

# An Annotated Checklist of the Fishes of the Galveston Bay System, Texas<sup>1</sup>

JACK C. PARKER

*Fishery Biologist (Research)*  
*Bureau of Commercial Fisheries Biological Laboratory*  
*Galveston, Texas*

## Abstract

This checklist includes fishes collected from Galveston Bay, Texas, in the course of regularly scheduled sampling operations by the Bureau of Commercial Fisheries during the years 1961-64. All other species known to occur in this bay system are also listed. The annotations, although incomplete in many instances, indicate the relative abundance of each species, as well as its distribution with respect to area, season, and salinity. Such information is based on observations by the author and those recorded in the literature. In all, 162 species represented by 122 genera and 66 families are listed.

## Introduction

This checklist is intended to expand present knowledge of the composition and distribution of the first fauna inhabiting Gulf coast estuaries and lagoons. Hoese (1958) noted the need for centralized information of this type for fishes in the Gulf of Mexico, and a similar need has become evident in the case of fish occurring in estuaries and lagoons of the Gulf coast. Much of the existing information on this subject is either recorded in mimeographed reports having limited distribution or is scattered throughout a variety of journals. To provide a more comprehensive listing, I have combined records from all other sources with information (1) furnished by personnel of the Texas Parks and Wildlife Department, and (2) collected over a 4-year period in the Galveston Bay system by personnel of the Bureau of Commercial Fisheries.

## Previous Literature

Jordan and Gilbert (1883) presented the first scientific listing of fishes from the Galveston area and included four species from the bay system proper. In 1894, Evermann and Kendall contributed additional species listings, as did Fowler (1945) and Baughman (1950a, 1950b). But it was not until Reid's studies (1955a, 1955b, 1956, 1957) in East Bay that an extensive survey of the fish fauna was presented. Rather elaborate studies have since been conducted by Chambers and Sparks (1959) in the upper (estuarine) portions of the Houston Ship Channel; by Hoese (1959a, 1959b, 1959c) in East and West Bays, the passes, and near the Galveston Jetties; by Renfro (1959a, 1959b) in Upper Galveston and Trinity Bays; by Arnold, Wheeler, and Baxter (1960) in East Lagoon; by Shidler (1960) throughout the bay system; by Pullen (1960, 1961, 1962) in Upper Galveston and Trinity Bays; and by Chin (1961) in Clear Lake.

<sup>1</sup> Contribution No. 198, Bureau of Commercial Fisheries, Galveston, Texas.

### Description of the Area

The Galveston Bay system is bounded from east to west on its seaward side by the Bolivar Peninsula, Galveston Island, and Follets Island, and is connected with the Gulf by Rollover Pass, Bolivar Roads, and San Luis Pass (Fig.1) Fresh water enters by way of two major river systems: the Trinity which empties into Trinity Bay and the San Jacinto which empties into the Houston Ship Channel and thence into Upper Gal-

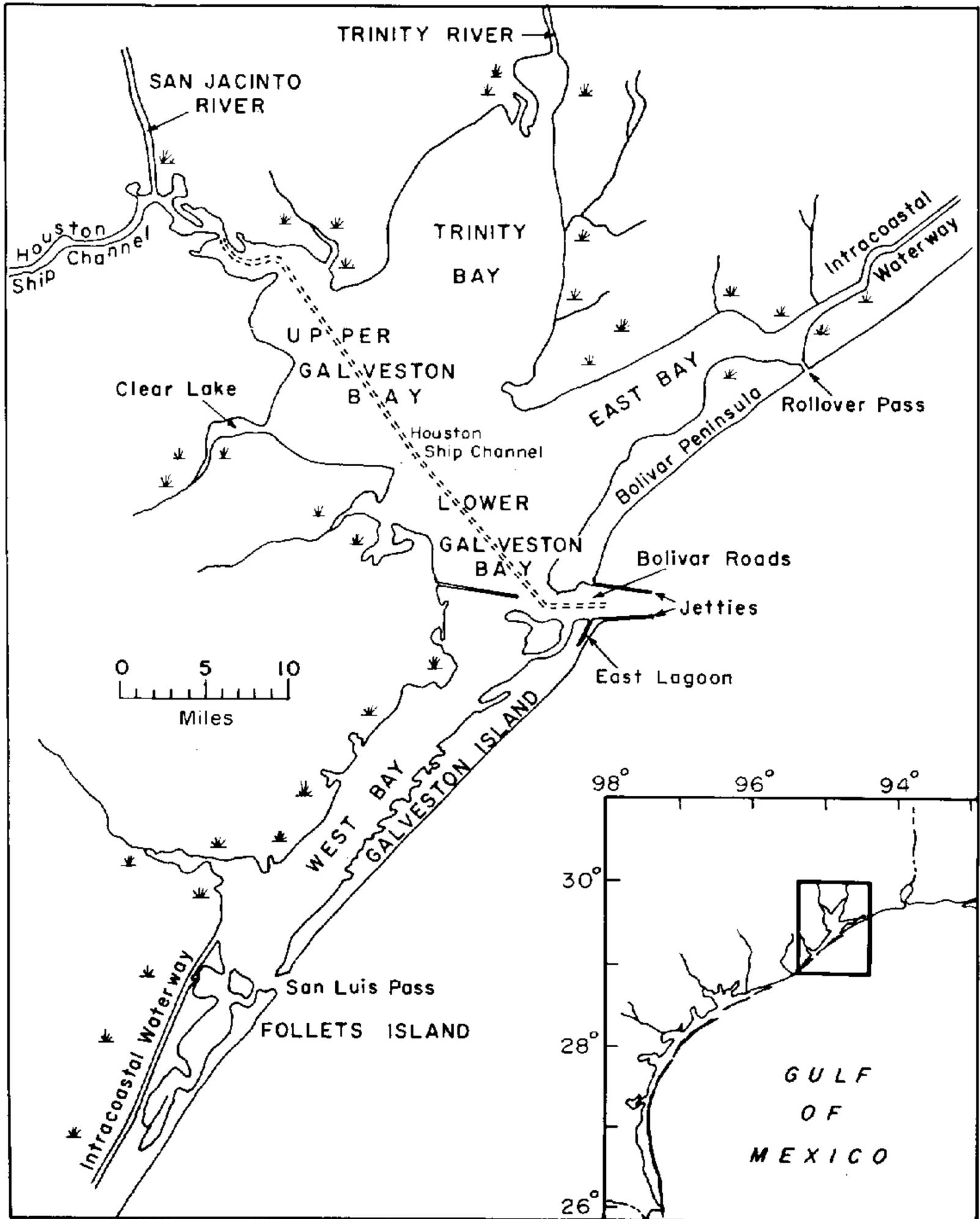


FIG. 1. Map of Galveston Bay.

veston Bay. Additional fresh water is contributed by numerous bayous and creeks as well as by the Intracoastal Waterway which transports runoff from peripheral marsh areas. Comprising an area of some 525 square miles, the system is composed of East Bay, West Bay, Upper and Lower Galveston Bays, and Trinity Bay, along with sundry secondary bays and lakes. The seaward limits of the system with respect to the species included in the following list were arbitrarily placed just inside the passes and jetties. The inland limits were set at the mouths of the San Jacinto and Trinity Rivers and at the east and west entrances of the Intracoastal Waterway. Observations in the near vicinity of the mouths of the numerous bayous and creeks are included.

### Presentation of Species

The annotations, although incomplete in many instances, are intended to describe the relative abundance of each species as well as its distribution with respect to area, season, and salinity. Those species collected and/or identified by Bureau of Commercial Fisheries personnel during the years 1961-64 are designated with an asterisk (\*). References following annotations include those studies which have contributed to the knowledge of the indicated species. It should be understood that many of the fishes inhabiting the inshore waters of the Gulf of Mexico and the fresh-water rivers and streams which empty into them are only occasional migrants into the bays. No attempt is made to include unreported but likely occurring forms or species whose location has been listed as "Galveston" with no specific reference to the bay system itself.

The fish species are listed according to the American Fisheries Society's "List of Common and Scientific Names of Fishes From the United States and Canada" (Special Publication No. 2, 2nd Ed., 1960). If more recent taxonomic revisions are available, however, the latest nomenclature is used. In all, 162 species represented by 122 genera and 66 families are included. Of these species, 115 were identified from material made available to the author. Information on the remaining 47 was obtained from published reports or from unpublished records of the Texas Parks and Wildlife Department.

Four arbitrary categories are used to indicate relative abundance: rare, uncommon, common, and abundant. A real distribution is described on the basis of seasons and salinity. Where appropriate, self-explanatory hydrographic connotations are also included.

The criteria which were used to describe the salinity characteristics of the Galveston Bay system are: extremely low (0-5 ppt), low (5-10 ppt), moderate (10-20 ppt), and high (20-35 ppt). Generally, under average river-flow conditions, extremely low salinity water is restricted to the marshes and bayous of the upper bays and to areas near the mouths of the rivers. Low salinity conditions are normally observed in the upper portions of Trinity, Upper Galveston, and East Bays; whereas, moderate salinity water is usually found in the lower regions of these bays as well as in the greater part of West Bay and the upper part of Lower Galveston Bay. The waters in and immediately adjacent to the jetties and passes normally fall into the high salinity range. A wedge of high salinity water consistently penetrates the bay at the bottom of the Houston Ship Channel, being observed on occasion some 20 nautical miles up the Channel from the Gulf.

## Annotated List

## CLASS CHONDRICHTHYES—Cartilaginous Fishes

## ORDER SQUALIFORMES (Selachii)

## Family Carcharhinidae—Requiem sharks

*Carcharhinus leucas* (Muller and Henle)—Bull shark

Rare, an occasional summer resident in high salinity waters.

Renfro (1959a); Pullen (1960, 1962).

*C. limbatus* (Muller and Henle)—Blacktip shark

Rare, an occasional summer resident in high salinity waters. Reid (1955a, 1955b, 1956, 1957).

*Scoliodon terraenovae* (Richardson)—Atlantic sharpnose shark

Rare, one specimen taken from West Bay in the summer of 1961 was identified by biologists of the Texas Game and Fish Commission (personal communication).

## Family Sphyrnidae—Hammerhead sharks

*Sphyrna lewini* (Griffith)—Scalloped hammerhead shark\*

Rare, a summer migrant usually present in high salinity waters.

*S. tiburo* (Linnaeus)—Bonnethead\*

Uncommon, a summer migrant usually present in high salinity waters.

## ORDER RAJIFORMES (BATOIDEI)

## Family Pristidae—Sawfishes

*Pristis pectinatus* Latham—Smalltooth sawfish\*

Rare, both young and adults have been caught in waters of high salinity.

## Family Rajidae—Skates

*Raja texana* Chandler—Roundell skate\*

Rare, one specimen was collected in East Bay in the summer of 1963.

## Family Dasyatidae—Stingrays

*Dasyatis americana* Hildebrand and Schroeder—Southern stingray\*

Uncommon in this bay system.

*D. sabina* (LeSueur)—Atlantic stingray\*

This is the common stingray of the area and is abundant during the spring and summer in both moderate and high salinity waters. Reid (1955a, 1955b, 1956, 1957); Hoese (1959a); Renfro (1959b); Shidler (1960); Pullen (1960, 1962).

*D. sayi* (LeSueur)—Bluntnose stingray \*

Rare, one specimen was collected in East Bay in the spring of 1963.

*Gymnura micrura* (Bloch and Schneider)—Smooth butterfly ray\*

Rare, apparently restricted to high salinity waters. Hoese (1959b).

## Family Myliobatidae—Eagle rays

*Aetobatus narinari* (Euphrasen)—Spotted eagle ray\*

Rare, collected from West Bay in August 1964 by a local fisherman.

*Rhinoptera bonasus* (Mitchill)—Cownose ray

Although uncommon during most of the year, there is evidence that large schools of the cownose ray spawn in the bay system in late summer. Pullen (1960, 1962).

## CLASS OSTEICHTHYES—Bony Fishes

## ORDER ACIPENSERIFORMES (CHONDROSTEI)

## Family Polyodontidae—Paddlefishes

*Polyodon spathula* (Walbaum)—Paddlefish\*

Rare, found near shore between the Galveston jetties in 1960 by a local resident. The fish, a fresh-water species, was alive but very sluggish when captured.

## ORDER SEMIONOTIFORMES (PROTOSPONDYLI AND GINGLYMODI)

## Family Lepisosteidae—Gars

*Lepisosteus oculatus* (Winchell)—Spotted gar\*

Common during all seasons, inhabiting extremely low to low salinity waters of the bayous and marshes. Reid (1955b, 1956, 1957) as *L. productus* Cope; Chambers and Sparks (1959) as *L. productus* (Cope); Chin (1961).

*L. osseus* (Linnaeus)—Longnose gar\*

Uncommon, occasionally entering the extremely low to low salinity waters of the bayous and marshes. Renfro (1959a, 1959b); Pullen (1960, 1962); Renfro (1963).

*L. platostomus* Rafinesque—Shortnose gar

Rare, predominantly a fresh-water species. Chambers and Sparks (1959).

*L. spatula* (Lacépède)—Alligator gar\*

Common from spring through fall in waters of low to moderate salinity. Baughman (1950a); Reid (1956, 1957); Chambers and Sparks (1959); Hoese (1959b); Renfro (1959a, 1959b); Arnold, Wheeler, and Baxter (1960); Pullen (1960, 1962); Chin (1961).

## ORDER CLUPEIFORMES (ISOSPONDYLI)

## Family Elopidae—Tarpons

*Elops saurus* Linnaeus—Ladyfish\*

Common during the summer in moderate to high salinity waters. Fowler (1945); Reid (1955a, 1955b, 1956, 1957); Renfro (1959a); Arnold, Wheeler, and Baxter (1960); Pullen (1960, 1962).

*Megalops atlantica* Valenciennes—Tarpon\*

Uncommon, during the summer schools of tarpon occasionally enter high salinity waters. Baughman (1950a) as *Tarpon atlanticus* Cuvier and Valenciennes.

## Family Albulidae—Bonefishes

*Albula vulpes* (Linnaeus)—Bonefish

Baughman (1950a) reports a record of this species from Galveston Bay, but as it is a leptocephalid, he presumes it might have been *Elops saurus* Linnaeus.

## Family Clupeidae—Herrings

*Alosa charysochloris* (Rafinesque)—Skipjack herring\*

Uncommon, this fresh-water species occasionally frequents extremely low to low salinity waters. Pullen (1962).

*Brevoortia gunteri* Hildebrand—Finescale menhaden\*

Uncommon, a marine species seldom found in the bays.

*B. patronus* Goode—Largescale menhaden\*

Abundant, found year round throughout the bay system. Fowler (1945) as

*B. tyrannus patronus* Goode; Reid (1955a, 1955b, 1956, 1957); Chambers and Sparks (1959); Hoese (1959b); Renfro (1959a, 1959b); Arnold, Wheeler and Baxter (1960); Pullen (1960, 1961, 1962); Shidler (1960); Chin (1961); Renfro (1963); Stevens (1963b).

*Dorosoma cepedianum* (LeSueur)—Gizzard shad\*

Common from spring through fall, residing predominantly in extremely low to low salinity waters. Jordan and Gilbert (1883); Reid (1955a, 1955b, 1956, 1957); Chambers and Sparks (1959); Renfro (1959a, 1959b); Arnold, Wheeler and Baxter (1960); Chin (1961); Pullen (1960, 1961, 1962).

*D. petenese* (Günther)—Threadfin shad\*

Common in the summer, fall, and winter in extremely low to moderate salinity waters. Fowler (1945) as *Signalosa patensis atchafalayae* Evermann and Kendall; Reid (1955a, 1955b, 1956, 1957) as *S. petenesis* Günther; Chambers and Sparks (1959); Renfro (1959a); Chin (1961); Pullen (1960, 1961, 1962).

*Harengula pensacolae* Goode and Bean—Scaled sardine\*

Common during late summer and early fall near the jetties and passes. Reid (1955b, 1956, 1957) as *H. p. pensacolae* Goode and Bean; Arnold, Wheeler and Baxton (1960).

*Opisthonema oglinum* (LeSueur)—Atlantic threadfin herring\*

Uncommon, occasionally present in waters of high salinity. Arnold, Wheeler and Baxter (1960).

*Sardinella anchovia* Valenciennes—Spanish sardine

Rare. Fowler (1945).

Family Engraulidae—Anchovies

*Anchoa hepsetus* (Linnaeus)—Striped anchovy\*

Uncommon, occasionally present in waters of high salinity. Reid (1955a, 1955b, 1956, 1957); Hoese (1959b); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Pullen (1960, 1962).

*A. mitchilli* (Valenciennes)—Bay anchovy\*

Abundant, found in large numbers during all seasons throughout the bay system. Jordan and Gilbert (1883) as *Stolephorus mitchilli* (Cuvier and Valenciennes); Fowler (1945) as *A. m. mitchilli* (Valenciennes); Reid (1955a, 1955b, 1956, 1957) as *A. m. diaphana* Hildebrand; Chambers and Sparks (1959) as *A. mitchilli* Hildebrand; Hoese (1959b); Renfro (1959a, 1959b); Arnold, Wheeler and Baxter (1960) as *A. m. diaphana* (Cuvier and Valenciennes); Pullen (1960) as *A. m. diaphana* Hildebrand; Chin (1961) as *A. m. diaphana* Hildebrand; Pullen (1961, 1962); Renfro (1963); Stevens (1963b).

ORDER MYCTOPHIFORMES (INIOMI)

Family Syndontidae—Lizardfishes

*Synodus foetens* (Linnaeus)—Inshore lizardfish\*

Common, found during spring, summer, and fall in high salinity waters. Fowler (1945); Reid (1955a, 1955b, 1956, 1957); Hoese (1959b); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1961, 1962).

## ORDER CYPRINIFORMES (OSTARIOPHYSI)

## Family Cyprinidae—Minnows and carps

*Campostoma anomalum* (Rafinesque)—Stoneroller

Rare. Fowler (1945).

*Cyprinus carpio* Linnaeus—Carp\*

Rare, found in extremely low salinity water near the mouths of the rivers and bayous. Chambers and Sparks (1959); Pullen (1960, 1962).

*Notropis* sp.—Shiner

Rare, predominantly a fresh-water species. Pullen (1962).

## Family Catostomidae—Suckers

*Carpiodes carpio* (Rafinesque)—River carpsucker\*

Rare, found in waters of low salinity near the mouths of the rivers and bayous. Renfro (1959a, 1959c).

*Ictiobus bubalus* (Rafinesque)—Smallmouth buffalo\*

Rare, restricted to waters of low salinity near the mouths of the rivers and bayous. Chambers and Sparks (1959); Pullen (1960, 1962).

## Family Ariidae—Sea Catfishes

*Bagre marinus* (Mitchill)—Gafftopsail catfish\*

Abundant from summer through fall in low to high salinity waters. Fowler (1945) as *Ailurichthys marinus* (Mitchill); Reid (1955a, 1955b, 1956, 1957); Chambers and Sparks (1959); Renfro (1959a, 1959b); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1962).

*Galeichthys felis* (Linnaeus)—Sea catfish\*

Abundant from spring through fall in moderate to high salinity waters. Fowler (1945) as *Trachysurus felis* (Linnaeus); Reid (1955a, 1955b, 1956, 1957); Chambers and Sparks (1959); Renfro (1959a, 1959b); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1961, 1962).

## Family Ictaluridae—Freshwater catfishes

*Ictalurus furcatus* (LeSueur)—Blue catfish\*

Rare, found in low salinity water near the mouths of the rivers and bayous. Renfro (1959a, 1959c); Pullen (1960, 1961, 1962) as *I. f. furcatus* (LeSueur).

*I. melas* (Rafinesque)—Black bullhead

Rare, found in low salinity water near the mouths of the rivers and bayous. Chambers and Sparks (1959) as *Ameirus melas* (Girard); Renfro (1959a); Pullen (1960, 1962) as *Amerius mela* Rafinesque.

*I. natalis* (LeSueur)—Yellow bullhead

Rare, found in low salinity water near the mouths of the rivers and bayous. Pullen (1962).

*I. punctatus* (Rafinesque)—Channel catfish\*

Rare, found in low salinity water near the mouths of the rivers and bayous. Renfro (1959a); Pullen (1960) as *I. p. punctatus* (Rafinesque); Pullen (1962).

## ORDER ANGUILLIFORMES (APODES)

## Family Anguillidae—Freshwater eel

*Anguilla rostrata* (LeSueur)—American eel.

Rare. Reported near the mouth of the Trinity River in data collected for a class project by the Department of Wildlife Management, Texas A & M University.

## Family Muraenidae—Morays

*Gymnothorax moringa* (Cuvier)—Spotted moray\*

Rare, found near the jetties and passes. Arnold, Wheeler and Baxter (1960) as *G. ocellatus* Agassiz.

## Family Ophichthidae—Snake Eels

*Myrophis punctatus* Lütken—Speckled worm eel\*

Common. This is the most abundant eel in the bay system although not collected in large numbers, it is distributed throughout the bay. Reid (1955b, 1956, 1957); Renfro (1959a, 1959b, 1963); Arnold, Wheeler and Baxter (1960); Chin (1961); Pullen (1960, 1962).

*Mystriophis mordax* (Poey)—Snapper eel

Rare, apparently restricted to high salinity waters. Reid (1957); Arnold, Wheeler and Baxter (1960).

*Ophichthus gomesi* (Castelnau)—Shrimp eel\*

Uncommon, found occasionally in moderate to high salinity waters. Renfro (1959a).

## ORDER BELONIFORMES (SYNENTOGNATHI)

## Family Belonidae—Needlefishes

*Strongylura marina* (Walbaum)—Atlantic needlefish\*

Common in waters of high salinity. Chambers and Sparks (1959); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Pullen (1960, 1962).

## Family Hemiramphidae—Halfbeaks

*Hyporhamphus unifasciatus* (Ranzani)—Halfbeak

Uncommon, found occasionally from spring through summer near the jetties. Arnold, Wheeler and Baxter (1960).

## Family Exocoetidae—Flyingfishes

*Prognichthys rondeleti* (Valenciennes)—Blackwing flyingfish

Rare. Baughman (1950a) as *Danichthys rondeletii* (Cuvier and Valenciennes). Biologists of the Texas Parks and Wildlife Department collected this species in Upper Galveston Bay in the spring of 1964 (personal communication).

## ORDER CYPRINODONTIFORMES (MICROYPRINI)

## Family Cyprinodontidae—Killifishes

*Adinia xenica* (Jordan and Gilbert)—Diamond killifish\*

Uncommon, but apparently distributed throughout the bay system in shallow water grass flats. Reid (1956); Simpson and Gunter (1956) as *A. multifasciata* Girard; Reid (1957); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Pullen (1960, 1962).

*Cyprinodon variegatus* Lacépède—Sheepshead minnow\*

Common in shallow waters throughout the bay system. Evermann and Kendall (1894); Reid (1955a, 1955b, 1956) as *C. v. variegatus* Lacépède; Simpson and Gunter (1956); Reid (1957) as *C. v. variegatus*; Chambers and Sparks (1959); Arnold, Wheeler and Baxter (1960) as *C. v. variegatus* Lacépède; Shidler (1960); Chin (1961); Pullen (1960, 1961, 1962).

*Fundulus chrysotus* (Günther)—Golden topminnow

Rare, apparently restricted to waters of extremely low salinity. Baughmann (1950a).

*F. grandis* Baird and Girard—Gulf killifish\*

Common year round in shallow water areas. Evermann and Kendall (1894) as *F. pallidus* Evermann; Fowler (1945) as *F. heteroclitus grandis* Baird and Girard; Reid (1955a, 1955b, 1956) as *F. g. grandis* Baird and Girard; Simpson and Gunter (1956); Reid (1957) as *F. g. grandis* Baird and Girard; Chambers and Sparks (1959); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Pullen (1960, 1962).

*F. jenkinsi* (Evermann)—Saltmarsh topminnow

Rare, apparently restricted to extremely low to moderate salinity waters near the mouths of the bayous and creeks. Evermann and Kendall (1894) as *Zygonectes jenkinsi* Evermann; Simpson and Gunter (1956).

*F. pulvereus* (Evermann)—Bayou killifish

Rare, apparently restricted to extremely low to moderate salinity waters near the mouths of the bayous and creeks. Gunter and Knapp (1951); Simpson and Gunter (1956); Pullen (1962).

*F. similis* (Baird and Girard)—Longnose killifish\*

Common throughout the year in shallow waters. Fowler (1945); Reid (1955b, 1956, 1957); Simpson and Gunter (1956); Chambers and Sparks (1959); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Chin (1961); Pullen (1960, 1962).

*Lucania parva* (Baird and Girard)—Rainwater killifish\*

Common to the waters of shallows and flats. Simpson and Gunter (1956); Pullen (1960, 1962).

## Family Poeciliidae—Livebearers

*Gambusia affinis* (Baird and Girard)—Mosquitofish

Common in waters near shore and in marshy flats. Simpson and Gunter (1956); Renfro (1959a, 1959b); Pullen (1960, 1962).

*Mollienesia latipinna* LeSueur—Sailfin molly\*

Common year round in the waters of shallows and flats. Reid (1955b, 1956); Simpson and Gunter (1956); Reid (1957); Renfro (1959a, 1959b); Arnold, Wheeler and Baxter (1960); Pullen (1960, 1961, 1962).

## ORDER GADIFORMES (ANACANTHINI)

## Family Gadidae—Hakes

*Urophycis floridanus* (Bean and Dresel)—Southern hake\*

Uncommon, found in small numbers during the spring, fall, and winter. Fowler (1945); Chambers and Sparks (1959); Hoese (1959b); Renfro (1959a); Pullen (1960); Chin (1961).

ORDER GASTEROSTEIFORMES (THORACOSTEI + HEMIBRANCHII +  
LOPHOBRANCHII + SOLENICHTHYES)

Family Syngnathidae—Pipefishes and seahorses

*Hippocampus erectus* Perry—Spotted seahorse\*

Rare, found in waters of high salinity near floating seaweed and in shallow grass flats.

*H. zosterae* Jordan and Gilbert—Dwarf seahorse\*

Rare, found in waters of high salinity near floating seaweed and in shallow grass flats.

*Syngnathus floridae* (Jordan and Gilbert)—Dusky pipefish\*

Rare, inhabiting high salinity waters of grassy flats. Hoese (1959b); Renfro (1959a); Pullen (1960, 1962).

*S. louisianae* Günther—Chain pipefish

Rare, reported from East Bay. Reid (1955a, 1955b, 1956, 1957).

*S. scovelli* (Evermann and Kendall)—Gulf pipefish\*

Common in moderate to high salinity waters in areas of vegetation. Hoese (1959b); Renfro (1959a); Chin (1961); Pullen (1962).

ORDER PERCOPSIFORMES (SALMOPERCAE)

Family Aphredoderidae—Pirate perches

*Aphredoderus sayanus* (Gilliams)—Pirate perch

Rare, predominantly a fresh-water species. Pullen (1960, 1962) as *A. s. gibbosus* (LeSueur).

ORDER PERCIFORMES (PERCOMORPHI, ACANTHOPTERYGII)

Family Serranidae—Sea basses

*Centropristes philadelphicus* (Linnaeus)—Rock sea bass\*

Rare, found in waters of high salinity. Hoese (1959b); Renfro (1959a); Pullen (1960, 1961, 1962).

*Epinephelus itajara* (Lichtenstein)—Jewfish

Rare, found predominantly near the jetties. Hoese (1959a) as *Promicrops itiaria* (Lichtenstein).

*E. nigritus* (Holbrook)—Warsaw grouper\*

Rare, collected in West Bay in January 1963 by a local fisherman.

*Roccus chrysops* (Rafinesque)—White bass

Rare, predominantly a fresh-water species. Chambers and Sparks (1959).

*R. mississippiensis* (Jordan and Eigenmann)—Yellow bass

Rare, a fresh-water species which occasionally ventures into low salinity waters. Chambers and Sparks (1959); Renfro (1959a, 1959c).

Family Lobotidae—Tripletails

*Lobotes surinamensis* (Bloch)—Tripletail

Uncommon. Reid (1955a, 1955b, 1956, 1957); Pullen (1962).

Family Lutjanidae—Snappers

*Lutjanus apodus* (Walbaum)—Schoolmaster

Rare, collected in 1963 in East Bay by personnel of the Texas Parks and Wildlife Department (personal communication).

*L. griseus* (Linnaeus)—Gray snapper

Rare, reported from West Bay in 1963 by personnel of the Texas Parks and Wildlife Department (personal communication).

*L. synagris* (Linnaeus)—Lane snapper\*

Uncommon, frequenting waters of high salinity. Arnold, Wheeler and Baxter (1960).

Family Centrarchidae—Sunfishes

*Chaenobryttus gulosus* (Cuvier)—Warmouth\*

Rare, a fresh-water species which occasionally ventures into low salinity waters during periods of fresh-water discharge from the rivers and bayous. Chambers and Sparks (1959); Renfro (1959a); Pullen (1960, 1962).

*Lepomis macrochirus* Rafinesque—Bluegill\*

Rare, a fresh-water species which occasionally ventures into low salinity waters during periods of fresh-water discharge from the rivers and bayous. Pullen (1962).

*L. microlophus* (Günther)—Redear sunfish

Rare, a fresh-water species which occasionally ventures into low salinity waters during periods of fresh-water discharge from the rivers and bayous. Chambers and Sparks (1959); Pullen (1960, 1962).

*Pomoxis annularis* Rafinesque—White crappie\*

Rare, a fresh-water species which occasionally ventures into low salinity waters during periods of fresh-water discharge from the rivers and bayous. Renfro (1959a, 1959c); Pullen (1960, 1962).

*P. nigromaculatus* (LeSueur)—Black crappie\*

Rare, predominantly a fresh-water species. Chambers and Sparks (1959).

Family Percidae—Perches

*Etheostoma lepidum* (Baird and Girard)—Greenthroat darter

Fowler (1945) reported this species as *Poecilichthys lepidus* (Baird and Girard), however, Hubbs (1954) notes that Fowler's record is based on *Etheostoma spectabile* Agassiz which would not be expected from the brackish water on Galveston Island.

Family Pomatomidae—Bluefishes

*Pomatomus saltatrix* (Linnaeus)—Bluefish \*

Found in large schools during the summer in high salinity waters. Renfro (1959a); Arnold, Wheeler and Baxter (1960); Pullen (1962).

Family Rachycentridae—Cobias

*Rachycentron canadum* (Linnaeus)—Cobia\*

Rare, young are found occasionally during the summer in high salinity waters.

Family Carangidae—Jacks and Pompanos

*Caranx crysos* (Mitchill)—Blue runner

Rare, reported from Lower Galveston Bay in 1963 by the Texas Parks and Wildlife Department (personal communication).

*C. hippos* (Linnaeus)—Crevalle jack\*

Common during the warmer months throughout the bay system. Reid (1955b, 1956, 1957); Hoese (1959b); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Pullen (1960, 1962).

*C. latus* Agassiz—Horse-eye jack

Rare, specimens of this jack were found in Upper Galveston Bay in extremely low salinity water. Pullen (1962).

*Cholroscombrus chrysurus* (Linnaeus)—Bumper\*

Common, found during the warmer months in moderate to high salinity waters. Reid (1955a, 1955b, 1956, 1957); Hoese (1959b); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Shidler (1960); Pullen (1960, 1962).

*Hemicaranx amblyrhynchus* (Cuvier)—Bluntnose jack\*

Uncommon, found during the warmer months in moderate to high salinity waters. Reid (1955b, 1956, 1957) as *H. amblyrhynchus* (Cuvier and Valenciennes).

*Oligoplites saurus* (Bloch and Schneider)—Leatherjacket\*

Common during the warmer months in high salinity waters of shallow grassy flats. Reid (1955b, 1956); Hoese (1959b); Renfro (1959a); Arnold, Wheeler, and Baxter (1960); Shidler (1960); Pullen (1960, 1962).

*Selene vomer* (Linnaeus)—Lookdown\*

Uncommon, occasionally frequenting high salinity waters. Hoese (1959b); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Shidler (1960).

*Seriola falcata* Valenciennes—Almaco jack\*

Uncommon, found during the summer near the jetties. This species has not previously been reported from Texas.

*Trachinotus carolinus* (Linnaeus)—Pompano\*

Uncommon, found occasionally during the warmer months in high salinity waters. Reid (1956, 1957); Renfro (1959a); Arnold, Wheeler and Baxter (1960).

*Vomer setapinnis* (Mitchill)—Atlantic moonfish\*

Uncommon, found occasionally during the warmer months in moderate to high salinity waters. Hoese (1959b); Renfro (1959a); Shidler (1960); Pullen (1960, 1962).

## Family Coryphaenidae—Dolphins

*Coryphaena hippurus* Linnaeus—Dolphin

Rare, predominantly a marine species. Arnold, Wheeler and Baxter (1960).

## Family Gerridae—Mojarras

*Eucinostomus gula* (Quoy and Gaimard)—Silver jenny\*

Uncommon, found during the warmer months in high salinity waters of shallow vegetated areas. *Eucinostomus* sp. reported by Reid (1955b, 1956) is probably this species; *Eucinostomus* sp. reported by Hoese (1959b) is probably this species; Renfro (1959a); Arnold, Wheeler and Baxter (1960).

## Family Pomadyasyidae—Grunts

*Orthopristis chrysopterus* (Linnaeus) Pigfish\*

Common, found during the warmer months in high salinity waters. Fowler (1945); Reid (1955b, 1956); Hoese (1959a, 1959b); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1962); Stevens (1963b).

## Family Sciaenidae—Drums

*Aplodinotus grunniens* Rafinesque—Fresh-water drum

Rare, predominantly a fresh-water species. Chambers and Sparks (1959).

*Bairdiella chrysura* (Lacépède)—Silver perch\*

Common from spring through fall throughout the bay system. Reid (1955a, 1955b, 1956, 1957); Hoese (1959b); Renfro (1959a, 1959b); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1962).

*Cynoscion arenarius* Ginsburg—Sand seatrout\*

Abundant all year throughout the bay system, but present in greatest numbers during the warmer months. Reid (1955a, 1955b, 1956, 1957); Chambers and Sparks (1959); Hoese (1959b); Renfro (1959b); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1961, 1962).

*C. nebulosus* (Cuvier)—Spotted seatrout\*

Abundant all year throughout the bay system, but present in greatest numbers during the warmer months. Reid (1955a, 1955b, 1956, 1957); Chambers and Sparks (1959); Hoese (1959b); Renfro (1959a, 1959b, 1963); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1962); Stevens (1963a, 1963b).

*C. nothus* (Holbrook)—Silver seatrout\*

Rare, appearing occasionally in high salinity waters. Fowler (1945); Hoese (1959b).

*Larimus fasciatus* Holbrook—Banded drum\*

Uncommon, found in small numbers during all seasons in high salinity waters. Reid (1956, 1957); Chambers and Sparks (1959); Arnold, Wheeler and Baxter (1960); Chin (1961); Pullen (1962).

*Leiostomus xanthurus* Lacépède—Spot\*

Abundant during the warmer months throughout the bay system. Fowler (1945); Reid (1955a, 1955b, 1956, 1957); Chambers and Sparks (1959); Hoese (1959b, 1959c); Renfro (1959a, 1959b); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1961, 1962).

*Menticirrhus americanus* (Linnaeus)—Southern kingfish\*

Common throughout the year in moderate to high salinity waters. Fowler (1945); Reid (1956, 1957); Renfro (1959a); Shidler (1960); Pullen (1960, 1961, 1962).

*M. littoralis* (Holbrook)—Gulf kingfish

Rare, predominantly a marine species. Reid (1956, 1957).

*Micropogon undulatus* (Linnaeus)—Atlantic croaker\*

Abundant all year throughout the bay system. Fowler (1945); Reid (1955a, 1955b, 1956, 1957); Chambers and Sparks (1959); Hoese (1959b, 1959c); Renfro (1959a, 1959b, 1963); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1961, 1962); Stevens (1963a, 1963b).

*Pogonias cromis* (Linnaeus)—Black drum\*

Abundant throughout the year in moderate to high salinity waters. Reid (1955a, 1955b, 1956, 1957); Chambers and Sparks (1959); Hoese (1959a,

1959b); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1962); Stevens (1963a, 1963b).

*Sciaenops ocellata* (Linnaeus)—Red drum\*

Abundant throughout the year in moderate to high salinity waters. Reid (1955a, 1955b, 1956, 1957); Chambers and Sparks (1959); Hoese (1959b, 1959c); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Chin (1961); Pullen (1960, 1962); Stevens (1963a, 1963b).

*Stellifer lanceolatus* (Holbrook)—Star drum\*

Abundant throughout the year in moderate to high salinity waters, but found predominantly in the deeper waters of the channels. Fowler (1945); Reid (1955b, 1956, 1957); Chambers and Sparks (1959); Hoese (1959b); Renfro (1959a); Shidler (1960); Chin (1961); Pullen (1960, 1961, 1962).

Family Sparidae—Porgies

*Archosargus probatocephalus* (Walbaum)—Sheepshead\*

Common all year in moderate to high salinity waters. Reid (1955b, 1956, 1957) as *A. oviceps* Ginsburg; Hoese (1959a, 1959b); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1962); Stevens (1963a, 1963b).

*Lagodon rhomboides* (Linnaeus)—Pinfish\*

Common all year in moderate to high salinity waters. Reid (1955a, 1955b, 1956, 1957); Chambers and Sparks (1959); Hoese (1959a, 1959b); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1962); Stevens (1963b).

Family Ehippidae—Spadefishes

*Chaetodipterus faber* (Broussonet)—Atlantic spadefish\*

Common during the warmer months in high salinity waters. Fowler (1945); Reid (1955b, 1956, 1957); Chambers and Sparks (1959); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1961).

Family Trichiuridae—Cutlassfishes

*Trichiurus lepturus* Linnaeus—Atlantic cutlassfish\*

Common during the warmer months in moderate to high salinity waters. Reid (1955b, 1956, 1957); Chambers and Sparks (1959); Hoese (1959b); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Shidler (1960); Pullen (1960, 1961).

Family Scombridae—Mackerels

*Scomberomorus maculatus* (Mitchell)—Spanish mackerel\*

Uncommon, found occasionally during the summer in moderate to high salinity waters. Reid (1956, 1957); Renfro (1959a); Pullen (1960); Shidler (1960).

Family Eleotridae—Sleepers

*Dormitator maculatus* (Bloch)—Fat sleeper

Uncommon, a fresh-water species whose range is extended throughout the bay system during periods of fresh-water flooding. Evermann and Kendall (1894); Chambers and Sparks (1959); Arnold, Wheeler and Baxter (1960); Pullen (1962).

## Family Gobiidae—Gobies

*Evorthodus lyricus* (Girard)—Lyre goby

Rare. Jordan and Gilbert (1883) as *Gobius lyricus* (Girard); Fowler (1945) as *Gobionellus lyricus* (Girard); Arnold, Wheeler and Baxter (1960).

*Gobioides broussoneti* Lacépède—Violet goby\*

Uncommon, residing primarily in shallow, low salinity waters of lakes and flats. Chambers and Sparks (1959); Renfro (1959a); Chin (1961); Pullen (1962).

*Gobionellus boleosoma* (Jordan and Gilbert)—Darter goby\*

Uncommon, found occasionally in waters of low salinity. Reid (1956, 1957); Hoese (1959a); Renfro (1959a); Pullen (1960, 1962).

*G. hastatus* Girard—Sharptail goby \*

Uncommon, found scattered throughout the bay system, but most abundant in waters of high salinity. Fowler (1945) as *G. h. hastatus* Girard; Renfro (1959a); Arnold, Wheeler and Baxter (1960); Pullen (1960); Shidler (1960) as *G. oceanicus*; Pullen (1961) as *Gobius hastatus*; Pullen (1962).

*G. shufeldti* (Jordan and Evermann)—Freshwater goby

Rare, apparently restricted to waters of low salinity. Chambers and Sparks (1959); Chin (1961).

*Gobiosoma bosci* (Lacépède)—Naked goby\*

Common, found all year throughout the bay system, but most abundant in the shallow lakes and flats. Hoese (1959a); Renfro (1959a, 1959b); Arnold, Wheeler and Baxter (1960) as *G. molestum* Girard; Shidler (1960); Chin (1961); Pullen (1960, 1962).

*G. robustum* Ginsburg—Code goby

Rare, collected by Hinton D. Hoese in grass flats in lower West Bay (personal communication).

*Microgobius gulosus* (Girard)—Clown goby\*

Common, residing year round throughout the bay system, but most abundant in the waters of shallow lakes and flats. Pullen (1960, 1962).

*M. thalassinus* (Jordan and Gilbert)—Green goby\*

Uncommon, found occasionally in the waters of the shallows and flats. Fowler (1945).

## Family Scorpaenidae—Scorpionfishes

*Scorpaena calcarata* Goode and Bean—Smoothhead scorpionfish\*

Rare, apparently restricted to deep waters of high salinity.

## Family Triglidae—Searobins

*Prionotus scitulus* Jordan and Gilbert—Leopard searobin\*

Uncommon, apparently restricted to high salinity waters.

*P. tribulus* Cuvier—Bighead searobin\*

Common, found during all seasons throughout the bay system. Fowler (1945); Reid (1956) as *P. t. crassiceps* Ginsburg; Renfro (1959a); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1962).

## Family Uranoscopidae—Stargazers

*Astrocopus y-graecum* (Suvier)—Southern stargazer\*

Rare, this species is occasionally found in the deeper high salinity waters of the bay system. Fowler (1945); Renfro (1959a); Chin (1961).

## Family Clinidae—Clinids

*Labrisomus nuchipinnis* (Quoy and Gaimard)—Hairy blenny.

Rare, apparently restricted to waters of high salinity. Hoese (1959a); Arnold, Wheeler and Baxter (1960).

## Family Blenniidae—Combtooth blennies

*Chasmodes bosquianus* (Lacépède)—Striped blenny\*

Common in waters of high salinity. Hoese (1959a); Shidler (1960); Pullen (1962).

*Hypsoblennius ionthas* (Jordan and Gilbert)—Freckled blenny\*

Common in high salinity waters near oyster reefs and around the jetties. Jordan and Gilbert (1883) as *Isesthes scrutater* sp. nov.; Hoese (1959a); Hofstetter (1959); Pullen (1960, 1962).

## Family Ophidiidae—Cusk-eels

*Ophidion welshi* (Nichols and Breder)—Crested cusk-eel\*

Uncommon, found occasionally in high salinity waters.

*Rissola marginata* (De Kay)—Striped cusk-eel\*

Uncommon, found in moderate to high salinity waters. Pullen (1960, 1962).

## Family Stromateidae—Butterfishes

*Peprilus paru* (Linnaeus)—Northern harvestfish\*

Common during the warmer months in waters of moderate to high salinity. Fowler (1945); Reid (1955b, 1956, 1957); Renfro (1959a); Pullen (1960, 1962).

*Poronotus burti* (Fowler)—Butterfish\* (see Collete, 1963)

Common during the warmer months in waters of high salinity. Fowler (1945) as *Peprilus burti* Fowler; Renfro (1959a) as *Poronotus triacanthus* (Peck); Pullen (1960, 1962) as *Poronotus triacanthus* (Peck).

## Family Mugilidae—Mulletts

*Mugil cephalus* Linnaeus—Striped mullet\*

Abundant all year throughout the bay system. Fowler (1945); Reid (1955a, 1955b, 1956, 1957); Chambers and Sparks (1959); Hoese (1959b); Renfro (1959a, 1959b); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1961, 1962); Stevens (1963b).

*M. curema* Valenciennes—White mullet

Uncommon, apparently restricted to high salinity waters. Reid (1955a, 1955b, 1956, 1957) as *M. curema* (Cuvier and Valenciennes); Chambers and Sparks (1959); Hoese (1959b); Renfro (1959a); Pullen (1962); Stevens (1963b).

## Family Atherinidae—Siversides

*Membras martinica* (Valenciennes)—Rough silverside\*

Common along shore lines, usually in high salinity waters. Reid (1955a, 1955b, 1956, 1957) as *M. m. vagrans* (Goode and Bean); Renfro (1959a); Arnold, Wheeler and Baxter (1960) as *M. vagrans vagrans* (Goode and Bean); Pullen (1960, 1962); Stevens (1963b).

*Menidia beryllina* (Cope)—Tidewater silversides\*

Common all year throughout the bay system. Fowler (1945); Reid (1955b, 1956, 1957) as *M. b. peninsulae* (Goode and Bean); Chambers and Sparks (1959); Renfro (1959a); Arnold, Wheeler and Baxter (1960) as *M. b. pensacolatae* (Goode and Bean); Shidler (1960); Chin (1961); Pullen (1960, 1961, 1962); Stevens (1963b).

## Family Polynemidae—Threadfins

*Polydactylus octonemus* (Girard)—Atlantic threadfin\*

Common during the warmer months in high salinity waters. Fowler (1945); Reid (1955a, 1955b, 1956, 1957); Chambers and Sparks (1959); Hoese (1959b); Renfro (1959a); Arnold, Wheeler and Baxter (1960); Chin (1961); Pullen (1960, 1962).

## ORDER PLEURONECTIFORMES (HETEROSOMATA)

## Family Bothidae—Lefteye flounders

*Ancylopsetta quadrocellata* Gill—Ocellated flounder \*

Uncommon, found occasionally in the Houston Ship Channel. Fowler (1945); Hoese (1959b); Pullen (1960, 1962).

*Citharichthys spilopterus* Günther—Bay whiff\*

Common during all seasons throughout the bay system, but most abundant in waters of moderate to high salinity. Fowler (1945); Reid (1955a, 1955b, 1956, 1957); Hoese (1959b, 1959c); Renfro (1959a); Shidler (1960); Chin (1961); Pullen (1960, 1961, 1962).

*Etropus crossotus* Jordan and Gilbert—Fringer flounder\*

Common during all seasons in moderate to high salinity waters. Fowler (1945) as *E. crossotus* Gilbert; Hoese (1959b).

*Paralichthys albigutta* Jordan and Gilbert—Gulf flounder \*

Uncommon in this bay system.

*P. lethostigma* Jordan and Gilbert—Southern flounder\*

Abundant all year throughout the bay system, but present in greatest numbers in moderate to high salinity waters. Chandler (1935); Fowler (1945); Reid (1955a, 1955b, 1956, 1957); Hoese (1959a); Renfro (1959a, 1959b); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1962); Stevens (1963a, 1963b).

*P. squamilentus* Jordan and Gilbert—Broad flounder

Rare. Baughman (1950a).

## Family Soleidae—Soles

*Archirus lineatus* (Linnaeus)—Lined sole\*

Common throughout the year in moderate to high salinity waters. Fowler (1945) as *A. achirus* (Linnaeus); Reid (1955b, 1956, 1957); Renfro (1959a); Chin (1961); Pullen (1960, 1962).

*Trinectes maculatus* (Bloch and Schneider)—Hogchoker\*

Common throughout the year in moderate to high salinity waters. Fowler (1945) as *Archirus fasciatus* Lacépède; Chambers and Sparks (1959) as *T. maculator* (Bloch); Hoese (1959b); Renfro (1959a, 1959b); Shidler (1960); Chin (1961); Pullen (1960, 1962).

## Family Cynoglossidae—Tonguefishes

*Symphurus plagiusa* (Linnaeus)—Blackcheek tonguefish\*

Common throughout the year in moderate to high salinity waters. This species is very abundant in the deep waters of the Houston Ship Channel. Fowler (1945); Reid (1955b, 1956); Hoese (1959b); Renfro (1959a); Chin (1961); Pullen (1960, 1961, 1962).

## ORDER ENCHENEIFORMES (DISCOCEPHALI)

## Family Encheneidae—Remoras

*Echeneis naucrates* Linnaeus—Sharksucker

Uncommon, found occasionally attached to rays and sharks. Pullen (1960, 1962).

## ORDER GOBIESOCIFORMES (XENOPTERYGII)

## Family Gobiesocidae—Clingfishes

*Gobiesox strumosus* Cope—Skilletfish\*

Common in waters of high salinity. Hoese (1959a); Arnold, Wheeler and Baxter (1960); Shidler (1960); Chin (1961); Pullen (1960, 1962).

## ORDER TETRAODONTIFORMES (PLECTOGNATHI)

## Family Monacanthidae—Filefishes

*Stephanolepis hispidus* (Linnaeus)—Planehead filefish\* (see Berry and Vogele, 1961)

Common in high salinity waters. Reid (1955b, 1956) as *Monacanthus hispidus* (Linnaeus); Shidler (1960) as *Monacanthus hispidus*.

## Family Tetraodontidae—Puffers

*Lagocephalus laevigatus* (Linnaeus)—Smooth puffer\*

Rare, collected in 1963 from East Bay by personnel of the Texas Parks and Wildlife Department and from West Bay by a local fisherman (personal communications).

*Sphaeroides nephelus* (Goode and Bean)—Southern puffer\*

Common during summer and fall in high salinity waters. Reid (1955a, 1955b, 1956, 1957); Hoese (1959b); Renfro (1959a); Shidler (1960); Chin (1961); Pullen (1960, 1961, 1962).

*S. testudineus* (Linnaeus)—Checkered puffer

Rare. Baughman (1950b)

## Family Diodontidae—Porcupinefishes

*Chilomycterus schoepfi* (Walbaum)—Striped burrfish\*

Common during the warmer months in high salinity waters. Reid (1956, 1957); Renfro (1959a); Shidler (1960).

*Diodon hystrix* Linnaeus—Porcupinefish.

Rare. Baughman (1950b).

## ORDER BATRACHOIDIFORMES (HAPLODOCI).

## Family Batrachoididae—Toadfishes

*Opsanus beta* (Goode and Bean)—Gulf toadfish\*

Uncommon, found in high salinity waters. Hoese (1959a, 1959b); Renfro (1959a, 1959b); Arnold, Wheeler and Baxter (1960); Chin (1961); Pullen (1960, 1962).

*Porichthys porosissimus* (Cuvier)—Atlantic midshipman\*

Common during all seasons in moderate to high salinity waters, but most abundant in the ship channel and around oyster reefs. Fowler (1945) as *Nautopaedium porosissimum* (Valenciennes); Hoese (1959b); Renfro (1959a); Shidler (1960); Pullen (1960, 1962).

## ORDER LOPHIIFORMES (PEDICULATI)

## Family Antennariidae—Frogfishes

*Histrio histrio* (Linnaeus)—Sargassumfish

Although not a permanent inhabitant, this fish may be found upon occasion swimming near sargassum weed which has drifted in from the Gulf. Renfro (1959a).

## Bibliography

- American Fisheries Society. 1960. A list of common and scientific names of fishes from the United States and Canada. Amer. Fish. Soc. spec. Publ. 2: 1-102, 2nd ed.
- Arnold, Edgar L., Jr., Ray S. Wheeler, and Kenneth N. Baxter. 1960. Observations on fishes and other biota of East Lagoon, Galveston Island. Spec. scient. Rep. U.S. Fish Wildl. Serv. (344): 1-30.
- Baughman, J. L. 1950a. Random notes on Texas fishes. Part I. Tex. J. Sci. 2(1): 117-138.
- . 1950b. Random notes on Texas fishes. Part II. Tex. J. Sci. 2(2): 242-263.
- Berry, Frederick H., and Louis E. Vogele. 1961. Filefishes (Monacanthidae) of the western North Atlantic. Fishery Bull. Fish Wildl. Serv. U.S. 61(181): 1-109.
- Chambers, Gilbert V., and Albert K. Sparks. 1959. An ecological survey of the Houston Ship Channel and adjacent bays. Publs. Inst. mar. Sci. Univ. Tex. 6: 213-250.
- Chandler, A. C. 1935. Parasites of fishes in Galveston Bay. Proc. U.S. natn. Mus. 83: 123-157, 12 pl.
- Chin, Edward. 1961. A trawl study of an estuarine nursery area in Galveston Bay with particular reference to Penaeid shrimp. Unpubl. Ph.D. Thesis, Univ. Wash., Seattle, 113 p.
- Collette, Bruce B. 1963. The systematic status of the Gulf of Mexico butterfish, *Poronotus burti* (Fowler). Copeia, 1963, (3): 582-583.
- Evermann, Barton W., and William C. Kendall. 1894. The fishes of Texas and the Rio Grand basin, considered chiefly with reference to their geographic distribution. Bull. U.S. Fish Comm. for 1892, 12: 57-126, 40 pl.
- Fowler, Henry W. 1945. A study of the fishes of the southern Piedmonte and coastal plain. Monogr. Acad. nat. Sci. Philad. (7): 1-408.
- Gunter, Gordon, and Frank T. Knapp. 1951. Fishes, new, rare or seldom recorded from the Texas coast. Tex. J. Sci., 3(1): 134-138.
- Hoese, Hinton D. 1958. A partially annotated checklist of the marine fishes of Texas. Publs. Inst. mar. Sci. Univ. Tex. 5: 312-352.
- . 1959a. Marine fish fauna survey. Tex. Game & Fish Comm., Mar. Fish. Div. Proj. Rept., 1958-1959, Proj. No. M-R-3, p. 1-3.
- . 1959b. Basic ecological survey of area M-3, a checklist of fish of area M-3. Tex. Game & Fish Comm., Mar. Fish. Div. Proj. Rept., 1958-1959, Proj. No. M-3-R-1, p. 1-5.
- . 1959c. Basic ecological survey of area M-3, hydrographic studies related to Rollover Pass and possible effect on the fauna. Tex. Game and Fish Comm., Mar. Fish. Div. Proj. Rept., 1958-1959, Proj. No. M-3-R-1, p. 1-3.
- Hofstetter, Robert P. 1959. Oyster Investigations, Galveston Bay, Survey of Oyster Spat Setting and Survival. Tex. Game & Fish Comm., Mar. Fish. Div. Proj. Rept. 1958-1959, Proj. No. MO-1-R-1, p. 1-9.
- Hubbs, Clark. 1954. Corrected distributional records for Texas freshwater fishes. Tex. J. Sci. 6(3): 277-291.
- Jordan, Daid Starr, and Charles H. Gilbert. 1883. Notes on fishes observed about Pensacola, Florida, and Galveston, Texas, with descriptions of new species. Proc. U.S. natn. Mus. 5: 241-307.
- Pullen, Edward J. 1960. An ecological survey of area M-2, collection and identification of vertebrate forms present in area M-2 and determine their relative seasonal abundance. Tex. Game & Fish Comm. Mar. Fish. Div. Proj. Rept., 1959-1960, Proj. No. M-2-R-2, p. 1-10.

- . 1961. Biological survey of area M-2, hydrographic and climatological data for area M-2. *Tex. Game & Fish Comm., Mar. Fish. Div. Proj. Rept., 1959-1960, Proj. No. M-2-R-2*, p. 1-22.
- . 1962. An ecological survey of area M-2, a study of the fishes of Upper Galveston Bay. *Tex. Game & Fish Comm., Mar. Fish. Div. Proj. Rept., 1960-1961, Proj. No. M-2-R-3*, p. 1-28.
- Reid, George K., Jr. 1955a. A summer study of the biology and ecology of East Bay, Texas. Part I. Introduction, description of area, methods, and some aspects of the fish community, the invertebrate fauna. *Tex. J. Sci.* 7(3) : 316-343.
- . 1955b. A summer study of the biology and ecology of East Bay, Texas. Part II. The fish fauna of East Bay, the Gulf beach, and summary. *Tex. J. Sci.* 7(4) : 430-453.
- . 1956. Ecological investigations in a disturbed Texas coastal estuary. *Tex. J. Sci.* 8(3) : 296-327.
- . 1957. Biologic and hydrographic adjustment in a disturbed Gulf coast estuary. *Limnol. Oceanogr.* 2(3) : 198-212.
- Renfro, William C. 1959a. Basic ecological survey of area M-2, check list of the fishes and commercial shrimp of area M-2. *Tex. Game & Fish Comm., Mar. Fish. Div. Proj. Rept., 1958-1959, Proj. No. M-2-R-1*, p. 1-30.
- . 1959b. Basic ecological survey of area M-2, chemical and physical analysis of the water of area M-2. *Tex. Game & Fish Comm., Mar. Fish. Div. Proj. Rept., 1958-1959, Proj. No. M-2-R-1*, p. 1-19.
- . 1959c. Survival and migration of fresh-water fishes in salt water. *Tex. J. Sci.*, 12(2) : 173-180.
- . 1963. Gas-bubble mortality of fishes in Galveston Bay, Texas. *Trans. Am. Fish. Soc.* 92(3) : 320-322.
- Shidler, John K. 1960. Oyster investigations, area MO-1, interim shrimp study. *Tex. Game & Fish Comm., Mar. Fish. Div. Proj. Rept., 1959-1960, Proj. No. MO-1-R-2*, p. 1-19.
- Simpson, Don G., and Gordon Gunter. 1956. Notes on habitats, systematic characters and life histories of Texas salt water Cyprinodontes. *Tulane Stud. Zool.*, 3(4) : 115-134.
- Stevens, James R. 1963a. Analysis of populations of sports and commercial fin-fish and of factors which affect these populations in the coastal bays of Texas: Population studies of the sports and commercial fin-fish and forage species of the Galveston Bay system. *Tex. Game & Fish Comm., Mar. Fish. Div. Proj. Rept., 1961-1962, Proj. No. MF-R-4*, p. 1-16.
- . 1963b. Analysis of population of sports and commercial fin-fish and of factors which affect these populations in the coastal bays of Texas: Coordination of coastwise fin-fish investigations project. *Tex. Game & Fish Comm., Mar. Fish. Div. Proj. Rept., 1961-1962, Proj. No. MF-R-4*, p. 1-61.