastian Island	+0:22	-0:19
Quatre Bayou Pass	+0:27	+1:18
Independence Island	+2:09	+1:29
Caminada Pass	+1:44	+1:14
Timbalier Island	+0:33	-0:41
Cocodrie, Terrebonne Bay	+2:50	+1:10
Wine Island	+1:12	+0:08
Raccoon Point	-0:10	-1:03
Ship Shoal Light	-1:40	-2:54

Charts in this calendar are intended for use solely as a reference guide to Louisiana fishing. It is not intended for navigational use. BTNEP makes no warranty, expressed or implied, with respect to the accuracy or completeness of the information contained in these charts. BTNEP assumes no liability with respect to the use of any information contained in this document.

BTNEP THANKS...

BARATARIA-TERREBONNE ESTUARY FOUNDATION

BTNEP BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

2017 TIDAL GRAPH CALENDAR

Project Manager: Andrew Barron

Contributors: Matt Benoit, Susan Testroet-Bergeron and Seth Moncreif

Text provided by: Andrew Barron

Design and layout by: deGravelles & Associates

P.O. Box 2663, NSU • N. Babington Hall • Thibodaux, LA 70310
800.259.0869 • www.BTNEP.org

Cover photo collage created using the following images: fat sleeper, gulf killifish, naked goby, sheepshead minnow and sailfin molly: illustrations by © Joseph R. Tomelleri, americanfishes.com; Lolliguncula brevis, Creative Commons, www.ncfishes.com; and bay anchovy, Gulf menhaden, Atlantic croaker, and striped mullet illustrations by © Diane Rome Peebles.

Back cover photo: Rex Caffey, Louisiana Sea Grant

FISHING REGULATIONS

This is not a comprehensive or official copy of the laws in effect and should not be utilized as such. Size and creel limit regulations are presented for selected species only. These species as well as other species may be managed by seasons, quotas and permits. Different regulations for bass, catfish and crappie may apply within specific areas. Contact the Louisiana Department of Wildlife and Fisheries (LDWF) for specific information.

FRESHWATER SPECIES

SPECIES	SIZE LIMIT	DAILY LIMIT
Large mouth and Spotted Bass***	None	10
(Atchafalaya Basin and Lake Verret-Palourde Area)	None	7
Crappie (Sac-a-lait)	None	50
Striped or Hybrid Striped Bass	None: 2 over 30" (TL)	5 (Any combination)
White Bass	None	50
Yellow Bass	None	50
Channel Catfish	25 less than 11" (TL)	100 ┐ 100 total of
Blue Catfish	25 less than 12" (TL)	100 ├ these three
Flathead Catfish (Spotted, Yellow or Opelousas)	25 less than 14" (TL)	100 ┘ species
Freshwater Drum (Gaspergou)	12" Minimum (TL)	25

SALTWATER SPECIES

SPECIES	SIZE LIMIT	DAILY LIMIT
Speckled Trout*	12" Minimum (TL)	25
(Cameron & Calcasieu Parishes**)	12" Minimum (TL), two over 25"	15
Red Fish*	16" Minimum (TL), one over 27"	5
Black Drum	16" Minimum (TL), one over 27"	5
Southern Flounder	None	10
Greater Amberjack	State & Federal Reg. 30" Min. (FL)	1
Cobia (Ling or Lemon Fish)	State & Federal Reg. 33" Min. (FL)	2
King Mackerel	State & Federal Reg. 24" Min. (FL)	2
Spanish Mackerel	State & Federal Reg. 12" Min. (FL)	15
Red Snapper***	State & Federal Reg. 16" Min. (TL)	***

** For Red Drum (Redfish) and Spotted Seatrout (Speckled Trout): Recreational saltwater anglers may possess a two day bag limit on land; however, no person shall be in possession of over the daily bag limit in any one day or while fishing on the water, unless that recreational saltwater angler is aboard a trawler engaged in commercial fishing for a consecutive period of longer than 25 hours.*

*** (Cameron & Calcasieu Parishes) Daily take and possession limit of 15 Spotted Seatrout (Speckled Trout): no person shall possess, regardless of where taken, more than two spotted seatrout exceeding 25 total inches in length, which are considered part of the daily bag and possession limit in state and coastal territorial waters South of 1-10 at the Louisiana/Texas border to its junction with LA HWY 171, south to Hwy's 14 and 27 near Holmwood, south along Hwy. 27 to Hwy. 82 to the Gulf of Mexico.*

**** There are specific regulations for Bass, Red Snapper and Shark. Contact the LDWF for more information.*

FORK LENGTH (FL): Tip of snout to fork of tail. TOTAL Length (TL): Tip of snout to tip of tail.

This public document was published at a total cost of $15,523. 20,000 copies of this public document were published in this first printing at a cost of $15,523. The total cost of all printings of this document, including reprints, is $15,523. This document was published by OTS–State Printing, 1201 North Third Street, Room G-224, Baton Rouge, LA 70802, for the Barataria-Terrebonne National Estuary Program, Nicholls State University Campus, to provide the public with environmental information under the authority of La. R.S. 30:2011. This material was printed in accordance with standards for printing by state agencies established pursuant to La. R.S. 43:31. Printing of this material was purchased in accordance with the provisions of the Louisiana Revised Statutes.