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# An Annotated List of the Fishes of Massachusetts Bay

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ABSTRACT

↙ The list includes 141 species in 68 families based on authoritative literature reports and museum specimens. First records for Massachusetts Bay are recorded for: Atlantic angel shark, Squatina dumeril; smooth skate, Raja senta; wolf eelpout, Lycenchelys verrillii; lined seahorse, Hippocampus erectus; rough scad, Trachurus lathami, and smallmouth flounder, Etropus microstomus. ↘



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## INTRODUCTION

One-hundred years after Goode and Bean (1879a) produced the first comprehensive list of species of fishes found in Massachusetts Bay, it seems appropriate to re-evaluate the occurrence of species in that body of water. We have produced a new list of all species of fishes known from Massachusetts Bay based on authoritative published reports, particularly: D.H. Storer (1853-1867); Goode and Bean (1879a,b); Gill (1905); Kendall (1908); Bigelow and Schroeder (1953a); and the surveys of the Massachusetts Division of Marine Fisheries (MDMF, see Chesmore et al. 1972; Clayton et al. 1976; Fiske et al. 1966; and Jerome et al. 1966, 1967, 1968, 1969).

We have examined specimens in museum collections, especially the Museum of Comparative Zoology at Harvard University (MCZ), the National Museum of Natural History (USNM), the Academy of Natural Sciences of Philadelphia (ANSP), the University of Michigan Museum of Zoology (UMMZ), and the Marine Science Institute of Northeastern University at Nahant (MSI). Bean (1880) included Massachusetts Bay specimens of 41 species of fishes in his list of duplicates distributed to other institutions by USNM, 1877-1880. We list those still represented by material at USNM plus specimens that we located at ANSP and UMMZ. We also include references to uncommon species but do not refer to all 41 species. We have tried to verify records of specimens formerly at the Boston Society of Natural History (BSNH) and the Essex Institute based on part of these two collections which were transferred to the MCZ. Selected specimens from the Massachusetts Division of Marine Fisheries (MDMF) Sandwich and Cat Cove laboratories were also examined. Special reference to occurrence at Nahant is due to collections made there or reported by a long series of ichthyologists including D.H. Storer (1839-1867), R.H. Wheatland (1862), F.W. Putnam (1866a,b), Louis Agassiz (1854-1866), Carl L. Hubbs (1927-28) and the first author's 18 years of summer observations there (1967-1983, 1985).

The limits of Massachusetts Bay (Figure 1) are considered to be Gloucester on the north, Stellwagen Bank on the east, and Cape Cod Bay on the south. This area is the same as that defined for Massachusetts Bay in the BIOME survey of the National Marine Fisheries Service's Northeast Fisheries Center (Lux and Kelly 1978). Species caught by recreational and commercial fisheries are frequently poorly represented in museum collections. Therefore, we include abundance and depth range of 43 species taken by the BIOME survey in Massachusetts Bay (Table 1). We are interested in records of additional species and specimens of species not yet represented in collections for deposit at the MCZ. Species are listed in approximately the order followed by Robins et al. (1980). Documentation from the literature and museum material are listed for each species. Specimen lengths are millimeters of Standard Length (SL), Total Length (TL) or

Fork Length (FL). Our list includes 141 species in 68 families in Massachusetts Bay but lacks authoritative specimen records of several of these. The six new records are marked with an asterisk.

Several additional species of fishes common south of Cape Cod have been taken in Cape Cod Bay as eggs or larvae as reported by Scherer (1984): Strongylura marina (Belontiidae), Ophidion marginatum (Ophidiidae), Gobiosoma ginsburgi (Gobiidae), and Paralichthys dentatus (Bothidae). All may be found in Massachusetts Bay.

The only "deep-sea" fishes included are those species that are well documented in the area (e.g. Maurolicus muelleri and Nezumia bairdii). Other deep-water forms will probably be found beyond Stellwagen Bank or in the stomachs of deep-feeding predators such as swordfish and tuna.

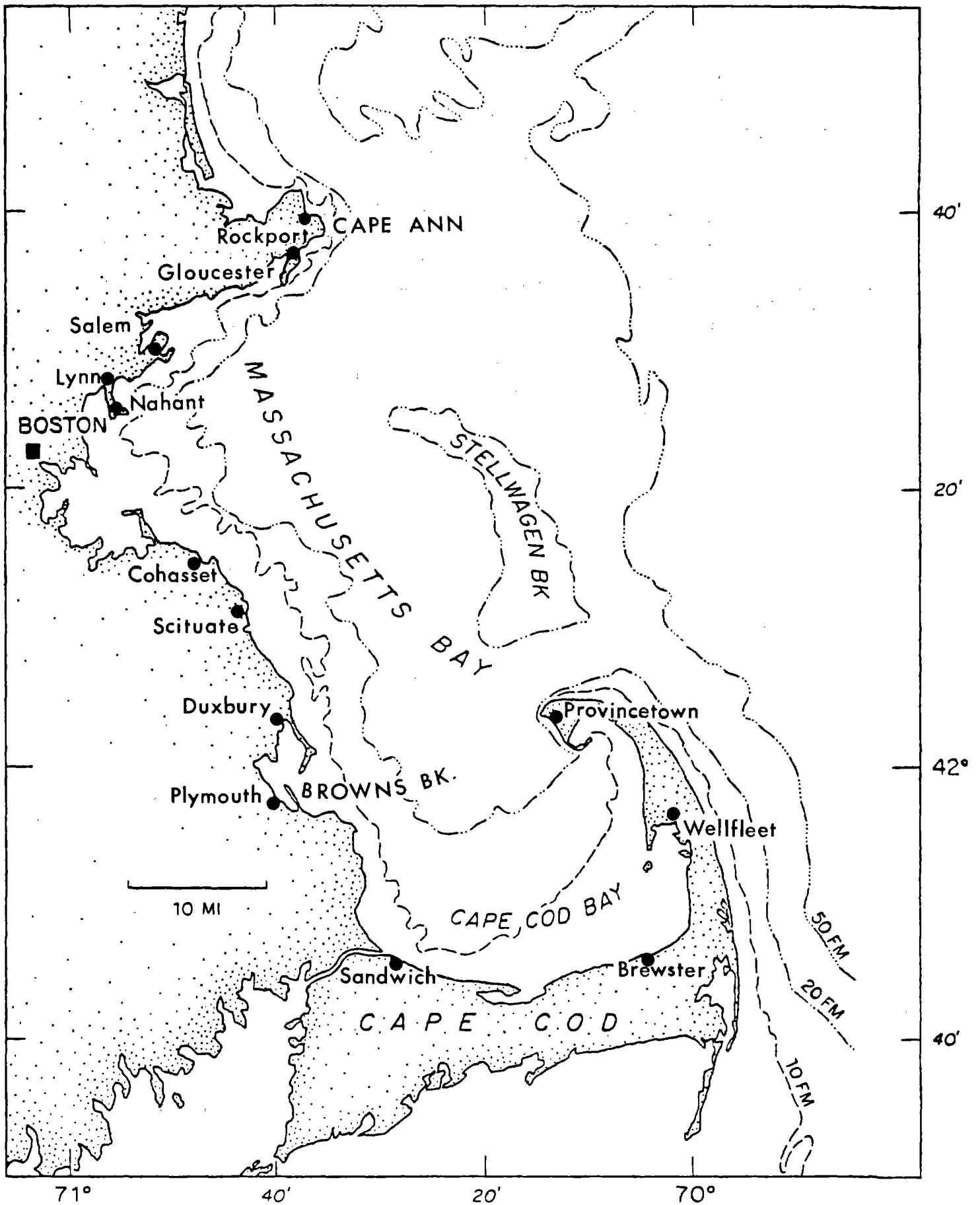


Figure 1. Map of Massachusetts Bay and surrounding area.  
 (Modified from Lux and Kelly 1978)

Table 1. Abundance of 43 species of fishes collected in Massachusetts Bay by the National Marine Fisheries Service at BIOME stations (1975-1977)

Species	No. Stations	No. Specimens	Depth Range (m)	Order of Abundance
<u>Hippoglossoides platessoides</u>	42	9107	34-91	1
<u>Merluccius bilinearis</u>	44	3471	34-91	2
<u>Glyptocephalus cynoglossus</u>	35	1429	34-91	3
<u>Urophycis chuss</u>	39	1018	34-91	4
<u>Limanda ferruginea</u>	30	803	34-84	5
<u>Ammodytes dubius</u>	12	743	34-88	6
<u>Gadus morhua</u>	39	705	34-91	7
<u>Sebastes fasciatus</u>	28	668	35-91	8
<u>Clupea harengus</u>	22	642	34-86	9
<u>Alosa pseudoharengus</u>	26	597	34-91	10
<u>Lumpenus maculatus</u>	14	484	55-88	11
<u>Macrozoarces americanus</u>	25	408	34-84	12
<u>Urophycis tenuis</u>	34	385	34-91	13
<u>Alosa aestivalis</u>	11	346	34-55	14
<u>Enchelyopus cimbrius</u>	29	226	34-91	15
<u>Melanogrammus aeglefinus</u>	18	197	34-91	16
<u>Myoxocephalus octodecemspinosus</u>	16	137	34-79	17
<u>Raja radiata</u>	31	126	34-88	18
<u>Pseudopleuronectes americanus</u>	11	100	34-86	19
<u>Pollachius virens</u>	8	71	34-91	20
<u>Lophius americanus</u>	24	67	34-86	21
<u>Hemitripterus americanus</u>	17	65	34-79	22
<u>Scomber scombrus</u>	5	60	34-91	23
<u>Paralichthys oblongus</u>	14	58	40-79	24
<u>Squalus acanthias</u>	16	51	34-88	25
<u>Aspidophoroides monoptyerygius</u>	10	27	40-88	26
<u>Lumpenus lampretaeformis</u>	6	23	34-73	27
<u>Peprilus triacanthus</u>	6	17	55-91	28
<u>Tautoglabrus adspersus</u>	10	14	34-84	29
<u>Anarhichas lupus</u>	9	14	34-79	30
<u>Raja senta</u>	9	13	40-88	31
<u>Scophthalmus aquosus</u>	8	13	34-66	32
<u>Arteidiellus atlanticus</u>	4	10	50-66	33
<u>Alosa sapidissima</u>	3	10	34-43	34
<u>Myxine glutinosa</u>	4	9	55-83	35
<u>Raja ocellata</u>	3	4	40-50	36
<u>Cryptacanthodes maculatus</u>	2	3	50-73	37
<u>Lycenchelys verrillii</u>	2	3	50-83	38
<u>Myoxocephalus aeneus</u>	1	3	50	39
<u>Brosme brosme</u>	2	2	40-48	30
<u>Raja erinacea</u>	1	1	46	41
<u>Centropristis striata</u>	1	1	66	42
<u>Cyclopterus lumpus</u>	1	1	50	43

## ANNOTATED LIST

### Myxinidae

1. Myxine glutinosa Linnaeus 1758 Atlantic hagfish

Numerous in deeper parts of Massachusetts Bay (Bigelow & Schroeder 1953a: 12) where it is occasionally taken after it has bored into the body cavity of hooked or gilled fishes. Taken at 4 BIOME stations at depths of 55-83 m (Table 1).

USNM 119079 (1, 265 mm TL) near Gloucester; Bur. Fish.; 19 March 1913.

MCZ 35764 (3, 340-430 mm TL) 32 mi ESE Thatchers I., 62 fm; 1937.

MDMF Sandwich Lab (1, 365 mm TL) 42°22.96'N, 70°42.07'W, 54 m; R/V Francis Elizabeth, Cr. 926, Sta. 23; 11 Sept. 1980.

### Petromyzontidae

2. Petromyzon marinus Linnaeus 1758 Sea lamprey

The sea lamprey occurs along the whole coast line of the Gulf of Maine (Bigelow & Schroeder: 1953a 14). Reported from Beverly and Salem by Goode & Bean (1879a: 31). Still common in some freshwater streams but widely reduced in numbers throughout the region due to damming.

MCZ - 8861, 8866, 41007, 41012, 41848 (7, 135-780 mm TL) from Salem-Beverly Harbor, "Massachusetts Bay," Swampscott, Boston Harbor, and Gloucester.

ANSP 359 (1, 660) Boston; J.H. Slack; 1859.

MDMF Cat Cove 43 (2) 20 May 1969.

### Odontaspididae

3. Eugomphodus taurus (Rafinesque 1810) Sand tiger

Reported from Lynn by Storer (1842) and Boston Bay (Kendall 1908: 6). A 4-ft long specimen was taken at Cohasset (Bigelow & Schroeder 1953a: 19). Rare in Massachusetts Bay but common south of Cape Cod.

MCZ - 402 S (juv. male, 1070 mm TL) Nahant; 1864. 436 S (juv. female, 950 mm TL) "Mass."

## Alopiidae

### 4. Alopias vulpinus (Bonnaterre 1758) Thresher shark

Reported from Nahant (Storer 1839) and Boston Harbor (Jackson 1852). No recent records were cited by Bigelow & Schroeder (1953a: 33).

MCZ - 1166 S (juv. female, 128 cm TL) "Massachusetts Bay". 486 S (juv. female, 118 cm TL) Nahant; L. Agassiz.

## Lamnidae

### 5. Carcharodon carcharias (Linnaeus 1758) White shark

Reported from Provincetown by Storer (1848d) as a new species, Carcharias atwoodi. Bigelow & Schroeder (1958) stated that between 15 and 20 individuals of this species were captured, or harpooned and lost in Massachusetts and Cape Cod bays between 1930 and 1958. The largest, a 15-ft, 4-in fish weighing 3,000 lbs, was taken 3 mi east of Minots Light, July 19, 1957; the smallest measured 4-ft, 9-in (not 3 ft as reported in Bigelow and Schroeder 1953a) and was taken near Boston Light Ship on Sept. 13, 1947. A 13-ft 1,000 lb. individual was harpooned 2 miles east of Graves Light in Boston Harbor on August 4, 1959 (Anonymous 1959). Casey & Pratt (1985) reviewed recent western North Atlantic records.

MCZ 39719 (female, 152 cm TL) Boston Lightship; J.W. Lowes; 13 Sept. 1947.

### 6. Cetorhinus maximus (Gunnerus 1765) Basking shark

Numerous observations of this species "basking" on the surface exist from Massachusetts Bay. A 13-ft female was harpooned near Boston Lightship, Aug. 1947 (Bigelow & Schroeder 1953a: 31) and a "600 pound" specimen was taken off Nahant in August 1980 (Anonymous 1980).

MCZ - 36620 (head) Boston Lightship; 1948. 54413 (head of female 385 cm TL) Nahant Bay, gill net; Aug. 1979.

### 7. Isurus oxyrinchus Rafinesque 1810 Shortfin mako

A 2-m specimen was taken on rod and reel in summer, 1941 near Plymouth (Bigelow & Schroeder 1953a: 25) and a similar size male was found on the beach at Marblehead on July 7, 1985.

MCZ, UMMZ & MSI - 0.



8. Lamna nasus (Bonnaterre 1788) Porbeagle

A young individual was reported off Gloucester in Oct. 1878 (Goode & Bean 1879a: 29). A 37-in specimen was taken at Nahant (Bigelow & Schroeder 1953a: 21) and 2-m TL male was taken in a gill net off Graves Light, Aug. 1979 (specimen examined by Collette but not retained).

USNM 89929 (2 embryos attached to large eggs) near Gloucester; M.W. Blake; Nov. 1913.

MCZ 209 S (930 cm TL) Nahant; L. Agassiz; 1854.

Carcharhinidae

9. Mustelus canis (Mitchill 1815) Smooth dogfish

Reported from off Central Wharf, Salem in 1856 by Goode & Bean (1879a: 30). Massachusetts Bay specimens noted in the BSNH collection (Kendall 1908: 3). A 3-ft female taken on hook and line off Cohasset, Sept. 1951 (Bigelow & Schroeder 1953a: 36).

MCZ 1406-8 S (3 male pups, 315-320 mm TL) "Massachusetts Bay;" ex. BNHS 1917.

10. Prionace glauca (Linnaeus 1758) Blue shark

One specimen was caught on Stellwagen Bank, Aug. 1928 (Bigelow & Schroeder 1953a: 39). More recently, an 8-ft male was taken behind Lynnway Marina in 1972 (Anonymous 1972) and a 220-cm male was harpooned on the northwest corner of Stellwagen Bank, Aug. 1980.

MCZ 36273 (jaws and photograph of 11-ft spec.) Stellwagen Bank.

Sphyrnidae

11. Sphyrna tiburo (Linnaeus 1758) Bonnet head

Reported from Massachusetts Bay by Garman (1913). However, the specimens are apparently no longer in existence (Bigelow & Schroeder 1953a: 45).

MCZ, UMMZ & MSI - 0.

12. Sphyrna zygaena (Linnaeus 1758) Smooth hammerhead

Reported from Provincetown by Storer (1848c) as a new species, Zygaena subarcuata. There is one record from Nahant (Bigelow & Schroeder 1953a: 45, fig. 16).

MCZ 1159 S (juv. female, 685 mm TL) Nahant; L. Agassiz.

#### Squalidae

13. Squalus acanthias Linnaeus 1758 Spiny dogfish

Spiny dogfish appear in Massachusetts Bay from June-Oct. (Bigelow & Schroeder 1953a: 49-51) and were apparently more numerous here during the last quarter of the past century and the early 1900's than they had been previously (p. 51). However, Storer (1839) mentioned a fishery for this species out of Truro and Provincetown. A total of 51 specimens were taken at 16 BIOME stations between 34-88 m (Table 1).

USNM - 22316 (male, 720 mm TL) Gloucester; Fish. Comm. 89013 (female, 420 mm) Gloucester. 91545 (1, 175 mm) banks 4 mi SSE Scituate Harbor; D.D. Streeter; 7 July 1930. 123619, 21670, 22660, 38254 (50 pups, 165-225 mm TL) near Gloucester.

MCZ - several collections from Massachusetts Bay and Gloucester.

MSI (4 pups, 195-227 mm TL) from female taken on hook and line, Nahant; Aug. 1967.

14. Somniosus microcephalus Greenland shark  
(Bloch & Schneider 1801)

Scymnus brevipinna LeSueur, 1818 is based on a stuffed specimen of this species from Marblehead. A 10-ft specimen was reported from Nahant by Cabot (1849) and others were reported from Massachusetts Bay and from near Cape Ann by Bigelow & Schroeder (1953a: 55).

MCZ 29609 (juv. male, 128 cm TL) near Boston Light; 1952.

#### Squatinae

15. \*Squatina dumeril LeSueur 1818 Atlantic angel shark

Not previously reported from Massachusetts Bay or the Gulf of Maine. Bigelow & Schroeder (1948: 542) reported the northern limit as southern New England, citing 3 specimens from Rhode

Island and 2 from the vicinity of Woods Hole.

MCZ 54681 (head of female, 970 mm TL) off Marblehead; 0.5 mi NE of Cat I.; gill net; D. Valido; 1979. 58102 (1, 1570 mm FL) off Plymouth; G. Good; 9 Nov. 1981.

#### Torpedinidae

16. Torpedo nobiliana Bonaparte 1835 Atlantic torpedo

First reported from Truro and S. Wellfleet (Storer 1839). Then reported from Provincetown by Storer (1843a) as a new species, Torpedo occidentalis. Goode & Bean (1879a: 28) reported three or four individuals seen in summer on the south side of Cape Ann. Also reported from off Plymouth (Bigelow & Schroeder 1953a: 60). The most recent record is of a 4-ft. individual caught at the mouth of Swampscott Harbor in July 1981 (Anonymous 1981).

MCZ - 36040 (male, 82 cm TL) 12-15 mi off Plymouth; Nov. 1943. 54412 (jaw from 127 cm TL female) Mass. Bay, probably near Marblehead; 1979.

#### Rajidae

17. Raja erinacea Mitchill 1825 Little skate

Abundant in Massachusetts Bay in summer at depths of 25-35 fms (Goode & Bean 1879a: 28). Smallest and commonest skate in Massachusetts Bay, caught everywhere (Bigelow & Schroeder 1953a: 70). Recent literature reports come from Quincy Bay (Jerome et al. 1966: 27-28) and from Lynn-Saugus Harbor (Chesmore et al. 1972: 17).

USNM - 107775 (male, 270 mm TL) N. Truro; L.W. True. 123200 (9, 120-150 mm TL) Provincetown; Edwards.

MCZ - 234 S, 253 S, 358 S, 1020 S, 1137 S (9, 85.5-550 mm TL) from Mass. Bay, Nahant, Boston Harbor, and Quincy. 42145 (female, 530 mm TL) Gloucester; June 1963. 51436 (male, 145 mm TL) Boston Harbor; March 1967.

UMMZ 140510 (male, 430 mm TL) Revere Beach; C.L. and L.C. Hubbs 28-24; 6 June 1928.

MSI - several specimens and egg cases from Nahant.

18. Raja ocellata Mitchill 1815 Winter skate

Reported from Nahant by Garman (1874). Said to be taken in larger numbers in winter than summer in Massachusetts Bay (Bigelow & Schroeder 1953a: 65). A male from Nahant (MCZ 352 S) is illustrated in Bigelow & Schroeder (1953b: fig. 52). Reported from 3 BIOME stations at depths of 40-50 m (Table).

USNM 123199 (2 juveniles and 1 tail) Gloucester; Fish. Comm.; 1878.

MCZ - 248 S, 352 S, 353 S, 354 S, 355 S (9, 545-880 mm TL) Nahant; L. Agassiz; 1862. 918 S (egg case) Massachusetts Bay.

MSI (female, 830 mm TL) Nahant, off Ocean St., 7 m, gill net; 9 April 1981.

19. Raja laevis Mitchill 1817 Barndoor skate

Known from various localities in Massachusetts Bay (Bigelow & Schroeder 1953a: 63). Garman (1913) described R. stabuliformis from Cohasset and Nahant based on specimens of this species. A syntypic female (MCZ 1138 S) from Nahant was illustrated (pl. 22, fig. 2) as part of the original description.

MCZ - 3 S (neurocranium and spinal cord) Nahant, L. Agassiz; Sept. 1862. 368 S (2, 108-120 cm TL) Mass. 1138 S (female, 122 cm TL) Nahant; L. Agassiz.

20. Raja radiata Donovan 1808 Thorny skate

Noted from Nahant (Garman 1874), Gloucester and Salem (Kendall 1908: 12) and Ipswich Bay (Bigelow & Schroeder 1953a: 73). Garman (1913) described R. scabrata from Nahant based on specimens of this species including MCZ 254 S (mentioned in text) and 1139 S (illustrated in pl. 21, fig. 2). A male (MCZ 249 S) and a female (MCZ 1139 S) from Nahant were illustrated by Bigelow & Schroeder (1953b; figs. 55 & 56). A total of 126 specimens were taken at 31 BIOME stations at depths of 34-88 m (Table 1).

USNM - 24360 (1, 115 mm TL) Provincetown; Fish. Comm.; 1879. 31577 (male, 200 mm TL) Race Point Lighthouse; Fish Hawk 1085; 1882. 33065 (male, 165 mm TL) Mass. Bay; Fish. Comm.

MCZ - 249 S, 251 S, 252 S, 254 S, 356 S, 357 S, 1139 S, 1140 S, 1141 S (16, 440-830 mm TL) Nahant; L. Agassiz; 1862-1866. 51891 (egg case) Gloucester Harbor; R. Garland.

21. \*Raja senta Garman 1885 Smooth skate

There are no previous records from Massachusetts Bay (Bigelow and Schroeder 1953a: 71-72), although the species occurs throughout the western side of the Gulf of Maine in deep water, such as west of Jeffreys and Cashes ledges (80-100 fms). Reported from 9 Massachusetts Bay BIOME stations at depths of 40-88 m (Table 1) but no specimens were retained to document these records.

MCZ 34768 (6, 86-255 mm TL) Cashes Ledge, 42°53'N 68°58'W; W.C. Schroeder; 4 Sept. 1930.

#### Acipenseridae

22. Acipenser brevirostrum LeSueur 1818 Shortnose sturgeon

This species was recorded from Provincetown (Bigelow & Schroeder 1953a: 85) and a questionable specimen is mentioned and photographed from Ipswich Bay (Jerome et al. 1968: 32). Storer (1839) described a small sturgeon (2-ft, 3-in) from the Charles River at Watertown as A. oxyrhynchus and noted its blunt snout. It is possible that his specimen was A. brevirostrum.

MCZ 29226 (1, 700 mm FL) Provincetown; received 1907.

23. Acipenser o. oxyrhynchus Atlantic sturgeon  
Mitchill 1815

Bigelow & Schroeder (1953a: 83) reported this sturgeon from Provincetown, inside and outside of Boston Harbor, Truro, the mouth of Gloucester Harbor, and from mouths of the Essex, Parker, and Ipswich rivers. Jerome et al. (1968: 32) reported it from the Parker River - Plum Island estuary. Hoff (1980) reviewed the history and status of this sturgeon.

MSI - 1 preserved specimen and 1 skeleton from Nahant.

#### Anguillidae

24. Anguilla rostrata (LeSueur 1817) American eel

Abundant in most estuaries, streams and rivers tributary to Massachusetts Bay. Muraena bostoniensis LeSueur (1817) was based on a specimen of this species collected at Boston. Storer (1839) reported 3,000 lbs per year taken at Watertown. Recent reports note specimens from Quincy Bay (Jerome et al. 1966: 23), Mystic R. (Haedrich & Haedrich 1974: 63), Salem Harbor (Anderson et al. 1975: 17). Three juveniles taken in tidepools at Nahant (Collette 1986).

USNM 106699 (1, 327 mm TL) N. Truro; G.S. Miller.

MCZ - 34310 (2, 260-265 mm TL) Gloucester. 9251 (54, 58-113) Salem; Wheatland; 1859. 9274 (1, 265) Salem Harbor; C.H. Norris; 1863. 9288 (1, 445) Salem Harbor; C.E. Putnam; 1858. 2490 (1, 180) Cohasset; J.W. Sovering. 31513 (1, 320) Cohasset Harbor; N. Bryant.

UMMZ - 140531 (11, 51-56) Saugus River mouth; C.L. & L.C. Hubbs 28-28; 12 June 1928. 140564 (31, 51-230) Duxbury Bay; C.L. & L.C. Hubbs 28-34; 1 July 1928. 140630 (2, 116-117) Mystic River; C.L. & L.C. Hubbs 28-53; 31 July 1928.

ANSP 1015-17 (2, 77-181) Boston Harbor, Long I.; J.H. Slack; 1859.

MSI - Nahant, juveniles taken from tidepools, 1969 (2, 60-80), 1973 (1, 89), 1979 and 1983 (1, 294). Juvenile (118) Bear Pond, Nahant; Aug. 1980.

#### Congridae

25. Conger oceanicus (Mitchill 1818) Conger eel

Leptocephali found several times at Nahant but no recent material (Putnam 1866b; Storer 1867a; Goode & Bean 1879a: 26; Bigelow & Schroeder 1953a: 156). Bigelow & Schroeder (1936: 326) reported on a leptocephalus picked up on a beach at Newburyport just north of Massachusetts Bay. Its identification was confirmed by David Smith (pers. comm. 1982). A specimen was also found in a tidepool in Maine (Moring & Moring 1986).

MCZ 34632 (1, 99 mm TL) Newburyport; Nov. 1929.

#### Clupeidae

26. Alosa aestivalis (Mitchill 1815) Blueback herring

Common in Massachusetts Bay and many of its tributaries (Bigelow & Schroeder 1953a: 107). Questionable records in early literature may be confused with A. pseudoharengus. Reported in recent literature from Quincy Bay at Long Island, Boston (Jerome et al. 1966: 23-24) and the lower Mystic River (Haedrich & Haedrich 1974: 63). Ranked 7th in abundance (1,349 specimens) in Salem Harbor (Anderson et al. 1975: 17). A total of 346 specimens taken at 11 stations in the BIOME survey (Table 1).

USNM 22696 (1, 222) Gloucester; Bur. Fish.

MCZ - 23292 (9, 52-58) Cambridge, Fresh Pond; Shaler; 1859.  
59018 (117, 41-63) Merrimack R. around Stanley I.; K.E. Hartel  
79-41; 30 Sept. 1970. 59019 (284, 19-71) Charles R., 1 km above  
Eliot Bridge; K.E. Hartel 79-29; 19 Aug. 1979. 60054 (3, 172-  
207) Charles R. at Anderson Bridge; 29 May 1980; K.E. Hartel 80-  
24; 29 May 1980.

27. Alosa pseudoharengus (Wilson 1811) Alewife

Abundant in Massachusetts Bay and many of its tributaries, although no longer as common as formerly due to environmental alterations and damming. Belding (1921) reviewed the status of the species in Massachusetts. Ranked third in numerical abundance and third in biomass in a survey of the lower Mystic River by Haedrich & Haedrich (1974: 63). A total of 597 specimens were recorded from 26 BIOME stations (Table 1). The early report of Alosa mediocris from Boston Harbor by Kendall (1908: 37) was based on a BSNH collection. These specimens are now probably MCZ 35781 which are actually A. pseudoharengus. The nearest records for A. mediocris are at North Truro, Provincetown, Brewster and the mouth of the Merrimack R. (Bigelow & Schroeder 1953a: 101).

USNM 41928 (1, 140) Gloucester, Fort Worth; H.C. Chester; 20 Sept. 1878.

MCZ - 2373, 17641, 17759, 17806, 17807, 17822, 17885, 30297, 34361, 35781 (19, 51-223) from the Mystic R., Cambridge, Boston Harbor, Charlestown, and Nahant; 1862-1871.

UMMZ 187300 (skeleton, 218) 10 mi. E of Gloucester; K.F. Lagler; Oct. 1967.

28. Alosa sapidissima (Wilson 1811) American shad

Reported from Salem Harbor (Goode & Bean 1879a: 24). Now rare in tributaries to Massachusetts Bay, but adults breed in the North and South R., Marshfield (Bigelow & Schroeder 1953a: 110-111). Haedrich & Haedrich (1974: 63) reported one immature specimen (149 mm) from the lower Mystic River. Ten specimens were recorded from 3 BIOME stations (Table 1). Attempts are currently underway to reintroduce this species into the Charles R. (MDMF, pers. comm., 1986).

MCZ - 17640 (1, 220) Nahant; L. Agassiz. 17822 (1, 187) Nahant; L. Agassiz. 40884 (1, 380) "Mass. Bay"; D.H. Storer; BSNH 368.

29. Brevoortia tyrannus (Latrobe 1802) Atlantic menhaden

Reported from Massachusetts Bay (Storer 1839), Lynn (Storer 1858a) and Boston Bay and Salem (BSNH specimens, Kendall 1908: 41). In years when menhaden come, they appear in Massachusetts Bay about mid-May, are most abundant July-Sept. and depart by early Nov. (Bigelow & Schroeder 1953a: 116-117). During 1949-1962, a commercial menhaden fishery existed in coastal waters from Cohasset to Beverly, with the greatest abundance in and around Boston Harbor (Jerome et al. 1966: 34-35). Immature specimens (53-75 mm SL) were taken on flood and ebb tides during November in the lower Mystic River (Haedrich & Haedrich 1974: 63). Ranked 17th in abundance (152 specimens) of 39 species from Salem Harbor (Anderson et al. 1975: 17). Eggs and larvae were taken in Beverly-Salem Harbor (Elliott et al. 1979: 7-8) where the eggs ranked 16th in abundance (193 eggs, 0.1%), larvae 19th (68 larvae, 0.4%).

USNM - 23773 and 24424 (2, 213-270) Provincetown; Sept. 1879; Fish. Comm. 26706-7 (2, 228-242) Massachusetts Bay.

MCZ - 17693 (1, 253) and 2371 (1, 233) Nahant; L. Agassiz. 25125 (1, 208) Mass. Bay.

MSI - large series collected at Nahant; B.B. Collette 1670; Aug. 1978. (3, 16-17) Nahant, East Point; C. Collette; 7 Aug. 1972.

30. Clupea h. harengus Linnaeus 1758 Atlantic herring

Herring, large or small, appear at one season or another along the entire coastline of the Gulf of Maine (Bigelow & Schroeder 1953a: 94). Immature herring ranked 4th in abundance and biomass in a survey of lower Mystic River (Haedrich & Haedrich 1974: 63). Herring ranked 22nd in abundance (97 specimens) of 39 species from Salem Harbor (Anderson et al. 1975: 17). Herring eggs are demersal but the pelagic larvae ranked 8th in abundance (445 larvae, 2.8% of total) in Beverly-Salem Harbor (Elliott et al. 1979: 8, 14). Larvae were collected from October to January (water temperatures ranged 0-18°C) with peak abundance occurring in November. A total of 642 specimens were recorded from 22 BIOME stations (Table 1). Clupea elongata LeSueur 1818 is based in part on material from Marblehead.

MCZ - 2374, 17646, 25246 (4, 175-223) Nahant; L. Agassiz; 1862. 23299 (5, 250-260) Boston Harbor; F. Steindachner. 33934 (5, 39-48) Beverly Harbor.

UMMZ - 140512 (15, 36-43) Revere Beach; C.L. & L.C. Hubbs 28-24; 6 June 1928. 140563 (852, 42-97) Duxbury Bay; C.L. & L.C. Hubbs 28-34; 1 July 1928. 140641 (37, 21-89) Lynn Harbor at Nahant; C.L. & L.C. Hubbs 28-55; Aug. 1928. 140514 (1, 40) Saugus River mouth near Point of Pines; C.L. & L.C. Hubbs 28-25; 8 June 1928. 61941 (8, 76-113) Plymouth; J. Metzelaar; 2 Aug. 1924.



## Engraulidae

31. Anchoa mitchilli (Valenciennes 1848) Bay anchovy

There is an early record from Provincetown (Storer 1858a). More recently they were found impinged on traveling screens at the Salem Power Plant, but were not taken during 1971-74 field sampling in Salem Harbor (Anderson et al. 1975: 15).

MCZ - 41243 (17, 48-70) "Massachusetts"; D.H. Storer; ex. BSNH 402. 58213 (2, 38-50) Pilgrim Lake, Truro; K.E. Hartel; 1981.

MDMF Cat Cove (1, 65) Salem Power Plant; 1977.

32. Engraulis eurystole (Swain & Meek 1885) Silver anchovy

Reported from Lynn by Hubbs (1953) as Anchoviella eurystole based on a specimen (UMMZ 140642) he collected in 1928. Recently reported from Nova Scotia by Markle et al. (1980).

UMMZ 140642 (1, 49) Lynn Harbor at Nahant; C.L. & L.C. Hubbs 28-55; Aug. 1928.

## Osmeridae

33. Osmerus mordax (Mitchill 1815) Rainbow smelt

Storer (1839) reported smelt (as Osmerus viridescens) taken in nets and by hook under the ice in winter, with 750,000 dozen taken annually in Watertown alone. Considered abundant by Goode & Bean (1879a: 23) and plentiful all around the inner parts of Massachusetts Bay and its tributary harbors by Bigelow & Schroeder (1953a: 138). Reported from Quincy Bay, Long Island, Boston and Mason's Point, Quincy (Jerome et al. 1966: 23). Ranked second in numerical abundance (890 specimens, 47-190 mm SL) and biomass in a survey of the lower Mystic River (Haedrich & Haedrich 1974: 63). Ranked 9th (784 specimens) of 39 species from Salem Harbor (Anderson et al. 1975: 17). The eggs are demersal but larvae have been taken in Beverly-Salem Harbor where they ranked 30th in abundance (Elliott et al. 1979: 8).

USNM 76352 (1, 240) Gloucester, Squam R.; F. Stacey; 12 Nov. 1879.

MCZ - 6923 (1, 143) Boston; 1853. 6930 (9, 73.5-91.0) Plymouth Long Pond; T. Lyman; 1871. 6941 (7, 82-104) Boston Harbor; A. Ordway; 1859. 21981 (1, 174) Nahant; L. Agassiz; 1863. 25075 (8, 120-189) Long Pond near Beverly; T. Lyman; 1881. 25584 (2, 188-205); 25765 (1, 177); and 56534 (1, 194) Charles R., Cambridge; K.E. Hartel; 11 Dec. 1979.

ANSP 7731 (1, 154) Boston; orig. USNM 3452. 22348-9 (2, 138-149) Nahant; J.H. Slack; 1859.

MDMF Cat Cove (1, 163) Town R., Quincy; 26 March 1977.

### Salmonidae

34. Oncorhynchus kisutch (Walbaum 1792) Coho salmon

Historically there have been several attempts to introduce species of Pacific salmon (Oncorhynchus) in tributaries to Massachusetts Bay. These early programs were carried out after the decline of the Atlantic salmon and none were successful in establishing a reproducing population. In recent years, the Massachusetts Division of Marine Fisheries has begun a stocking program in the North River drainage. Since 1971, between 3,000 and 105,000 young have been stocked annually (R. Fairbanks, MDMF, pers. comm., 1987). Adults returning to the North River have supported a small but steady recreational fishery (Chamberlain 1980). However, due to physical conditions in the river (dams, etc.), no natural reproduction has taken place.

USNM, MCZ, ANSP, UMMZ & MSI: 0.

35. Salvelinus fontinalis (Mitchill 1815) Brook trout

Common in many streams tributary to Massachusetts Bay where naturally reproducing populations are supplemented by stocking. Historically, some individuals from coastal streams entered Massachusetts Bay (Goode & Bean 1879a: 23). Bigelow and Schroeder (1953a: 121) mentioned that only "a couple of small streams on the Massachusetts Bay side of the Cape still support a race of trout that ran down to the sea regularly".

USNM, MCZ, ANSP, UMMZ & MSI: no saltwater specimens.

36. Salmo salar Linnaeus 1758 Atlantic salmon

Storer (1839) reviewed the early decline of the species. Prior to the damming of streams (particularly the Merrimack in 1847), the Atlantic salmon was undoubtedly common in Massachusetts Bay. However, there have been no real spawning runs since 1860 (Bigelow & Schroeder 1953a: 125), and most records of the species since then in local tributaries probably resulted from extensive, though unsuccessful, stocking attempts. Occasionally, a number of fish, which are probably from northern populations, enter the area (eg. 4,400 lbs taken on the North Shore in 1937). Current efforts being made to reintroduce the fish to the Merrimack may be more successful than earlier stocking programs.

USNM 89016 (1, 353) Gloucester, mackerel net at surface; C. Birdseye; 23 Nov. 1927.

#### Sternoptychidae

37. Maurollicus muelleri (Gmelin 1892) Pearlsides

First reported by Storer (1839), as Scopelus humboldtii, from a specimen found alive on the beach of Nahant in Dec. 1837. Additional specimens, one from the stomach of a cod from Provincetown, and 6 others found on the beach at Provincetown were noted by Storer (1858a). Bigelow & Schroeder (1953a: 145) summarized records from the Gulf of Maine with no additional reports subsequent to Storer's from Massachusetts Bay. Grey (1964: 226) cited USNM 30223 from Provincetown.

USNM 30223 (1, 35) Provincetown; 23 Sept. 1879.

MCZ 61965 (1, 51) Provincetown, Race Point Beach; K.E. & J.A. Hartel; 9 March 1985.

#### Batrachoididae

38. Opsanus tau (Linnaeus 1766) Oyster toadfish

Goode & Bean (1879a: 11) reported that a specimen labelled "Massachusetts Bay" was then in the collections of the Boston Society of Natural History (No. 494). According to Bigelow & Schroeder (1953a: 520), there was only one definite Massachusetts Bay record, from Cohasset. Lawton et al. (1984: 200) listed it from near the Pilgrim Nuclear Power Station at Plymouth in western Cape Cod Bay.

USNM, MCZ, ANSP, UMMZ & MSI - 0

#### Lophiidae

39. Lophius americanus Valenciennes 1837 American goosefish

Storer (1855) reported that it was not a common species in Massachusetts Bay but was widely taken from Lynn to Provincetown during September, October, and November. In Massachusetts Bay it is most common on smooth bottom south of Boston (Bigelow & Schroeder 1953a: 540). Specimens were taken just inside Salem Harbor and at the Wingaersheek Beach station in the Annisquam River (Jerome et al. 1969: 30-33). A total of 67 specimens was taken at 24 BIOME stations at depths of 34-86 m (Table 1). Eggs and larvae were collected in Beverly-Salem Harbor (Elliott et al. 1979: 7-8); eggs ranked 14th in abundance, larvae 28th, both 0.1%

of the total or less.

MCZ 11778 (1, 48) Provincetown; J.H. Blake; ca. 1860.

MSI - (1, 960 mm TL), Nahant, East Point; 10 m; W.E. Wehling; 9 Sept. 1979. An egg mass was picked up on Short Beach, Nahant, 1971.

#### Merlucciidae

#### 40. Merluccius bilinearis (Mitchill 1814) Silver hake

Reported from Boston Bay by Kendall (1908: 137). Eggs and larvae have been taken at several localities in Massachusetts Bay (Bigelow & Schroeder 1953a: 179, Fig. 85). Reported from Quincy Bay at Pemberton Point, Hull (1, 72 mm TL) and Long Island Bridge, Boston (4,  $\bar{x}$  TL 343 mm) by Jerome et al. (1966: 27-30). Ranked 29th in abundance (8 specimens) of 39 species from Salem Harbor (Anderson et al. 1975: 17). Eggs and larvae were found in the ichthyoplankton in Beverly-Salem Harbor (Elliott et al. 1979: 7-8, 41). Eggs ranked 8th in abundance, 2,572 eggs comprising 0.9% of the total. Larvae ranked 20th, 65 larvae, 0.4% of total. Eggs were taken at 12-22°C, larvae 12-20°C. The second most abundant species at Massachusetts Bay BIOME stations, 3,471 specimens taken at 44 stations at depths of 34-91 m (Table 1).

USNM - 31560, 14876 (4, 50-207) Massachusetts Bay; Bur. Fish.

MCZ - 12390 (1, 103) Nahant; mid 1800's. 40907 (1, 320) Annisquam; 1880; orig. BSNH 1257. 56691 (16, 55-224) 42°31.2'N, 70°39'W; 62.5 fm; F/V Francis Elizabeth cr. 925, sta. 114; 8 May 1980.

UMMZ - 126215 (1, 345) Cohasset; A. Loveridge; 13 June 1932. 146280 (1, 200) Browns Bank.

MSI - (1, 127) Broad Sound; 2 Sept. 1976. (1, 340) Nahant, East Point; W. Fowle; 24 June 1980. (2, 265-313) Nahant, East Point; W. Fowle; 12 July 1980.

#### Gadidae

#### 41. Brosme brosme (Müller 1776) Cusk

Cusks are rarely taken in Cape Cod Bay or the deeper holes in Massachusetts Bay (Bigelow & Schroeder 1953a: 241). However, eggs and larvae have been recorded from Beverly-Salem Harbor (Elliott et al. 1979: 7-8). Eggs ranked 15th in abundance, less than 0.1% of the total; larvae ranked 27th, 0.1% of the total. Taken twice in Massachusetts Bay BIOME stations at depths of 40-

48 m (Table 1).

USNM - 22319 (1, 472) Gloucester; 1878; Fish. Comm. 24712 (1, 375) Gloucester, 5 mi. SSE Eastern Pt.; Dec. 1879; F. Fowler.

42. Enchelyopus cimbrius (Linnaeus 1766) Fourbeard rockling

The first Massachusetts record, under the name Motella caudacuta, is based on a specimen washed ashore at Provincetown (Storer 1848a). There are other early reports from very shallow water, on Nahant Beach, for example, (Kendall 1908: 144, BSNH specimens). A common bottom fish in deeper parts of Massachusetts Bay (Goode & Bean 1879a: 89) with definite records from Ipswich Bay, Gloucester, and Nahant (Bigelow & Schroeder 1953a: 237). Taken at 29 BIOME stations, 226 specimens at depths of 34-91 m (Table 1). Impinged on traveling screens at the Salem Harbor Electric Generating Station although not found during the survey of Salem Harbor (Anderson et al. 1975: 15). Eggs and larvae were important components of the ichthyoplankton in Beverly-Salem Harbor from March through November (Elliott et al. 1979: 7-8, 29). Eggs ranked third in abundance, 12,781 eggs, comprising 4.4% of the total. Larvae ranked 6th in abundance or 3.5% of the total. Eggs were in the plankton from the end of March to early November with a peak in June. Larvae were collected from the end of April through mid-November with a peak in July. Eggs and larvae were collected over a temperature range of 4-22°C.

USNM - 21918, 21919, 83925, 131920 (12, 78-234) Massachusetts Bay; Fish. Comm.; 1877-78. 20686 (5, 35-40) Nahant; C. Cooke. 23761 (1, 190) Provincetown; Fish. Comm. 217914 (1, 293) E of Gloucester; 14 Dec. 1975.

MCZ - 12347 (21, 10.3-22.3) Nahant; 1862. 56709 (9, 116-200) 42°31.21'N, 70°39.00'W; 62.5 m; F/V Francis Elizabeth cr. 925, sta. 14; 8 May 1980.

MSI (1, 40) Nahant; 1972.

MDMF Cat Cove - 2 collections (2, 127-146) Salem Power Plant; 1978.

43. Gadus morhua Linnaeus 1758 Atlantic cod

Reported along the whole coast of Massachusetts by Storer (1839). Common in Massachusetts Bay where spawning grounds are along the 20 fm curve in the southern half of Massachusetts Bay (Bigelow & Schroeder 1953a: 192). Recorded from the mouth of the North River (Fiske et al. 1966: 17), at all three off-shore stations in Quincy Bay - Long Island Bridge and Gallups Island, Boston and Wollaston Beach, Quincy (Jerome et al. 1966: 27-30) and ranked 13th in abundance (390 specimens) of 39 species from Salem Harbor (Anderson et al. 1975: 17). A total of 705 specimens taken at 39

BIOME stations at depths of 34-91 m (Table 1). One immature individual taken in the lower Mystic River (Haedrich & Haedrich 1974: 63). Eggs were found in the ichthyoplankton in Beverly-Salem Harbor from November through the first of July, with a peak in late April, and ranked 11th in abundance or 0.2% of the total (Elliott et al. 1979: 7-8, 29). Larvae were found from December to the end of July with a peak in late April, and ranked 12th in abundance, 1.2% of the total. Eggs and larvae were found at temperatures of  $-2^{\circ}$  to  $20^{\circ}\text{C}$ .

USNM 83932 (1, 74) Massachusetts Bay; Fish. Comm.; 1878.

MCZ 12303 Nahant; Agassiz; discarded.

UMMZ 187302 (2 skeletons, 289-305) 10 mi E of Gloucester; K.F. Lagler; Oct. 1967.

ANSP 22746 (1, 150) Gloucester Harbor; May 1879; R.E. Earle; orig. USNM 23166.

MSI (2, 288-397) Nahant; Aug. 1967.

44. Melanogrammus aeglefinus (Linnaeus 1758)

Haddock

Reported from Massachusetts Bay by Storer (1839). The most productive of small haddock grounds on the west side of the Gulf of Maine includes Stellwagen Bank (Bigelow & Schroeder 1953a: 205-206). Haddock are one of the most sought-after fishes in the North River area and are caught 6-7 mi out from the mouth of the river (Fiske et al. 1966: 24). Ranked 25th in abundance (33 specimens) of 39 species from Salem Harbor (Anderson et al. 1975: 17). Taken at 18 BIOME stations at depths of 34-91 m (Table 1). Eggs ranked 20th in abundance in the ichthyoplankton in Beverly-Salem Harbor and were collected from March to June at water temperatures of  $2-14^{\circ}\text{C}$  (Elliott et al. 1979: 7-8, 29). Larvae ranked 18th in abundance and were taken in the same time period at water temperatures of  $4-20^{\circ}\text{C}$ .

USNM 100456 (1, 15)  $43^{\circ}48'N$ ,  $70^{\circ}05'W$ ; 1910.

MCZ 56686 (10, 74.0-115)  $42^{\circ}34'N$ ,  $70^{\circ}37'W$ ; 38 fm; R/V Albatross IV 79-12; 7 Nov. 1979.

UMMZ 187301 (skeleton, 445) 10 mi E of Gloucester; K.F. Lagler; Oct. 1967.

MDMF Cat Cove 35 (1, 190) Rockport, Thatchers I.; 1963.

45. Microgadus tomcod (Walbaum 1792)

Atlantic tomcod

A resident species entering brackish water, common about walls and bridges in summer and taken with nets and hooks in winter in company with smelt (Goode & Bean 1879a: 8). Storer (1858a) reported 2,000 bushels taken annually at Watertown (Charles River). The species is found in practically every estuary around the Massachusetts Bay region (Bigelow & Schroeder 1953a: 198). Recent reports are from Humarock, mouth of the North River (Fiske et al. 1966: 17-18), at Long Island, Boston (Jerome et al. 1966: 23-24). Two specimens were taken in the lower Mystic River (Haedrich & Haedrich 1974: 63). Ranked 11th in abundance (617 specimens) of 39 species from Salem Harbor (Anderson et al. 1975: 17). Larvae ranked 24th in abundance, 0.1% of total, in ichthyoplankton in Beverly-Salem Harbor (Elliott et al. 1979: 8). Three specimens taken in a tidepool at Nahant (Collette 1986).

MCZ - 12321, 24061, 24062 (3, 274-302) Nahant; L. Agassiz. Neponset River; K.E. Hartel (specimens not retained); June 1983.

ANSP 22747 (1, 210) Boston Harbor; J.H. Slack.

MSI 3 collections (3, 75-115) Nahant, East Point; 1968-1969.

46. Pollachius virens (Linnaeus 1758)

Pollock

An extremely abundant resident species according to Goode & Bean (1879a: 8). Common along the whole coast of Massachusetts (Kendall 1908: 138). In the southern part of Massachusetts Bay, harbor pollock move out in June and return again in autumn; large pollock are in greatest numbers in late autumn and early winter (Bigelow & Schroeder 1953a: 218). Taken at the mouth of North River and offshore (Fiske et al. 1966: 17, 24). One immature specimen taken in lower Mystic River (Haedrich & Haedrich 1974: 64). Ranked 33rd in abundance (33 specimens) of 39 species from Salem Harbor (Anderson et al. 1975: 17). Commonly taken off Nahant on hook and line. Taken at 8 BIOME stations at depths of 34-91 m (Table 1). Eggs and larvae were taken in Beverly-Salem Harbor but neither were very abundant (Elliott et al. 1979: 7-8, 29). Eggs were found from September through March at temperatures of 2-16°C and ranked 24th in abundance. Larvae were taken from October through April at temperatures of 0-14°C and ranked 13th in abundance.

MCZ - 12279, 12289, 12302, 12305, 12320, 12325, 12334, 12336 (51, 16-281) Swampscott, Beverly, Nahant, and Salem; 1849-1880.

UMMZ - 162027 (1, 251) Gloucester, Milk I.; Capt. Webb; 1878; orig. USNM 22690. 187303 (4 skeletons, 301-407) 10 mi E of Gloucester; K.F. Lagler; Oct. 1967.

ANSP - 9017 (1, 275) Nahant; from MCZ. 8904 (1, 245) Boston Harbor; J.H. Slack. 8905 (1, 250) Gloucester; orig. USNM 39690.

MSI - (1, 320) Nahant, East Point; B.B. Collette 1230; 1967.  
(1, 128) Nahant, East Point, W. Fowle; 25 Aug. 1980.

47. Urophycis chuss (Walbaum 1792) Red hake

Reported from Massachusetts Bay by Storer (1858a) and Kendall (1908: 143). Found in deeper parts of Massachusetts Bay (Bigelow & Schroeder 1953a: 229). A single young male trawled in lower Mystic River (Haedrich & Haedrich 1974: 64). Ranked 16th in abundance (168 specimens) of 39 species from Salem Harbor (Anderson et al. 1975: 17). The 4th most abundant species at Massachusetts Bay BIOME stations, 1,018 specimens taken at 39 stations at depths of 34-91 m (Table 1). Eggs and larvae were taken in Beverly-Salem Harbor (Elliott et al. 1979; 7-8, 34). Eggs comprised 2.4% of the total, and were found from June to October at water temperatures of 10-22°C. Larvae were less abundant, 14th in abundance, 1.2% of the total. They were taken from July to November at water temperatures of 6-22°C.

USNM 88466 (2, 290-330) Gloucester; W.W. Welsh; March 1913.

MCZ - 12389 (1, 61) Nahant. 12383 (3, 61-83) Massachusetts Bay.

MSI - 3 collections (5, 134-197) Nahant and Beverly Harbor; 1973-75.

48. Urophycis tenuis (Mitchill 1815) White hake

Reported from between Cape Ann and Boston Harbor (Storer 1839 and 1858a). White hake are apparently more plentiful than U. chuss at depths greater than 40-50 fm in the Gulf of Maine (Bigelow & Schroeder 1953a: 228). However, at BIOME stations, more U. chuss were recorded than U. tenuis (1,018 specimens from 39 stations vs. 385 specimens from 34 stations) in the same depth range (Table 1). Taken by otter trawl at Kings Landing, 2.5 mi. upriver from the mouth of the North River (Fiske et al. 1966: 19). A single immature specimen trawled in lower Mystic River (Haedrich & Haedrich 1974: 64). Ranked 23rd in abundance (69 specimens) of 39 species from Salem Harbor (Anderson et al. 1975: 17).

USNM 21790 (1, 237) Gloucester, U.S. Fish Comm.

UMMZ - 140513 (163, 54-80) Revere Beach; C.L. & L.C. Hubbs 28-24; 6-7 June 1928. 140522 (55, 53-74) Saugus River mouth; C.L. & L.C. Hubbs 28-25; 8 June 1928. 140651 (36, 59-95) Lynn Harbor at Nahant; C.L. & L.C. Hubbs 28-55; Aug. 1928.

MSI - (2, 140-161) Beverly Harbor; T. Levesque; 19 Aug. 1975.  
(1, 107) Nahant, Little Nahant Beach; B.B. Collette 1770; 20 Aug. 1981.



Macrouridae

49. Nezumia bairdii (Goode & Bean 1877) Marlin-spike

The holotype (USNM 21014) was taken 44 mi ESE of Cape Ann in 160 fm (Goode & Bean 1877: 470). Listed from deep waters of Massachusetts Bay by Goode & Bean (1879a: 7-8) based on specimens collected by the Fish Commission in 1877. Bigelow & Schroeder (1953a: 245) mentioned a specimen taken off Gloucester, among Gulf of Maine records.

USNM 21014 (1, 255+ mm TL) 44 mi ESE of Cape Ann; Speedwell; 19 Aug. 1877.

Zoarcidae

50. \*Lycenchelys verrillii (Goode & Bean 1877) Wolf eelpout

Bigelow and Schroeder (1953a: 516) noted a number of records for this species from north and east of Massachusetts Bay. They specifically mentioned 61 specimens taken west of Jeffreys Ledge (off Cape Ann) in 1930. National Marine Fisheries Service records (Table 1) show 3 specimens taken at 2 BIOME stations in Massachusetts Bay in 50-83 m between 1975-1977.

USNM, MCZ, ANSP and UMMZ - 0.

51. Macrozoarces americanus (Schneider 1801) Ocean pout

Reported from Massachusetts Bay by Storer (1839). One of the specimens from Gloucester that Bean (1880: 82) reported as distributed is now ANSP 22740. Bigelow & Schroeder (1953a: 514) reported that they had never seen one taken in less than 10 fm in the Massachusetts Bay region, although it has been reported from Gloucester Harbor. Recent reports document this species from Long Island Bridge and Gallups Island, Boston and it ranked 6th in abundance (15 specimens) of 11 species at offshore stations in Quincy Bay (Jerome et al. 1966: 27). Individuals were also taken off the mouth of the North River (Fiske et al. 1966: 20) and four specimens were taken in lower Mystic River (Haedrich & Haedrich 1974: 64). Ranked 21st in abundance (112 specimens) of 39 species from Salem Harbor (Anderson et al. 1975: 17). A total of 408 specimens were taken at 25 BIOME stations at depths of 34-84 m (Table 1).

MCZ - 12501, 25101, 25102, 26662, 28273 (6, 356-855) from Nahant, Gloucester, and Boston Harbor; 1800's. 31485 (3, 39-54) 10 mi. off Cape Ann. 56696 (10, 365-500) 42°28.63'N, 70°38.09'W; 77 m; F/V Francis Elizabeth 925, sta. 30; 10 May 1980. 56321 (2, 40-48) Nahant, East Point; S. Norton; 10 Mar. 1980.

ANSP 22740 (1, 430) Gloucester; orig. USNM 22632.

MSI - 5 collections (6, 230-682) Nahant and Beverly Harbor; 1967-1974.

#### Hemiramphidae

52. Hyporhamphus cf. unifasciatus (Ranzani 1842) Halfbeak

An early report of Hemiramphus from Danvers Mill Pond (Putnam 1871a) probably refers to this species. There are three 1951 records from Massachusetts Bay - Quincy Bay, off Revere, and Sandwich (Bigelow & Schroeder 1953a: 169).

MCZ - 37326 (1, 139) Revere. 37327 (1, 172) Quincy Bay. 37342 (1, 153) Sandwich.

#### Scomberesocidae

53. Scomberesox saurus (Walbaum 1792) Atlantic saury

Reported from Massachusetts Bay by Goode & Bean (1879a: 21) and from the Weir River, Hingham, on the basis of BSNH specimens by Kendall (1908: 58). Bigelow & Schroeder (1953a: 170) reported seeing schools at several locations in Massachusetts Bay.

MCZ 35762 (1, 230) Weir R., Hingham; 1874; ex. BSNH 1156.

MSI (1, 350) Middle Bank, part of Stellwagen Bank; 1974.

#### Cyprinodontidae

54. Fundulus heteroclitus macrolepidotus Mummichog  
(Walbaum 1792)

An abundant species in every saltmarsh and protected backwater in Massachusetts Bay. There are early records from Boston (Storer 1839) and Salem (Kendall 1908: 62). Taken at Humarock and First Herring Brook, Scituate (Fiske et al. 1966: 17-18). Ranked 2nd in abundance (5,333 specimens) of 12 species taken at four shore stations in Quincy Bay (Jerome et al. 1966: 23-31). Ranked 5th in abundance (2,848 specimens) of 39 species from Salem Harbor (Anderson et al. 1975: 17). Found in 8 of 22 samples from two Nahant tidepools (Collette 1986). We follow Morin and Able (1983) in our use of the subspecies macrolepidotus.

USNM - 91467 (8, 43-46) Gloucester, Little R.; W.W. Welsh; 20 May 1913. 125539 (7, 97-170) Truro, Parmett R.; Bur. Fish.; 14 Sept. 1842.

MCZ - 1224 (3, 57-71) Hingham; S.F. Baird. 51847 & 51871 (3, 66-100) Cohasset; J. Wallace; 1976. 56563 (2, 31-41) Charles R. off Soldiers Field Road; K.E. Hartel 79-30; 19 Aug. 1979.

ANSP - 7257-61 (5, 53-75) Hingham; S.F. Baird; orig. USNM 1586. 7279-87 (9, 40-63) Boston; J.H. Slack. 7430-37 (8, 40-53) Boston; J.H. Slack. 7438-40 (3, 83-99) Boston Harbor; J.H. Slack. 7444-45 (6, 45-80) Boston Harbor; J.H. Slack.

UMMZ - 14055 (267, 24-89) Saugus River mouth near Point of Pines; C.L. & L.C. Hubbs 28-25; 8 June 1928. 140532 (70, 15-71) Point of Pines; C.L. & L.C. Hubbs 28-28; 12 June 1928. 140538 (192, 16-87) Scituate; C.L. & L.C. Hubbs 28-32; 17 June 1928. 140566 (148, 25-77) Duxbury Bay; C.L. & L.C. Hubbs 28-34; 1 July 1928. 140631 (67, 15-67) Mystic River above Alewife Brook; C.L. & L.C. Hubbs 28-53; 31 July 1928. 140643 (3, 51-67) Lynn Harbor at Nahant; C.L. & L.C. Hubbs 28-25; Aug. 1928.

MSI - 10 collections (126, 8-85 mm SL) Nahant, tidepools on East Point; 1968-1975. (50, 14-75) Nahant, Bear Pond; B.B. Collette & K.E. Hartel, BBC 1758; 31 Aug. 1980. (110, 15-76) Nahant, Bear Pond; B.B. Collette 1779; 19 July 1983.

55. Fundulus majalis (Walbaum 1792) Striped killifish

There are early records from the vicinity of Boston (Storer 1842 and 1858a) and Salem (Kendall 1908) and more recently from Cohasset (Bigelow & Schroeder 1953a: 165). Ranked 6th in abundance (10 specimens) of 12 species taken at 3 shore stations in Quincy Bay (Jerome et al. 1966: 23-31) and ranked 12th in abundance (607 specimens) of 39 species from Salem Harbor (Anderson et al. 1975: 17). Massachusetts Bay is the northernmost area where this species is commonly found.

USNM - 42403 (7, 84-119) Hingham; S.F. Baird. 70198 (3, 64-104) Sandwich; V.N. Edwards; 16 Sept. 1892.

MCZ - 1202 (3, 43-47) Salem Mill Pond; R.H. Wheatland; 1860. 35078 (9, 42-87) Cohasset; 1939. 34704 (4, 37-42) Cohasset; 1937. 54987 (6, 44-61) Hingham, Broad Cove; R.H. Gibbs 1960-2; 27 Feb. 1960.

ANSP 7118-27 (10, 33-47) Salem; J.H. Slack; 1859.

UMMZ - 140539 (43, 39-65) Scituate; C.L. & L.C. Hubbs 28-32; 17 June 1928. 140565 (61, 32-73) Duxbury Bay; C.L. Hubbs 28-34; July 1928.

MDMF Cat Cove 15 (1, 81) Boston Harbor; Aug. 1963.

Atherinidae

56. Menidia beryllina (Cope 1866) Inland silverside

A specimen taken in Cohasset in 1939 was the only published Massachusetts Bay record (Bigelow & Schroeder 1953a: 305). Carl and Laura Hubbs collected it in 1928 but these specimens (UMMZ 140516, 140533, 140541) were not mentioned by Bigelow & Schroeder. We have re-examined UMMZ 140541 but could not locate 140516 or 140533 in Nov. 1987 but Barry Chernoff (pers. comm.) assures us that these two lots were also correctly identified. A specimen (USNM 58880) was taken at Sandwich in 1842. During the late 1970's the species was common in the Charles River Basin and other tributaries to Massachusetts Bay as far north as Nahant. Recent collections (1981-86) have failed to find this species in the Charles River Basin.

MCZ - 35079 (1, 32) Cohasset; 1939. 54604 (1, 39) N. Hingham, Broad Cove; Feb. 1960. 56127 (1, 435) Dorchester, Neponset R.; Oct. 1979. 7 MCZ collections (54403, 56121-26) (752, 11-66) Charles River Basin; July-Dec., 1979.

UMMZ - 140516 (1, 47) Saugus River mouth; C.L. & L.C. Hubbs 28-25; 8 June 1928. 140533 (5, 41-47) Point of Pines; C.L. & L.C. Hubbs 28-28; 12 June 1928. 140541 (9, 33-44) Scituate; C.L. & L.C. Hubbs 28-32; 17 June 1928.

ANSP 158189 (23, 37-62) Nahant, Bear Pond; B.B. Collette & K.E. Hartel, BBC 1758; 31 Aug. 1980.

57. Menidia menidia (Linnaeus 1766) Atlantic silverside

Common to abundant inshore in Massachusetts Bay. Present in lower Charles River prior to damming (Storer 1853b). Most abundant species (22,682 specimens) of 12 species at each of 4 shore stations in Quincy Bay (Jerome et al. 1966: 31). Most abundant of 39 species from the North River with more than 1,000 specimens taken at 2 intertidal stations (Fiske et al. 1966: 18, 20). Second most abundant (1,271 specimens) of 15 species at 6 shore stations in Beverly-Salem Harbor (Jerome et al. 1967: 34). A length frequency graph for 1,566 specimens for the Annisquam River - Gloucester Harbor area showed a range of 15-140 mm in length (probably total length), with strong modes at 30-35 and 80-85 mm (Jerome et al. 1969: 37, fig. 7). Also 2nd in abundance of 32 species at 5 shore stations in Lynn-Saugus (Chesmore et al. 1972: 20) and of 40 species from Salem Harbor (Anderson et al. 1975: 17). Two specimens taken in lower Mystic River (Haedrich & Haedrich 1974: 64). Larvae were found in Beverly-Salem Harbor where they ranked 26th in abundance (13 larvae), 0.1% of the total (Elliott et al. 1979: 8).

USNM - 23414 (2, 77-85) Gloucester; A.H. Clark. 70143 (9, 50-69)

Gloucester, Pavillion Beach; Grampus; 29 July 1895.

MCZ - 18191 (5, 89-96) Boston Harbor; 1859. 18215 (4, 90-125) Dorchester. 18217 (6, 53-58) North Danvers; Essex Inst.; 1858. 18218 (1, 92) Chelsea Beach. 18226 (2, 71-83) Aquarial Gardens; 1859. 36339 (2, 66-77) Gloucester; H.B. Bigelow; 1913. 41024 (28, 18-99) Annisquam; ex. BSNH 1171. 52750 (30, 43-69) Cohasset; K.E. Hartel; 14 Aug. 1977. 56408 (489, 18-77) Nahant, sand flats near pharmacy; B.B. Collette 1669; 24 Aug. 1978.

UMMZ - 140540 (1, 79) Scituate; C.L. & L.C. Hubbs 28-32; 17 June 1928. 140644 (5, 50-59) Lynn Harbor at Nahant; C.L. and L.C. Hubbs 28-55; Aug. 1928.

### Zeidae

58. Zenopsis conchifera (Lowe 1852) Buckler dory

Storer (1858b) described this species as Zeus ocellatus based on a specimen from Provincetown originally deposited at BSNH. We have been unable to locate Storer's type. Bigelow & Schroeder (1953a: 299) reported it from off Cape Ann and in Cape Cod Bay. We have no recent specimens, but J.D. Kaylor (pers. comm.) informed us of the capture of one small specimen in Ipswich Bay in November of 1984 by the F.V. Maria Rosa; the specimen was lost.

MCZ - 36658 (1, 116) 25 mi E of Cape Ann, Mass., 75 fm; July 1948. 37541 (1, 220) Cape Cod Bay, 10 mi NE Canal breakwater; 18 fm; dragger Santina; 7 July 1952.

### Gasterosteidae

59. Apeltes quadracus (Mitchill 1815) Fourspine stickleback

There are early reports from Salem (Storer 1839; Putnam 1856b; Goode & Bean 1879a) and Annisquam (Kendall 1908; 63-64 based on BSNH specimens). Common along the shores of the Gulf of Maine in estuarine situations (Bigelow & Schroeder 1953a; 312). Ranked 4th (177 specimens) in abundance of 12 species found at 4 shore stations in Quincy Bay (Jerome et al. 1966: 31). Found at 2 of 6 stations in the North River (Fiske et al. 1966: 17-18). Found at 2 of 6 shore stations in Beverly-Salem Harbor where it ranked 6th (75 specimens) in overall abundance of 15 species (Jerome et al. 1967: 34). Taken at 2 of 7 shore stations in the Annisquam River-Gloucester Harbor area and ranked 9th (10 specimens) in abundance of the 16 species taken (Jerome et al. 1969: 24, 33). Found at 3 of 5 shore stations in the Lynn-Saugus Harbor area and ranked 14th (13 specimens) in abundance of the 32 species taken (Chesmore et al. 1972: 18-20). Ranked 4th (5,939 specimens) of 40 species from Salem Harbor (Anderson et al. 1975: 17).

MCZ - 23 lots, totaling 226 specimens from Nahant (6679, 6747, 6679, 6743, 56402), Salem (6742), Beverly (6775), Marshfield (43175, 54585-6, 54590-4), Cohasset (51855, 51872) and Weymouth (54587).

UMMZ - 5 lots collected by C.L. & L.C. Hubbs in 1928, totaling 73 specimens from Saugus River (140519, 140535), Scituate (140574), Duxbury Bay (140569), and the Mystic River (140634).

MSI - (8, 25-32) Nahant, Bear Pond; B.B. Collette & K.E. Hartel, BBC 1758; 31 Aug. 1980. (18, 21-42) Nahant, Bear Pond; B.B. Collette 1779; 19 July 1983;

60. Gasterosteus aculeatus Linnaeus 1758 Threespine stickleback

Common to plentiful in estuaries of Massachusetts Bay. There are early records from Boston (Storer 1839), Brookline (Storer 1853a), Salem (Putnam 1856b; Wheatland 1862), Annisquam, Cohasset, and Malden (Kendall 1908: 62). Present at all 4 shore stations in Quincy Bay and ranked 3rd in abundance (182 specimens) of the 12 species taken (Jerome et al. 1966: 23, 31). Taken at 3 of 6 shore stations in the North River (Fiske et al. 1966: 18). Found at 5 of 6 shore stations in Beverly-Salem Harbor and ranked 8th (46 specimens) of 15 species taken (Jerome et al. 1967: 24, 34). Collected at 3 of 4 shore stations in the Annisquam-Gloucester Harbor area and ranked 4th of 16 species at 7 shore stations (Jerome et al. 1969: 26, 33). Found at all 5 shore stations in Lynn-Saugus Harbor and ranked 4th (287 specimens) in abundance of 32 species taken (Chesmore et al. 1972: 18-19, 20). Ranked 3rd (10,495 specimens) of 40 species from Salem Harbor (Anderson et al. 1975: 17). Common in tidepools at Nahant, taken in 15 of 22 collections in two tidepools (Collette 1986).

MCZ - 21 lots totaling 428 specimens from Nahant (6669, 6679, 6719, 6743, 56404), Swampscott (6752, 6687), Salem (6663-4, 27421), Boston (6703, 33401, 54249), Cohasset (52514), Gloucester (54575), Cambridge (6672, 6676), Marshfield (54577), and Hingham (54578).

UMMZ - 5 lots collected by C.L. & L.C. Hubbs in 1928, totaling 755 specimens from Saugus River (140518, 140534), Duxbury Bay (140568), Mystic River (140633), and Nahant (140649).

MSI - 15 lots totaling 155 specimens from tidepools at East Point, Nahant and from grass flats near the pharmacy at Nahant; 1968-1985.

61. Gasterosteus wheatlandi Putnam 1866 Blackspotted stickleback

Originally described from Nahant by Putnam (1866a) but the type-specimens have been lost. Also reported from Swampscott (Kendall

1908: 63; Bigelow & Schroeder 1953a: 311). One specimen listed from a spring shore station in the North River (Fiske et al. 1966: 20). Much less common than G. aculeatus although found with it.

MCZ - 6692 (2) Swampscott. 6772 (11, 31-37) Cambridge. 43176 (3) North Cohasset. 52753 (2, 32-38) Cohasset, Quarry Point; K.E. Hartel & J. Wallace; 4 July 1977. 56403 (1, 27) Nahant, grass flats near pharmacy; B.B. Collette; Aug. 1978. 54600 (1, 30) Hingham, Broad Cove; W.H. Krueger; 11 June 1959. 54696 (2, 36-38) Marshfield Hills; W.H. Krueger; 27 March 1960.

UMMZ - 140521 (3, 31-32) Saugus River mouth; C.L. & L.C. Hubbs 28-25; 6 June 1928. 140543 (2, 33-34) Scituate; C.L. & L.C. Hubbs 28-32; 17 June 1928. 140567 (1, 32) Duxbury Bay; C.L. & L.C. Hubbs 28-34; 1 July 1928.

MSI (1, 24) Nahant, grass flats near pharmacy; 19 July 1983; B.B. Collette 1778.

62. Pungitius pungitius (Linnaeus 1758) Ninespine stickleback

There are early reports from Salem (Storer 1839; Putnam 1856b; Wheatland 1862) and Annisquam (Kendall 1908: 61, based on BSNH specimens). Found all around the shores of Massachusetts Bay but never in large numbers. One specimen (42 mm TL) was collected at Long Island, Boston (Jerome et al. 1966: 23-24). Two were taken in 1 of 6 North River stations (Fiske et al. 1966: 18-20). Taken at 3 of 6 shore stations in Beverly-Salem Harbor (Jerome et al. 1967: 24). Found at 1 of 4 shore stations in the Annisquam River - Gloucester Harbor area and ranked 7th of 16 species from 7 shore stations (Jerome et al. 1969: 26, 33). Found at 2 of 5 shore stations in the Lynn-Saugus Harbor area, and ranked 10th (67 specimens) of 32 species taken (Chesmore et al. 1972: 18-20). Ranked 8th (976 specimens) of 40 species from Salem Harbor (Anderson et al. 1975: 17).

MCZ - 14 lots totaling about 200 specimens mostly from Agassiz's collections at Nahant (6753, 6782) and R.H. Wheatland's collections from Salem Mill Pond from 1856-1860 (6678, 6734, 6745, 6767, 6661-2, 6664-6, 41236). 54602 (1, 34) N. Cohasset; W.H. Krueger; 11 June 1959. 57271 (21, 39-56) Saugus; K.E. Hartel; 19 Oct. 1980.

UMMZ - 4 lots collected by C.L. & L.C. Hubbs in 1928, totaling 45 specimens from Saugus River (140520), Scituate (140543), Mystic River (140632), and Nahant (140648).

ANSP 14215-27 (12, 54-63) Salem; J.H. Slack.

MSI - (2, 46-47) Nahant, East Point tide pools; B.B. Collette 1250; 29 Aug. 1968. (19, 32-44) Nahant, Bear Pond; B.B. Collette 1779; 19 July 1983. (11, 28-43) Nahant, grass flats near pharmacy; B.B. Collette 1778; 19 July 1983.

Fistulariidae

63. Fistularia tabacaria Linnaeus 1758 Bluespotted cornetfish

There are 2 records from the Gulf of Maine, 1 from Rockport, taken in Sept. 1865 (Goode & Bean 1879a: 4) and one taken on the northern edge of Georges Bank in 1947 (Bigelow & Schroeder 1953a: 317).

MCZ 40909 (1, 465) "Massachusetts"; D.H. Storer.

Syngnathidae

64. \*Hippocampus erectus Perry 1810 Lined seahorse

This species so rarely strays past Cape Cod that there is only one definite record (Nahant, this report) and one dubious report (Massachusetts Bay, Goode and Bean 1879a) in the inner parts of the Gulf of Maine. Two specimens were collected from the Maine coast in 1953 (Taylor et al. 1957: 33).

MCZ 56391 (1, 33 mm trunk length) Nahant, off East Point at 20 m on lobster trapline; 21 Sept. 1976.

65. Syngnathus fuscus Storer 1839 Northern pipefish

Common throughout most of Massachusetts Bay, especially in areas where eel grass (Zostera) is found. There are many early records from Nahant (Storer 1839); Boston (Storer 1863), Beverly (Goode & Bean 1879a: 4), Cohasset, Annisquam, and Swampscott (Kendall 1908: 65). Syngnathus peckianus Storer 1839 is a synonym. Recent literature records specimens from: Quincy Bay (Jerome et al. 1966: 26, 31), North River (Fiske et al. 1966: 18, 20), Beverly-Salem Harbor where it ranked 11th (15 specimens) of 15 species collected (Jerome et al. 1967: 24, 34), Little River and Niles Beach in the Annisquam-Gloucester Harbor area (Jerome et al. 1969: 28-39, 33), Lynn-Saugus Harbor (Chesmore et al. 1972: 18-20) and from Salem Harbor where it ranked 6th (1,369 specimens) of 40 species (Anderson et al. 1975: 17). Larvae ranked 11th in abundance in the ichthyoplankton in Beverly-Salem Harbor, 280 larvae, 1.8% of the total (Elliott et al. 1979: 8).

USNM - 86574 (1, 200) Gloucester; 1878; Fish. Comm. 109528 (1, 99) Provincetown. 132737-53 (53, 114-183) Provincetown Harbor; 1 Dec. 1915.



MCZ - 11741-2 (2, 58-69) Nahant; Agassiz. 36048 (43, 76-137) Charles R.; 1848. 36043 (1, 215) Gloucester. 36044 (1, 165) and 36052 (1, 107) Cohasset; H.B. Bigelow. 36050 (6, 145-190) Salem Mill Pond; Essex Inst.; 1859. 36054 (1, 79) Duxbury. 36058 (1, 170) Chelsea; Agassiz. 56405 (2, 94-110) Nahant, sand flats behind pharmacy; B.B. Collette 1665; Aug. 1978. 57902 (1, 225) Nahant, East Point; B.B. Collette; 28 Aug. 1980.

UMMZ - 140517 (2, 122-124) Saugus River mouth; C.L. and L.C. Hubbs 28-25; 8 June 1928. 140647 (3, 75-167) Lynn Harbor at Nahant; C.L. & L.C. Hubbs 28-55; Aug. 1928.

ANSP 836 (1, 121) Boston Harbor; T. Nuttall.

MSI - 2 collections (3, 110-111) Nahant, East Point; 1972-1974. (3, 42-222) Nahant, grass flats near pharmacy; B.B. Collette 1778; 19 July 1983.

#### Moronidae

66. Morone americana (Gmelin 1789) White perch

There are early reports from mouths of rivers and ponds near Boston (Storer 1853a), Floating Bridge Pond, Salem and Flax Pond, Lynn (Goode & Bean 1879a: 20), and from Fresh Pond, Cambridge (Kendall 1908: 97, based on BSNH specimens). According to Storer (1853a: 10), white perch were brought to the Boston market in the spring and autumn from the mouths of nearby rivers. Bigelow & Schroeder (1953a: 406) had heard only vaguely of them in Duxbury Bay, and in the North and South rivers in Marshfield, but reported them from salt creeks about Cohasset in the summer of 1950. A mature female (140 mm) was trawled in the lower Mystic River (Haedrich & Haedrich 1974: 64).

MCZ 56505 (1, 49) and 56506 (2, 155-162) Charles River Basin; K.E. Hartel 79-29 and 79-1; Aug. 1979.

67. Morone saxatilis (Walbaum 1792) Striped bass

There are early reports from Chelsea, Nantasket, and Boston (Storer 1839) and it was considered "a common resident, penetrating far up the larger rivers" (Goode & Bean 1879a: 19-20). Storer (1853a) reported 36-lb and 77-lb individuals taken from a bridge over the Charles River. Reported from the following localities along the coast of Massachusetts Bay: Plymouth Harbor, especially off Eel Cr.; Duxbury Bay; North and South rivers in Marshfield; Scituate; Cohasset; Boston Harbor; Hull Gut; Weir R., Hingham; and Wollaston Beach (Bigelow & Schroeder 1953a: 396). One specimen each was taken at 2 Quincy Bay stations, Long Island, Boston and Wollaston Beach, Quincy (Jerome et al. 1966: 33). There is a sport fishery for striped bass from spring to fall near the mouth of the North River (Fiske

et al. 1966: 24). Taken by the trap net fishery and by party boats outside Beverly-Salem Harbor (Jerome et al. 1967: 37-38). Two specimens were taken at the Little River station in the Annisquam River-Gloucester Harbor area (Jerome et al. 1969: 29). One individual was taken at the Short Beach station in Revere, and there is a sport fishery for striped bass off Lynn-Saugus Harbor (Chesmore et al. 1972: 19-20). An immature individual was taken in the lower Mystic River (Haedrich & Haedrich 1974: 65). Ranked 31st (4 specimens) of 40 species taken in Salem harbor (Anderson et al. 1975: 17).

MCZ - 40912 (2, 318-339) Massachusetts Bay; D.H. Storer. 57695 (2, 354-365) Scituate; W. Sides; 22 Sept. 1961.

### Serranidae

68. Centropristis striata (Linnaeus 1758) Black sea bass

There are early reports from Nahant (Storer 1853a; Putnam 1856a), Salem Harbor (Putnam 1856a), Beverly Bar (Kendall 1908), and Cohasset Narrows (Bean 1880). The Cohasset Narrows specimen (USNM 21440) was listed by Bean (1880: 99) as being distributed to another institution. Neither Kendall (1908: 99) nor Bigelow & Schroeder (1953a: 408) had any records to add to the above. Adults were reported to have been taken by hook and line and in lobster pots off Nahant in the summer of 1973 but no specimens were saved.

USNM 24362 (1, 260) Gloucester; Hoyt.

MCZ 21965 (1, 315) "Massachusetts Bay".

MSI (1) Nahant, East Point Canoe Beach; 7 m; T. van Wey and R. Etter; 20 June 1983.

MDMF Cat Cove (1, 220) Salem Willows.

### Priacanthidae

69. Pristigenys alta (Gill 1862) Short bigeye

There are 3 records for Massachusetts Bay: one individual was found alive on Marblehead Beach in 1859 (Storer 1867a), a second at Scituate in 1932 (MacCoy 1933), and a third was picked up in a Cohasset tide pool in 1937 (Schroeder 1937: 238). Bigelow & Schroeder (1953a: 410) summarized these records.

MCZ - 41253 (1, 45) Scituate; Sept. 1932. 34671 (1, 30) Cohasset; 7 Sept. 1937.

Pomatomidae

70. Pomatomus saltatrix (Linnaeus 1758) Bluefish

There are early records from Lynn (Storer 1842), Beverly (Cabot 1846), Nahant (Jackson 1847) and Hingham (Kendall 1908). According to Storer (1853b), the first bluefish seen north of Cape Cod after a long period of absence was in Oct. 1837. This species was extremely abundant in Massachusetts Bay from 1850-1860 (Bigelow & Schroeder 1953a: 386). Bluefish are taken by the trap net fishery outside Beverly-Salem Harbor (Jerome et al. 1967: 37). Ranked 30th (6 specimens) of 40 species in Salem Harbor (Anderson et al. 1975: 17). Common off Nahant in late August in some summers; 15 were taken on hook and line on 29 Aug. 1978.

USNM 88461-2 (2, 123-160) Massachusetts; W.W. Welsh.

MCZ - 16950 (1, 81) Boston; 1853. 16940 (1, 139) Massachusetts Bay. 41909 (2, 76-107) Gloucester; 1962.

MDF - Cat Cove (2, 60-75) Salem Power Plant; 1977, 1978.

Echeneidae

71. Echeneis naucrates Linnaeus 1758 Sharksucker

There are two early records, one from the bottom of a fishing boat in Boston Harbor (Storer 1839), and a second from Salem Harbor (Wheatland 1852). Bigelow & Schroeder (1953a: 485) had no new records to add. A specimen was attached to a 9-ft blue shark (Prionace glauca) caught off the Lynnway Marina on 27 Aug. 1972 (photo in Herald Traveler, Anonymous 1972).

USNM, MCZ, ANSP, UMMZ & MSI - 0

72. Remora brachyptera (Lowe 1839) Spearfish remora

Not infrequently accompanying swordfish into Massachusetts Bay according to Goode & Bean (1879a: 21), but there are no recent records.

USNM, MCZ, ANSP, UMMZ & MSI - 0

73. Remora remora (Linnaeus 1758) Remora

The only Gulf of Maine records are of one taken many years ago in Salem Harbor (Goode & Bean 1879a: 21) and one from Provincetown (Bigelow & Schroeder 1953a: 487).

USNM, MCZ, ANSP, UMMZ & MSI - 0

Carangidae

74. Caranx crysos (Mitchill 1815) Blue runner

There are early records from Boston (Storer 1842), Charlestown (Storer 1853b), off Gloucester (Goode & Bean 1879a: 11), and Ipswich Bay (Kendall 1908: 81 based on BSNH specimens). Bigelow & Schroeder (1953a: 376-377) summarized these records and noted that while rare, this species is more likely to round Cape Cod than is the following one. Lawton et al. (1984: 201, 204) reported several taken by gill net near the Pilgrim Nuclear Power Station at Plymouth in western Cape Cod Bay.

USMN 10670 (1, 160) N. Truro; S.J. Eastman; 30 Sept. 1889.

UMMZ 157064 (1, 135) Gloucester trap; A. Perlmutter; 22 Sept. 1947.

75. Caranx hippos (Linnaeus 1766) Crevalle jack

There are two published records of this southern fish from the Gulf of Maine, one from Lynn Beach in the summer of 1847 (Wheatland 1852), and the second from Provincetown in 1933 (Bigelow & Schroeder 1953a: 376).

MCZ 29289 (1, 165) Sandwich; 1908.

76. Naucrates ductor (Linnaeus 1758) Pilotfish

There are no records from Massachusetts Bay but it may occur there because pilotfish have been reported from Provincetown (Atwood 1859, MCZ 40911; Bigelow & Schroeder 1953a: 373) and several localities in Maine: off Portland (Bigelow & Schroeder 1953a: 373), Richmond Island and Southport (Scattergood 1959).

USNM, MCZ, ANSP, UMMZ & MSI - 0.

77. Selar crumenophthalmus (Bloch 1793) Bigeye scad

There are no records from Massachusetts Bay, but there are 2 records for Cape Cod Bay, Provincetown, and Sandwich (Bigelow & Schroeder 1953a: 378).

USNM, MCZ, ANSP, UMMZ & MSI - 0.

78. Selene setapinnis (Mitchill 1815) Atlantic moonfish

There are several early records from near South Boston (Storer 1853b), Danvers, North River, Salem, and Gloucester (Goode & Bean 1879a: 16). Impinged on traveling screens at Salem Power Plant, but not found during field sampling (Anderson et al. 1975: 15).

MCZ - 16798 (1, 40) Quincy; J.P. Thresher; mid-1800's. 41234 (1, 35) Dorchester; W.T. Hersey; April 1870; originally identified as Selene vomer, ex. BSNH 1252.

79. Selene vomer (Linnaeus 1758) Lookdown

Bigelow & Schroeder (1953a: 380) reported occasional specimens from Beverly and North Truro. A Dorchester record (Kendall 1908: 83) is based on a BSNH specimen (now MCZ 41234) which we identify as Selene setapinnis. Lawton et al. (1984: 202-203) reported a specimen from near the Pilgrim Nuclear Power Station at Plymouth in western Cape Cod Bay.

USNM, MCZ, UMMZ & MSI - 0

80. Seriola zonata (Mitchill 1815) Banded rudderfish

A rare visitor to the Gulf of Maine with records from Beverly, Provincetown (MCZ 16955), Wellfleet (Storer 1844b) and North River, Salem (Goode & Bean 1879a: 16; Bigelow & Schroeder 1953a: 374). Lawton et al. (1984: 201, 204) reported several taken by gill net from near the Pilgrim Nuclear Power Station at Plymouth in western Cape Cod Bay.

USNM 48909 (1, 155) N. Truro; G.S. Miller, Jr.; 3 Sept. 1890.

MCZ 17332 (1, 215) Boston.

UMMZ 157062 (1, 174) Gloucester, Annisquam River; A. Perlmutter; 9 Sept. 1947.

81. \*Trachurus lathami Nichols 1920 Rough scad

Bigelow & Schroeder (1953a: 377) mentioned specimens from Maine and Cape Cod. We have examined 2 specimens, procured by John Kaylor in 1985, from the Annisquam River, Gloucester which are the only known records for Massachusetts Bay proper.

MCZ - 37141 (1, 87) Sandwich; B. Morrow; Aug. 9, 1950. 63051 (2, 110-115) Annisquam R., Gloucester; J. Randazza; fall 1985.

ANSP 147879 (1, 200) Provincetown; C. Mayo; summer 1959.

## Sparidae

### 82. Stenotomus chrysops (Linnaeus 1766)

Scup

The first reports of this species north of Cape Cod are from Nahant by Storer (1839, 1853b). Storer believed that its presence in Massachusetts Bay may have been due to introduction. He stated the following: "In the year 1834 or 1835, Captain William C. Downes, of Holmes's Hole, carried a smack-load of this species from the Vineyard Sound, and threw them overboard in Plymouth Harbor...Mr. James Newcomb, fishmonger in the Boston Market, informs me that in the year 1831 or 1832 a smack-load of scapaugs arrived in Boston Harbor. A portion of them were purchased by subscription among the fishermen in the market, and thrown into the harbor. The next season two specimens were caught from our wharves; in the summer of 1835, one individual was taken at Nahant, and was considered a very strange fish, no specimen having been know to have been seen there before; in 1836, still another was captured at Nahant. As no specimen had ever been taken so far north before, and as the few taken would lead to the inference that those which had been transplanted from Buzzard's Bay had not bred in the cold waters of this portion of Massachusetts Bay, we are led to believe that individuals taken immediately around Boston were of the number of those originally brought from the South." (Storer 1853b: 51). There are subsequent records from Cohasset Narrows and Swampscott (Kendall 1908: 103, based on BSNH specimens). Bean (1880: 95) listed USNM 21436 from Cohasset Narrows as being distributed to another institution. Also reported from Thatchers Island (Goode 1884) and there is a recent Cat Cove specimen from there. Lawton et al. (1984: 201, 203-204) reported 245 specimens taken by otter trawl and several by gill net from near the Pilgrim Nuclear Power Station at Plymouth in western Cape Cod Bay.

USNM, MCZ, ANSP, UMMZ & MSI - 0.

MDMF Cat Cove 38 (1, 89) Rockport, Thatchers I.; 8 Oct. 1963.

## Sciaenidae

### 83. Cynoscion regalis (Bloch & Schneider 1801)

Weakfish

The earliest record of this species is from the weir at Milk Island, Cape Ann (Goode & Bean 1879a: 17). Kendall (1908: 105) reported it from Massachusetts Bay (BSNH specimen). Only during periods of great abundance has it appeared in any numbers in Cape Cod and Massachusetts bays; in 1906, 369 lbs. were reported from Nahant (Bigelow & Schroeder 1953a: 421). Eggs or larvae were reported for June-August in Cape Cod Bay by Scherer (1984: 158).

MCZ 40874 (1, 300) Massachusetts Bay; D.H. Storer.

MSI (1, 640) Nahant, found dead on Short Beach; Aug. 1973.

84. Leiostomus xanthurus Lacepède 1802 Spot

Reported only once from the Gulf of Maine, a single specimen from Massachusetts Bay in November 1936 (Smith and Goffin 1937: 236). Listed by Lawton et al. (1984: 201) from near the Pilgrim Nuclear Power Station at Plymouth in western Cape Cod Bay.

USNM, MCZ, ANSP, UMMZ & MSI - 0

85. Menticirrhus saxatilis Northern kingfish  
(Bloch & Schneider 1801)

One individual was taken at the entrance to Boston Harbor before 1833, one at Lynn in 1840, and 2 from Provincetown (Storer 1842, 1853b). Goode & Bean (1879a: 17) reported one from Marblehead Light and another from Spite Bridge, Danvers. Bean (1880: 93) listed USNM 21441 from Cohasset Narrows as being distributed to another institution. Lawton et al. (1984: 201, 203-204) reported one specimen taken by otter trawl, 1970-1976 and several by gill nets from near the Pilgrim Nuclear Power Station at Plymouth in western Cape Cod Bay. Larvae were reported from Cape Cod Bay in July and August by Scherer (1984: 158).

USNM, MCZ, ANSP, UMMZ & MSI - 0

86. Pogonias cromis (Linnaeus 1766) Black drum

Only a stray visitor to the Gulf of Maine, where 2 or 3 specimens have been taken at Provincetown (Goode & Bean 1879a: 17), and one in the Mystic River (Kendall 1908: 107, based on BSNH specimens). Bigelow & Schroeder (1953a: 426) added no recent records. Listed by Lawton et al. (1984: 201) from near the Pilgrim Nuclear Power Station at Plymouth in western Cape Cod Bay.

USNM, MCZ, ANSP, UMMZ & MSI - 0

Labridae

87. Tautoga onitis (Linnaeus 1758) Tautog

There are early records from Plymouth, Nahant, Lynn and Boston (Storer 1855). Bigelow & Schroeder (1953a: 481) summarized early speculations as to whether tautog are native north of Cape Cod or introduced. Several have been seen around Nahant in recent

summers. Individuals are quite common around the deep ledges off Cohasset (J. Wallace 1981, pers. comm.). Eggs and larvae were present in the ichthyoplankton in Beverly-Salem Harbor (Elliott et al. 1979: 7-8, 41). Eggs were taken from May through September, with a peak in July, and ranked 10th in abundance (733 eggs) or 0.3% of the total. Larvae were found from June through October and comprised 0.2% of the total. Eggs and larvae were found at temperatures of 12-22°C.

USNM 23232 (1, 215) Nahant.

MCZ - 14382-3 (3, 141-210) Swampscott; Lovering; received in 1860. 25482 (1, 358) Nahant; L. Agassiz.

88. Tautogolabrus adspersus (Walbaum 1792)

Cunner

Considered "common everywhere in shallow water and in harbors" by Goode & Bean (1879a: 14). The Massachusetts Bay region is perhaps the species chief center of abundance, according to Bigelow & Schroeder (1953a: 477). Due to its habitat preferences which make it difficult to sample with seines or trawls, it was taken in low numbers by Massachusetts Division of Marine Fisheries surveys in the North River (Fiske et al. 1966: 18), Beverly-Salem Harbor (Jerome et al. 1967: 34), Annisquam River-Gloucester Harbor (Jerome et al. 1969: 29) and Lynn-Saugus Harbor (Chesmore et al. 1972: 20). Three specimens were trawled in the lower Mystic River (Haedrich & Haedrich 1974: 64). Ranked 14th (146 specimens) of 40 species from Salem Harbor (Anderson et al. 1975: 17). Cunner was the most abundant species (235,935 eggs or 80.7% of the total) in Beverly-Salem Harbor (Elliott et al. 1979: 7-8, 19, 25-28). Eggs were taken from late April through mid-October. Larvae ranked second in abundance (2,779 larvae) or 17.8% of the total. Larvae were sampled from the end of April through the first of October with the peak at the end of July, and ranked second in abundance (2,779 larvae) or 17.8% of the total. Eggs and larvae were taken in temperatures of 10-22°C. Cunner is the most abundant species of fish around rocks at Nahant. Young and juveniles are abundant in tidepools at Nahant, they were taken in 20 of 22 collections in two tidepools, as many as 1,842 young (9-28 mm SL) in one collection in August 1981 (Collette 1986).

USNM - 100465 (1, 23) Gloucester, Squam R.; 29 April 1913. 154060 (15, 20-37) Provincetown Harbor; Grampus; 1 Oct. 1915.

MCZ - 14352, 14369, 25476 (7, 20-96) Nahant; L. Agassiz. 51912 (1, 26) Boston Harbor; 1967. 52775 (2, 114-121) Cohasset Harbor; K.E. Hartel; 1977. 56310 (1, 76) Beverly, Halfway Rock; S. Norton; July 1979. 65174 (1842, 9-28) Nahant; B.B. Collette, 1769; 15 Aug. 1981.

ANSP 22708 (1, 145) Boston Harbor; J.H. Slack.



UMMZ - 89262 (34, 8-120) East Point, Nahant; C.L. Hubbs & W.C. Schroeder, H 27-103; 16 Aug. 1927.

MSI - 18 collections (474, 9-255) Nahant, East Point; 1968-1981.

#### Mugilidae

89. Mugil cephalus Linnaeus 1758 Striped mullet

There is one early record from Provincetown (Storer 1853b) and one supposedly from Essex, but mullet only rarely stray past Cape Cod (Bigelow & Schroeder 1953a: 306). Recent specimens were reported from Salem Harbor (Anderson et al. 1975: 17), near the Pilgrim Nuclear Power Station at Plymouth (Fairbanks and Lawton 1977: 310), and western Cape Cod Bay (Lawton et al. 1984: 201).

MCZ 52713 (1, 306) Plymouth, Pilgrim Nuclear Power Station; 1975.

#### Stichaeidae

90. Lumpenus lampretaeformis (Walbaum 1792) Snake blenny

The first Massachusetts Bay record (as Blennius serpentinus) was of a 16-in specimen from a cod stomach (Storer 1848b). Considered a common resident of the deep waters of the Bay by Goode & Bean (1879a: 10). Drifting larvae taken in tow nets off Ipswich Bay, Cape Ann, and Boston Harbor (Bigelow & Schroeder 1953a: 496), and one larva was reported from Beverly-Salem Harbor (Elliott et al. 1979: 50). A total of 23 specimens was recorded at 6 BIOME stations at depths of 34-73 m (Table 1).

USNM - 83931 (2, 193-243) Massachusetts Bay; Speedwell. 89023 (1, 217) off Gloucester, 35 fm; C. Birdseye; 30 Aug. 1927.

MCZ 56690 (7, 260-420) and MSI (3, 350-385) 42°31.21'N, 70°39.0'W; 62.5 m; 8 May 1980.

MDMF Cat Cove 46 (1, 280) Rockport, Thatchers I.; F/V Francis Elizabeth Cruise 925; sta. 14; 1964.

91. Lumpenus maculatus (Fries 1837) Daubed shanny

Several specimens were collected in 40-90 fm in Massachusetts Bay by the Fish Commission in 1887 (Goode & Bean 1879a: 10-11). Bigelow & Schroeder (1953a: 497) had no additional records from Massachusetts Bay. A total of 484 specimens were taken at 14 BIOME stations at depths of 55-88 m (Table 1).

MCZ 56688 (14, 78.7-125) and MSI (6, 100-117) 42°28.03'N, 70°38.09'W; 77.3 m; 10 May 1980.

MDMF - Cat Cove 27 (1, 45) Rockport, Thatchers I.; 1963.

92. Stichaeus punctatus (Fabricius 1780) Arctic shanny

There is only one record for Massachusetts Bay, at Nahant (Collette & MacPhee 1969).

USNM 203405 (1, 43) Nahant; B.B. Collette & J.A. MacPhee; 22 July 1968.

93. Ulvaria subbifurcata (Storer 1839) Radiated shanny

First described by Storer from a specimen found at low tide among seaweed at Nahant in 1838. Bigelow & Schroeder (1953a: 500) found several individuals in tide pools at Nahant, trawled the species in Massachusetts Bay, and took its pelagic larvae in tow nets in Massachusetts Bay. The eggs are demersal; larvae were taken in Beverly-Salem Harbor from April through July, peaking in abundance at the end of April into May (Elliott et al. 1979: 8, 34, 37-38). Ranked fourth in abundance (1603 larvae) comprising 10.2% of the total larvae. The species can usually be taken subtidally around rocky shores at Nahant with the aid of rotenone. Taken in 12 of 22 collections from two tidepools at Nahant (Collette 1986).

MCZ - 9 lots (24, 20-110) Nahant. 3 lots (3, 73.7-98.7) Halfway Rock, Beverly; 1978-1980. 52697 (1, 20) Cohasset, 1977.

UMMZ 89259 (13, 22-105) East Point, Nahant; C.L. Hubbs & W. C. Schroeder, H 27-103; 16 Aug. 1927.

MSI - 12 lots (26, 18-116) Nahant.

Pholidae

94. Pholis gunnellus (Linnaeus 1758) Rock gunnel

There are early reports of this species under names including Muraenoides ingens H. R. Storer, M. macrocephalus Girard, and Gunnellus mucronatus H.R. Storer from Chelsea Beach (H.R. Storer 1850), Nahant (Storer 1855), Naugus Head (Goode & Bean 1879a: 11), and Ipswich Bay (Kendall 1908: 133). Found along the north shore of Massachusetts Bay, at Cohasset on the south shore, and off Plymouth (Bigelow & Schroeder 1953a: 494; p. 492, fig. 257, Gloucester specimen). This species has demersal eggs but the larvae are a common component of the ichthyoplankton (Elliott et al. 1979: 8), ranking 17th in abundance (104 larvae), or 0.7% of the total larvae in Beverly-Salem Harbor. This is the most abundant species in Nahant tidepools, taken in all 22 collections in two tidepools, 2 to 232 specimens per collection (Collette 1986).

USNM - 92222 (1, 127) Gloucester Harbor; R. Greenfield; 24 July 1929. 100464 (1, 20) Gloucester; 14 April 1913.

MCZ - 19 early collections (51, 48-193) from Nahant (12666-9, (12694). 56199-201, 56298, 56302, 56311 (7, 59-153) Nahant; S. Norton; 1979. 56399 (180, 39-170) Nahant, East Point; B.B. Collette 1752; 16 Aug. 1979.

ANSP 10607-12 (6, 74-121) Boston Harbor; J.H. Slack; 1859.

UMMZ - 5 lots totaling 15 specimens from Nahant (89261, 140650, 162234) and Massachusetts Bay (162194).

MSI - 23 lots (711, 30-170) Nahant, 1967-1985 and 1 (58) Beverly Harbor; 1974.

#### Anarhichadidae

#### 95. Anarhichas lupus Linnaeus 1758 Atlantic wolffish

There are early reports of this species from the Cusk Rocks between Cape Ann and Boston (Storer 1839, 1855), off Gloucester and Annisquam (Kendall 1908: 135, based on BSNH specimens). Anarhichas vomerinus Agassiz in Storer (1855), is a junior synonym. Known from deeper rocky spots near Gloucester and Nahant where fishermen have reported it as fairly plentiful (Bigelow & Schroeder 1953a: 506). Three specimens were taken at Mellos Bank, outside of Gloucester Harbor (Anderson et al. 1975: 30). Fourteen specimens taken at 9 BIOME stations at depths of 34-79 m (Table 1).

USNM 24701 (1, 375) Gloucester; J. Fowler.

MCZ - 12483 (1, 680) Nahant; L. Agassiz; holotype of A. vomerinus. 36422 (1, 610) "Massachusetts Bay"; J.A. Cutting. 56693 (1, 400) 42°28'N, 70°11'W; 93 m; R/V Delaware II 80-02, sta. 302; 22 April 1980.

#### 96. Anarhichas minor Olafsen 1774 Spotted wolffish

Reported from off the mouth of Gloucester Harbor and from Eastport, Maine by Goode & Bean (1879a: 11). Bigelow and Schroeder (1953a: 508) noted two more records from the Gulf of Maine (off Cape Elizabeth and off Portland Lightship).

USNM, MCZ, ANSP, UMMZ & MSI - 0

## Cryptacanthodidae

### 97. Cryptacanthodes maculatus Storer 1839

Wrymouth

Three Massachusetts Bay specimens were mentioned in Storer's original description, including individuals from Boston Harbor and Nahant. Goode & Bean (1879a: 10) referred to 7 more collected by the U.S. Fish Commission on the coast of Massachusetts, plus several from the shores of Essex County. An albino form was described as C. inornatus by Gill (1863: 332), based in part on specimens from Marblehead and Swampscott. Bigelow & Schroeder (1953a: 502) reported the species from outer Boston Harbor and noted that they had taken its late larvae and fry in tow nets off Boston Harbor and at other scattered localities in the Gulf of Maine. Three larvae were reported from Beverly-Salem Harbor (Elliott et al. 1979: 56).

MCZ - 12655 (2, 500-660 mm TL) Swampscott, Aquarial Gardens; received 1860. 59345 (1, 660) 42°30'N, 70°38'W; 68.4 m; F/V Francis Elizabeth Cruise 926, sta. 21; 11 Sept. 1980.

## Ammodytidae

### 98. Ammodytes americanus DeKay 1842

American sand lance

Work in progress by Betsy Washington of the Systematics Laboratory indicates that there are two species of Ammodytes in the western North Atlantic: A. americanus, an inshore species with fewer vertebrae, lateral plicae, gill rakers and pectoral fin rays and A. dubius, a more offshore species with higher counts. The first record of Ammodytes for Massachusetts Bay seems to be from Gloucester by Kendall (1908: 70) based on BSNH specimens. Plentiful along the coast from Cape Cod to Cape Sable wherever there are sandy shores (Bigelow & Schroeder 1953a: 490). Found at 3 of 6 shore stations in the North River (Fiske et al. 1966: 18-20) and ranked 4th of 24 species (262 specimens) from the shore stations. Taken at Niles Beach in the southeastern part of Gloucester Harbor (Jerome et al. 1969: 26). One specimen taken at each of 2 shore stations in Lynn-Saugus Harbor, Saugus River and Pines River (Chesmore et al. 1972: 18-24). One specimen collected among 40 species from Salem Harbor (Anderson et al. 1975: 17). The eggs are demersal but larvae are very abundant in the ichthyoplankton in Beverly-Salem Harbor, ranking first in abundance, 4,429 larvae, 28.3% of the total (Elliott et al. 1979: 8, 34, 41-42). Larvae were found from late December to the first of June, with a peak near the end of March. Water temperatures ranged from -2° to 18°C with the peak larval abundance about 6°C.

The USNM specimens from Gloucester, UMMZ specimens from Scituate and the MSI specimens from Nahant agree with counts of A. americanus from Maine-Mass.: plicae 124-142, mostly 134 or fewer; vertebrae 64-71, mostly 69 or fewer; gill rakers 22-28, mostly 24; and pectoral fin rays 12-14, mostly 13.

USNM 73499 (3, 95-109) Gloucester, the Cut and Pavillion Beach; Grampus; 24 July 1895.

MCZ - 12472 (1, 182) Salem. 12468 (12, 53-110) Nahant.

UMMZ 140537 (181, 64-137) Scituate; C.L. & L.C. Hubbs 28-32; 17 June 1928.

MSI (135, 65-93) Nahant, East Point, Canoe Beach; B.B. Collette 1759; 7 Aug. 1980.

99. Ammodytes dubius Reinhardt 1838 Northern sand lance

This is the offshore species of sand lance. Records from deeper water such as the 743 specimens from 12 BIOME stations at depths of 34-88 m (Table 1) are probably referable to this species.

The MCZ specimen from Stellwagen Bank has relatively high numbers of vertebrae (71) and pectoral fin rays (14) agreeing with A. dubius but the counts of plicae (136) and gill rakers (25) are in between the usual ranges for the two species.

MCZ 40699 (1, 177) N end Stellwagen Bank; F. Burnett; 12 Aug. 1960.

#### Trichiuridae

100. Trichiurus lepturus Linnaeus 1758 Atlantic cutlassfish

One individual was recorded from Lynn by Storer (1843b) and another from Salem Harbor by Goode & Bean (1879a: 14). There are no recent records north of Cape Cod (Bigelow & Schroeder 1953a: 351).

USNM, MCZ, ANSP, UMMZ & MSI - 0

Scombridae

101. Sarda sarda (Bloch 1793) Atlantic bonito

There are early records from Salem (Putnam 1856c), Lynn and Nahant (Storer 1842). Known to have reached Cape Ann in large numbers in the past as happened in 1876 when 73 were taken one August day in a weir near Gloucester (Bigelow & Schroeder 1953a: 338).

USNM 48907-8 (2, 197-202 mm FL) N. Truro; G.S. Miller, Jr.; July-Sept. 1880.

MCZ 17080 (1, 257 mm FL) Nahant; L. Agassiz; 1883.

102. Scomber japonicus Houttuyn 1782 Chub mackerel

Reported from Salem (Putnam 1856c), Lynn and Provincetown (Storer 1853b). Described as Scomber dekayi by Storer (1853b). Bigelow & Schroeder (1953a: 335) caught one at Cohasset in September 1942.

USNM - 89017-8 (2, 415-450 mm FL) Gloucester; Birdseye. 23479, 23480, 23754 (3, 194-214) Provincetown; Fish. Comm.

MCZ 22638 (1, 168 mm FL) Provincetown.

103. Scomber scombrus Linnaeus 1758 Atlantic mackerel

Goode & Bean (1879a: 14-15) reported that mackerel "visit the coast of New England yearly in enormous schools, appearing in Massachusetts Bay in May, where, after spawning, they remain until October or November". Widely distributed in the entire Gulf of Maine from July to September (Bigelow & Schroeder 1953a: 329, fig. 176). Mackerel are the object of sport and sometimes commercial fisheries off Quincy Bay (Jerome et al. 1966: 35), the North River (Fiske et al. 1966: 24), Beverly-Salem Harbor (Jerome et al. 1967: 37-38), Gloucester Harbor where 200,000 lbs were taken by the trap fishery in 1966 (Jerome et al. 1969: 36), and Lynn-Saugus Harbor (Chesmore et al. 1972: 20). Specimens were taken in the lower Mystic River (Haedrich & Haedrich 1974: 64) and Salem Harbor (Anderson et al. 1975: 17). Eggs ranked sixth in abundance in Beverly-Salem Harbor, comprising 1.3% of the total (Elliott et al. 1979: 7-8, 19). Larvae ranked 16th, 0.7% of the total. Eggs were present from May to August, at water temperatures of 8-20°C. Larvae were taken in June and July at water temperatures of 12-22°C.

USNM - 26356 (2, 174-170 mm FL) W. Gloucester; T. Burns; 15 Sept. 1880. 32384 (1, 325) 23 mi. E Thatchers I.; Collins. 133979 (2, 97-103) Gloucester, Riverdale Cove; 6 Aug. 1878.

MCZ - 16783 (6, 94.3-112 mm FL) Salem Harbor; R.H. Wheatland. 16738, 16985, 16938, 25481 (16, 103-213) Nahant; L. Agassiz; 1863.

ANSP - 11389 (1, 150 mm FL) Gloucester; Fish Commission. 22562 (1, 240) Nahant; J.H. Slack.

MSI (1, 177 mm FL) Nahant, East Point, Canoe Beach; B.B. Collette 1670; 29 Aug. 1978.

104. Scomberomorus maculatus (Mitchill 1815) Spanish mackerel

Storer (1843c) recorded an individual caught at Lynn in July 1841. The species has also been taken at Provincetown and at Monhegan Island, Maine (Goode & Bean 1879a: 15-16), but there are no recent records north of Cape Cod (Bigelow & Schroeder 1953a: 348; Collette & Russo 1985: 645-646).

USNM, MCZ, ANSP, UMMZ & MSI - 0

105. Thunnus t. thynnus (Linnaeus 1758) Atlantic bluefin tuna

There are early records from the North River, Salem (Wheatland 1852; Putnam 1856c), Cape Ann, Massachusetts Bay, and Provincetown (Storer 1853b). A 9-ft, 6-in specimen was stranded on the flats of North River, Salem in August 1846 and a 775-lb specimen was stranded on the beach at Beverly in July 1877 (Goode & Bean 1879a: 15). Most occurrences in the Gulf of Maine are outside of a line from Provincetown to Cape Ann (Bigelow & Schroeder 1953a: 342-343).

USNM, MCZ, ANSP, UMMZ & MSI - 0

#### Xiphiidae

106. Xiphias gladius Linnaeus 1758 Swordfish

Swordfish are only occasionally seen off Massachusetts Bay (Bigelow & Schroeder 1953a: 355).

USNM, MCZ, ANSP, UMMZ & MSI - 0

#### Ariommidae

107. Ariomma bondi Fowler 1930 Silver rag

Not known to occur in Massachusetts Bay, but included here on the

basis of specimens from Provincetown and specimens taken by the Massachusetts Division of Marine Fisheries "off Plymouth" and off Cape Ann. The junior synonym Cubiceps nigriargenteus Ginsburg 1954 was based on specimens from the Sandwich fish trap on Cape Cod (including MCZ 37183).

MCZ - 40259 (1, 118) off Provincetown; H. Lyman; 25 Sept. 1958. 40498 (1, 115) Provincetown; C. Mayo III; summer 1959. 66809 (1, 75) off Cape Ann, 42°42'N, 70°42'W, 20-22 m; R/V Gloria Michelle 8792; 11 Sept. 1987.

MDMF Sandwich Lab (1, 104) "off Plymouth"; R/V Francis Elizabeth Cr. 2, sta. 91; 20 Oct. 1979.

#### Centrolophidae

108. Hyperoglyphe perciformis (Mitchill 1818) Barrelfish

The only published Gulf of Maine records are from Boston Harbor (Storer 1846), Salem (Goode & Bean 1879a: 16), Gloucester and Annisquam (Kendall 1908: 87). Bigelow & Schroeder (1953a: 370) added no recent records. We have examined 2 specimens (one deposited at MCZ) taken in the Cape Cod Canal in 1967.

MCZ - 25670 (1, 226) Boston; mid to late 1800's. 56956 (1, 116) Cape Cod Canal; W.T. Sides; 30 Aug. 1967.

#### Stromateidae

109. Peprilus triacanthus (Peck 1800) Butterfish

There are early reports of this species from Provincetown and Boston by Storer (1853b). Goode & Bean (1879a: 16-17) felt that its occurrence was not unusual in the summer and mentioned specimens from Salem Harbor. Bean (Kendall 1908: 87) reported it from Gloucester. Anderson et al. (1975: 17) reported 3 specimens from Salem Harbor. Eggs ranked 7th in Beverly-Salem Harbor, 1.3% of the total, and were present from June to September at water temperatures of 12-22°C, with a peak in abundance in August (Elliott et al. 1979: 7-8, 19). Larvae were found from July to September at water temperatures of 14-22°C and ranked 22nd in abundance.

USNM - 10776 (1, 97) N. Truro; L.W. True; July 190. 116384 (1, 152) Gloucester Harbor.

MCZ - 16815 (2, 116-18) Malden; Higgins. 56687 (10, 97-108) 42°34'N, 70°37'W; 38 m; Albatross IV 79-12, sta. 613; 7 Nov. 1979.

MDMF Cat Cove 33 (1, 89) Rockport, Thatcher's I.; 1 Oct. 1963.



## Scorpaenidae

### 110. Sebastes fasciatus Storer 1854 Acadian redfish

There are early reports, usually as S. marinus, from Massachusetts Bay (Storer 1839), Misery Island, Salem Harbor (Wheatland 1852; Putnam 1856b) and Gloucester (Kendall 1908: 120). Storer originally (1854) described S. fasciatus from Provincetown. Goode & Bean (1879a: 14) considered it "common in summer in the deeper parts of the bay, where it appears to breed". Considerable numbers are sometimes taken on lines or in trawls at 20-25 fm in the Massachusetts Bay region (Bigelow & Schroeder 1953a: 434). A total of 668 specimens were taken at 28 BIOME stations at depths of 35-91 m (Table 1).

All records of Sebastes from Massachusetts Bay are probably referable to S. fasciatus, not S. marinus or S. mentella. Counts of most USNM and MCZ specimens agree with the description of S. fasciatus given by Ni (1981). Anal rays are usually III, 7, rarely III, 8, gill-rakers on the first arch are 34-37, mostly 36, and the pectoral fin does not reach past the anus.

USNM - 46084 (3, 78-101) Massachusetts Bay; Albatross. 83929 (3, 31-51) Massachusetts Bay; Fish. Comm.; 1878. 89019 (1, 191) Gloucester; 35 fms.; C. Birdseye; 30 Aug. 1927. 143784 (5, 56-90) Gloucester; Fish. Comm.; 1878.

MCZ - 26663 (1, 220) Gloucester. 13849 (1, 280) Boston mkt.; Steindachner; 1873. 22664-6 (3, 244-257) Swampscott; R.H. Wheatland; 1859; Essex Inst.

UMMZ 146282 (1, 133) Brown's Bank; J. Rockwell; Nov. 1940.

ANSP 12201 (1, 108) Gloucester.

MDMF Cat Cove 32 (1, 99) Rockport, Thatchers I.; 1963.

## Triglidae

### 111. Prionotus carolinus (Linnaeus 1758) Northern searobin

The first Massachusetts Bay records are from Green Island and Phillips Point, Lynn (Storer 1842, 1845a). Prionotus pileatus Storer 1845c is a junior synonym. Other early reports are from Salem Harbor (Wheatland 1852), Salem (Goode & Bean 1879a: 12), Cohasset Narrows and Annisquam (Kendall 1908: 128, based on BSNH specimens). Material (USNM 21443) from Cohasset Narrows was reported by Bean (1880: 85) as being distributed to another institution. Bigelow & Schroeder (1953a: 470) added that Welsh saw several in a trap at Manchester, and that one was trawled off Plymouth in 30 fm in 1943. A single young specimen (95 mm) was trawled in the lower Mystic River (Haedrich & Haedrich 1974: 64).

One specimen was taken in Salem Harbor (Anderson et al. 1975: 17). Eggs and larvae were taken occasionally in the ichthyoplankton in Beverly-Salem Harbor, eggs ranked 23rd, larvae 33rd (1 larva) (Elliott et al. 1979: 7-8).

MCZ - 13473 (1, 215) Massachusetts Bay; L. Agassiz. 13474 (1, 190) Massachusetts Bay, Aquarial Gardens. 13476 (1, 260) Salem Harbor; Essex Institute. 13489 (1, 205) Massachusetts Bay; Capt. Putnam; 1861. 13517 (1, 241) Boston Harbor. 13522 (1, 227) Nahant; L. Agassiz. 13523 (1, 260) Salem; Goode. 36041 (1, 250) 12-15 mi. off Plymouth; 20 Nov. 1943. 39774 (1, 190) Winthrop; Aug. 1957. 44160 (2, 215-220) Manchester, near Gales Point; 22 June 1970. 56275 (1, 214) Nahant, East Point, Shag Rock; 20 m; S. Norton; 6 May 1979.

MSI (1, 265) Nahant, East Point, Canoe Beach; 1970.

MDMF Cat Cove (2, 82-112) Salem Power Plant; Dec. 1977 and 1978.

112. Prionotus evolans (Linnaeus 1758) Striped searobin

Included with a query in a list of fishes from Salem Harbor (Wheatland 1852). Reported from Gloucester by Kendall (1908: 128, based on a BSNH specimen). Bigelow & Schroeder (1953a: 471) listed only two additional records from north of Cape Cod: Monhegan Island, Me. and North Truro. Six specimens were reported from Salem Harbor by Anderson et al. (1975: 17).

MCZ - 41202 (1, 115) Massachusetts Bay; D.H. Storer; ex. BSNH 329. 42157 (1, 220) mouth of Gloucester Harbor; J. Morris; fish trap; 5 July 1963.

Cottidae

113. Arteidiellus atlanticus Jordan & Evermann 1898  
Atlantic hookear sculpin

Trawled in considerable numbers in Massachusetts Bay in 42-90 fm (Goode & Bean 1877: 477), but the only other early record is from near Race Point lighthouse (Kendall 1908: 121, based on BSNH specimen). Bigelow & Schroeder (1953a: 441) stated that it, under the name Arteidiellus uncinatus (Reinhardt 1833), was generally distributed in the Gulf of Maine at depths greater than 20-30 fm but added no additional records from Massachusetts Bay proper. Use of the name A. atlanticus follows Van Guelpin (1986). Ten specimens were taken at 4 BIOME stations at depths of 50-66 m (Table 1).

USNM - 21069 (4, 30-32) Massachusetts Bay, 33-90 fm; Fish. Comm.; 14 Aug. 1877; paratypes of Arteidiellus atlanticus. 31809 (4, 35-52) Cape Cod Light House; 90 fm; Fish. Comm.; 3 Aug. 1882. 46056 (2, 42-50) Gloucester; Fish. Comm., Albatross; 1878.

MCZ 66808 (1, 51) off Marblehead, 42°48'N, 70°44'W; 54-55 m; R/V Gloria Michelle 8792; 10 Sept. 1987.

114. Hemitripterus americanus (Gmelin 1789) Sea raven

Considered "very common" in Massachusetts Bay by Storer (1836, 1853a) and "common in deep water approaching the shores" by Goode & Bean (1879a: 13-14). Other early reports are from Salem Harbor (Putnam 1856b), Gloucester and Annisquam (Kendall 1908: 124 based on BSNH specimen). Found all around the coastal belt of the Gulf of Maine from 1-2 fm down to 50 fm and also in the deeper harbors such as Salem and Boston (Bigelow & Schroeder 1953a: 456). Taken by the MDMF surveys in Quincy Bay (Jerome et al. 1966: 27), the North River (Fiske et al. 1966: 18), Beverly-Salem Harbor (Jerome et al. 1967: 30), the Annisquam River-Gloucester Harbor area (Jerome et al. 1969: 30), and Salem Harbor (Anderson et al. 1975: 17). Occurs at depths of 10-20 m off Nahant. A total of 65 specimens was taken at 17 BIOME stations at depths of 34-79 m (Table 1).

USNM - 24614 (2, 90-102) Massachusetts Bay; Fish. Comm. 11707 (1, 86) Gloucester; Fish. Comm., 1878.

MCZ - 13980 (1, 185) Nahant; 1856. 13982 (2, 240-275) Boston Harbor; Aquarial Gardens; 1859. 13983 (2, 124-190) Massachusetts Bay. 27264 (1, 500) Massachusetts Bay. 42159 (1, 235) mouth of Gloucester Harbor; J. Morris; lobster trap; 15 June 1963. 51869 (1, 300) Cohasset; K.E. Hartel & J. Wallace; 3 April 1976. 56189, 56282, 56285 (3, 93-225) Nahant, East Point; 3-15 m; S. Norton; 1979-80.

ANSP - 12035 (1, 290) Nahant. 22712 (1, 225) Boston Harbor.

MSI - 2 collections (3, 245-304) Nahant, East Point; 1969-1973.

115. Myoxocephalus aeneus (Mitchill 1815) Grubby

A common resident of shallow water (Goode & Bean 1879a: 13) that can be found at various localities in Massachusetts Bay such as Cape Ann, Gloucester, Salem, and Cohasset (Bigelow & Schroeder 1953a: 444). Taken by the MDMF in surveys of the North River (Fiske et al. 1966: 18), the Annisquam River-Gloucester Harbor area (Jerome et al. 1969: 30), and Lynn-Saugus Harbor (Chesmore et al. 1972: 20). Three specimens were trawled in the lower Mystic River (Haedrich & Haedrich 1974: 64). Ranked 20th (132 specimens) of 40 species from Salem Harbor (Anderson et al. 1975: 17). Larvae ranked 5th in abundance, comprising 4.4% of the total larvae, in Beverly-Salem Harbor (Elliott et al. 1979: 8, 34). Larvae were in the plankton from February to May at temperatures of 2-18°C with a peak in abundance in March. Common around Nahant (Norton 1980), taken in 17 of 22 collections from two tidepools, as many as 127 specimens in one collection (Collette 1986).

MCZ - 13672 (21, 21.4-75.5) Boston Harbor. 13698, 13699, and 25221 (3, 33.3-85.0) Nahant; L. Agassiz. 54734 (114, 24-72) Nahant, East Point; B.B. Collette 1752; 16 Aug. 1979. About 39 additional MCZ (56000's) collections (277, 26-110) Nahant, East Point, Dive Beach; S. Norton; 1978-80. 56318 (1, 72) Beverly, Half-way Rock; S. Norton; 23 July 1979.

UMMZ - 89260 (18, 30-88) East Point, Nahant; C.L. Hubbs & W.C. Schroeder, H27-103; 16 Aug. 1927. 140645 (128, 22-92) Lynn Harbor at Nahant; C.L. & L.C. Hubbs 28-55; Aug. 1928.

MSI - 22 lots (186, 15-105) Nahant, East Point; 1967-1985.

116. Myoxocephalus octodecemspinosus Longhorn sculpin  
(Mitchill 1815)

A common resident species according to Goode & Bean (1879a: 13) and Bigelow & Schroeder (1953a: 451). Common at Nahant. Taken by the MDMF surveys of Quincy Bay (Jerome et al. 1966: 27), the North River (Fiske et al. 1966: 18), Beverly-Salem Harbor (Jerome et al. 1967: 24), the Annisquam River-Gloucester Harbor area (Jerome et al. 1969: 30), and in Lynn-Saugus Harbor (Chesmore et al. 1972: 20). Ranked 33rd (2 specimens) among 40 species from Salem Harbor (Anderson et al. 1975: 17). A total of 137 specimens was taken at 16 BIOME stations at depths of 34-79 m (Table 1).

USNM 89021 (1, 217) Gloucester; C. Birdseye.

MCZ - 14 early lots from Salem, Nahant, Boston Harbor, and Cohasset. 56279 (2, 250-270) Nahant, East Point, Dive Beach; S. Norton; 21 Dec. 1978. 56283 (1, 215) Nahant, East Point, Shag Rocks; 15 m; S. Norton; 29 May 1980. 56695 (11, 54-267) 62°31.21'N, 70°39.00'W; 62.5 m; 8 May 1980.

UMMZ - 89258 (1, 106) East Point, Nahant; C.L. Hubbs & W.C. Schroeder, H27-103; 16 Aug. 1927. 140645 (128, 22-92) Lynn Harbor at Nahant; C.L. & L.C. Hubbs 28-55; Aug. 1928.

ANSP 12077-8 (2, 94-220) Boston Harbor.

MSI - several lots from Nahant and Beverly Harbor.

117. Myoxocephalus scorpius (Linnaeus 1758) Shorthorn sculpin

There are early records from Nahant and Boston (Storer 1839), Chelsea (Girard 1850), Salem and Gloucester (Kendall 1908: 123). Although considered a very common resident of the bays, particularly in winter by Goode & Bean (1879a: 13), this is the least common sculpin around Nahant. Common all around the entire coastline of the Gulf of Maine (Bigelow & Schroeder 1953a: 448). Taken in Mill River, tributary of the Annisquam River (Jerome et

al. 1969: 30) and in the Lynn-Saugus Harbor area, the Saugus and Pines rivers (Chesmore et al. 1972: 20). Ranked 31st (4 specimens) of 40 species from Salem Harbor (Anderson et al. 1975: 17).

MCZ - 13710 (1, 127) Massachusetts Bay; Aquarial Gardens. 32953 (1, 260) Cohasset; 1932. 56191, 56192, 56276, 56284 (4, 162-207) Nahant, East Point, Dive Beach; S. Norton; 1979-80.

UMMZ - 89258 (1, 106) East Point, Nahant; C.L. Hubbs & W.C. Schroeder, H27-103; 16 Aug. 1927. 126216 (2, 216-239) Cohasset; A. Loveridge; 26 June 1932.

MSI - (3, 230-320) Nahant, 1968-1973.

118. Triglops murrayi Günther 1888 Moustache sculpin

There are early records from Massachusetts Bay (Goode & Bean 1879a: 13) and from Race Point lighthouse (Kendall 1908: 121; USNM 31580). Bigelow & Schroeder (1953a: 442) considered the species, as the junior synonym T. ommatistius Gilbert 1913, uncommon but trawled them in Massachusetts Bay.

USNM 73921 (1, 86) Gloucester; holotype of Triglops ommatistius Gilbert.

#### Agonidae

119. Aspidophoroides monopterygius (Bloch 1786) Alligatorfish

The earliest report is of 3 specimens from the stomachs of haddock caught within 2 mi of Nahant (Storer 1839). Other early records are from Boston Bay (Storer 1853a), Massachusetts Bay (Goode & Bean 1877, 1879a), and Ipswich Bay (Kendall 1908: 125, based on BSNH specimen). Bigelow & Schroeder (1953a: 458) considered this species to be not uncommon, based on 8 specimens trawled at 32 fm in Ipswich Bay and 6 more from 27 fm in the inner part of Massachusetts Bay. Larvae ranked 29th in abundance (4 larvae) in Beverly-Salem Harbor (Elliott et al. 1979: 8). A total of 27 specimens was taken at 10 BIOME stations at depths of 40-88 m (Table 1).

USNM - 23174, 24336, 31565, 41752-53, 41758-62, 417565-66, 41772, 41774-75, 41778-79, 83872, 134946 (86, 49-125) Gloucester, Stellwagen Bank, Massachusetts Bay; Fish. Comm.; 1877-79.

MCZ - 13457, 26628, 27807, 41215 (5, 95-115) Massachusetts Bay; 1878-1880. 56689 (2, 93-94) 42°31.21'N, 70°39.00'W, 62.5 m.; F/V Francis Elizabeth Cruise 925, sta. 14; 8 May 1980.

ANSP - 12224 (1, 52) Massachusetts Bay; orig. USNM 23174. 77862 (1, 67) Massachusetts Bay; U.S. Fish Commission.

MDMF Cat Cove (1, 75) off Gloucester; 1976.

Cyclopteridae

120. Cyclopterus lumpus Linnaeus 1758 Lumpfish

There are early records from Massachusetts Bay (Storer 1839), Nahant (Garman 1892), and Swampscott (Kendall 1908: 126 based on BSNH material). Common at Nahant, Swampscott, Cohasset, Plymouth, and Truro (Bigelow & Schroeder 1953a: 463). Taken by the MDMF in surveys of Quincy Bay (Jerome et al. 1966: 23), the North River (Fiske et al. 1966: 18), Beverly-Salem Harbor (Jerome et al. 1967: 24, 30), in the Annisquam River-Gloucester Harbor area (Jerome et al. 1969: 30) and in Lynn-Saugus Harbor (Chesmore et al. 1972: 18). Ranked 24th (57 specimens) of 40 species from Salem Harbor (Anderson et al. 1975: 17). Five larvae were taken in Beverly-Salem Harbor (Elliott et al. 1979: 50). Adults are common inshore at Nahant in the spring, juveniles have been taken in tidepools (Collette 1986).

USNM 154884 (1, 25) Gloucester; A.R. Crittenden.

MCZ - 8 lots (17, 10-350) from Nahant, Swampscott, Beverly and Salem; 1864-1976.

UMMZ - 89257 (3, 16-23) East Point, Nahant; C.L. Hubbs & W.C. Schroeder, H 27-103; 16 Aug. 1927. 140530 (1, 230) Nahant; C.L. & L.C. Hubbs 28-27; 10 June 1928.

ANSP 142592 (1, 23) Rockport, between Milk I. and Lands End; 10 Sept. 1947.

MSI - 9 lots of juveniles (20, 10-70) from Nahant; 1968-85. 2 lots (2, 215-328) Nahant; April 1974, May 1976.

MDMF Cat Cove 57 (1, 24) Gloucester, Mill River; 12 Dec. 1966.

121. Eumicrotremus spinosus Atlantic spiny lump sucker  
(Müller 1777)

This is a rare stray from the Arctic and far North Atlantic oceans. One specimen was dredged by the U.S. Fish Commission 6 miles off Half-way Rock Salem, 10 Aug. 1877 in 35 fm (Goode & Bean 1877: 477). Also reported from deep waters of Massachusetts Bay (Goode & Bean 1879a: 12; Kendall 1908: 126 based on BSNH material) and from 15 miles southeast of Cape Ann (Bigelow & Schroeder 1953a: 463). An illustration of a Massachusetts Bay specimen originally published by Goode & Bean (1895) is included as fig. 242 in Bigelow & Schroeder. Jerome et al. (1969: 30) reported that a specimen was taken in Mill River, tributary to the Annisquam River, but this record was apparently based on MDMF Cat Cove 57 which is a 24-mm specimen of Cyclopterus lumpus.

USNM 21070 (1, 25) Massachusetts Bay; Fish Comm.; 10 Aug. 1877.

122. Liparis atlanticus (Jordan & Evermann 1898) Seasnail

Generally distributed around the shoreline of the Gulf of Maine (Bigelow & Schroeder 1953a: 465), with early records from Nahant and Salem (Storer 1867a; Putnam 1874b, and Garman 1892). Taken by MDMF surveys in Beverly-Salem Harbor (Jerome et al. 1967: 29), the Annisquam River-Gloucester Harbor complex (Jerome et al. 1969: 30), and in Lynn-Saugus Harbor (Chesmore et al. 1972: 19). Larvae were found in the ichthyoplankton in Beverly-Salem Harbor from April to the first of June at water temperatures of 6-20°C (Elliott et al. 1979: 8, 41). The larvae ranked 9th in abundance (comprised 2.2% of the total) and peaked in abundance in April. Common in tidepools and subtidally at Nahant; taken in 10 of 22 collections from two tidepools (Collette 1986).

MCZ - 12944 (1, 56) Nahant; A. Agassiz; 1861. 12955 (2, 24-28) Massachusetts Bay. 12956 (1, 25) Salem Harbor; 1873. 56060 (1, 71) Cohasset. 5 recent MCZ (56000's) lots (27, 51-79) from Nahant; S. Norton; 1979-80.

MSI - 14 lots (47, 7-65) Nahant, East Point; 1968-85.

123. Liparis coheni Able 1976 Gulf snailfish

There are early reports (as Liparis liparis or L. vulgaris) from Salem Harbor (Putnam 1874b) and Baker's Island near Salem (Goode & Bean 1879a: 12). Reported (as Liparis liparis) in Massachusetts Bay by Bigelow & Schroeder (1953a: 367). Larvae also reported as L. liparis ranked 25th in abundance in Beverly-Salem Harbor (Elliott et al. 1979: 8). Our use of L. coheni is based on Able (1976).

MCZ 56061 (1, 38) Nahant off Canoe Beach at 20 m; W.E. Wehling; Aug. 1978.

MSI - several specimens collected at Nahant during parasite study; S. Bailey; 1982-83.

MDMF Cat Cove (1, 48) Salem area.

Dactylopteridae

124. Dactylopterus volitans (Linnaeus 1758) Flying gurnard

The only report is of an individual said to have been taken in Massachusetts Bay (Bigelow & Schroeder 1953a: 473).

MCZ 35766 (1, 120) "Massachusetts Bay"; ex. BSNH 2147.

Bothidae

125. Paralichthys oblongus (Mitchill 1815)      Fourspot flounder

Not common north of Cape Cod. Putnam (1870) mentioned two specimens from Salem Harbor. One individual was trawled by the U.S. Fish Commission Aug. 15, 1878 in Gloucester Harbor (Goode & Bean 1879b: 40). Specimens from "off Plymouth" are in the MDMF lab at Sandwich. This species is plentiful south of Cape Cod (Bigelow & Schroeder 1953a: 271). Platessa quadrocellata Storer 1847 was based on a specimen of P. oblongus from Provincetown (MCZ 35789). Eggs and larvae were reported from Beverly-Salem Harbor by Elliott et al. (1979: 7-8, 56), ranking 18th (63 eggs, 0.1% of total) and tied for last (1 larva), respectively. A total of 58 specimens were taken at 14 BIOME stations at depths of 40-79 m (Table 1).

MCZ 56692 (3, 136-260) 42°06'N, 70°21'W; 58m; R/V Delaware II 80-02, Sta. 291; 21 April 1980.

MDMF Cat Cove 50 (1, 250) between Gloucester and Nahant; 1964.

126. Scophthalmus aquosus (Mitchill 1814)      Windowpane

Reported from Salem Harbor in 1870 and from Gloucester Harbor and Milk Island in 1878 by Goode & Bean (1879a: 6). Bigelow & Schroeder (1953a: 294) knew of no other records from Massachusetts Bay. Recent records from MDMF surveys are more numerous: 2 of 3 offshore stations in Quincy Bay (Jerome et al. 1966: 27-34); the mouth of the North River (Fiske et al. 1966: 17-20); just inside the entrance to Salem Harbor (Jerome et al. 1967: 36); 2 of 7 offshore stations in the Gloucester Harbor area for a ranking of 13th of 26 species (Jerome et al. 1969: 31-36); off Nahant in the entrance to Lynn Harbor (Chesmore et al. 1972: 20, 24); ranked 14th (244 specimens) of 40 species of fishes taken in Salem Harbor (Anderson et al. 1975: 17); and a young specimen (33 mm) trawled in the lower Mystic River (Haedrich & Haedrich 1974: 65). Windowpane eggs ranked fifth in abundance (6,969 eggs, 2.4% of total) in Beverly-Salem Harbor (Elliott et al. 1979: 7-8, 45-49). Eggs were found from June to October, with a peak in abundance in July. The average number of eggs per 100 m<sup>3</sup> per tow was 49-51 in 1976. Larvae were taken from June through November and comprised 0.7% of all larvae collected. Eggs and larvae were found at temperatures of 12-22°C. Thirteen specimens were taken at 8 BIOME stations at depths of 34-66 m (Table 1).

USNM 154890 (1, 197) Provincetown.

MCZ 49947 (1, 138) "Massachusetts Bay"; ex. BSNH 921.



MSI - 7 lots (24, 139-320) from Beverly Harbor (1975), Nahant (1977), and Lynn Harbor (1979, 1981).

MDMF Cat Cove (1, 107) Salem Harbor; 1974.

127. \*Etropus microstomus (Gill 1864) Smallmouth flounder

Scherer (1984) first reported this species from Cape Cod Bay based on larval specimens. In 1987, Steven Correia (MDMF) collected two specimens (25-130 mm SL) of smallmouth flounder off Wellfleet in Cape Cod Bay. The larger specimen was deposited in the MCZ. These are the first records of adults north of Cape Cod. The MCZ specimen agrees with the description of E. microstoma in Leslie and Stewart (1986) based on body depth, squamation, and number of gill-rakers. They reported the northern-most record for this species as New York, but 1987 MDMF trawl surveys collected 61 specimens off Nantucket, Martha's Vineyard and in Buzzards Bay. We have also seen a specimen seined at Falmouth.

MCZ - 66806 (1, 116) off Wellfleet, 41°55'N 70°00'W, 8 m; S. Correia, MDMF; 14 Sept. 1987. 66798-66805, 66807 (44, 51-110) Nantucket Sound, Vineyard Sound, and Buzzards Bay; MDMF; 1987. 66810 (1, 26) Falmouth, Eel Pond; A.E. Launer; 16 Sept. 1986.

#### Pleuronectidae

128. Glyptocephalus cynoglossus (Linnaeus 1758) Witch flounder

A common resident inhabiting the deepest part of Massachusetts Bay but unknown until the U.S. Fish Commission found them in great abundance in 45 fm off Salem in 1877 (Goode & Bean 1877: 476). Known from Ipswich Bay, near Gloucester, off Boston Harbor, and in the deeper parts of the Bay (Bigelow & Schroeder 1953a: 288). Eggs of witch flounder were reported from Salem Harbor in April and June 1972 and May and July 1973 (Anderson et al. 1975: 24). Eggs and larvae were taken in Beverly-Salem Harbor in 1975-76, and comprised 0.2% of the totals (Elliott et al. 1979: 7-8, 55-56). A total of 1,429 specimens were taken at 35 BIOME stations at depths of 34-91 m (Table 1), making it the third most abundant species.

USNM 21058 (2, 87-97) Massachusetts Bay, 90 fm; Fish. Comm.; 14 Aug. 1877.

MCZ 56710 (7, 68-180) 42°28.63'N, 70°38.09'W; 77.3 m; F/V Francis Elizabeth cruise 925, sta. 30; 10 May 1980.

UMMZ 162028 (1, 243) Gloucester; U.S. Fish. Comm.; orig. USNM 21817.

ANSP 8839 (1, 175) Massachusetts Bay; from USNM.

129. Hippoglossoides platessoides American plaice  
(Fabricius 1780)

A common species in the deep waters of the Bay, approaching the shores in winter according to Goode & Bean (1879a: 7). Adults not common in water shallower than 15-20 fm; recorded from Provincetown, Massachusetts Bay, off Cape Ann, and on Stellwagen Bank in 25 fm (Bigelow & Schroeder 1953a: 264). Eggs and larvae were reported from Salem Harbor in May 1972 and eggs in April-June 1973 (Anderson et al. 1975: 24). Eggs were in the plankton in Beverly-Salem Harbor from February to the first part of July, peaking in April (Elliott et al. 1979: 14). Eggs ranked 9th in abundance (1,939 eggs, 0.7% of total), larvae 7th (528 larvae, 3.4% of total). The most abundant species in the BIOME stations in Massachusetts Bay, 9,107 specimens taken at 42 stations at depths of 34-91 m (Table 1).

MCZ 56694 (5, 110-195) 42°34'N, 70°35'W; 49 m; R/V Albatross IV 79-12, sta. 614; 7 Nov. 1979.

MDMF - Cat Cove 36 (1, 124) Rockport, Thatchers I.; Oct. 1963.

130. Hippoglossus hippoglossus (Linnaeus 1758) Atlantic halibut

Once very abundant in Massachusetts Bay (Goode & Bean 1879a: 7). A 200-lb individual was caught by a dory fisherman off Half-way Rock, Salem Harbor in 1875 and a still larger fish in Gloucester Harbor in 1876 (Goode & Bean 1879a: 7). A few "chicken" halibut, 10-lb and upward are brought in every summer in Massachusetts Bay, with some larger fish (Bigelow & Schroeder 1953a: 256). A 54-lb fish was caught in Boston Harbor in June 1951 (Bigelow & Schroeder 1953a: 250). A 170-lb halibut was caught off Scituate and a 182-lb fish was boated on Cashes Ledge in August 1980 (Chamberlain 1980). Not taken at any BIOME stations in Massachusetts Bay (Table 1).

UMMZ 187304 (1, 435) 10 mi E of Gloucester; K. F. Lagler; Oct. 1967.

131. Limanda ferruginea (Storer 1839) Yellowtail flounder

Described as Platessa ferruginea by Storer (1839) from Cape Ann. Yellowtails are common residents of the deep waters of the Bay (Goode & Bean 1879a: 6), and are so plentiful on Stellwagen Bank that they have long been the mainstay of the draggers that fish there (Bigelow & Schroeder 1953a: 274). A specimen from Gloucester was used for fig. 136 in Bigelow & Schroeder. Recent MDMF surveys show a wide distribution: offshore in Quincy Bay (Jerome et al. 1966: 27-34); off the mouth of the North River in 6 fm (Fiske et al. 1966: 20); at all 3 offshore stations in the Beverly-Salem Harbor area, Beverly Harbor (36), Chappel Ledge (9), and Salem Harbor (7) to rank 3rd of 27 species collected (Jerome et al. 1967: 31, 36); ranked 1st or 2nd in abundance at

3 stations in the Gloucester Harbor area (Jerome et al. 1969: 30-33), Mellos Bank (852 individuals), southeast Gloucester Harbor (56), and Wingaersheek Beach (97); 15 were taken in March-May and October-November north of Cherry Island Bar off Revere Beach (Chesmore et al. 1972: 24), and they ranked 15th (172 individuals) of 40 species taken in Salem Harbor (Anderson et al. 1975: 17). Eggs were taken in Beverly-Salem Harbor from March through the first of October, peaking in June (Elliott et al. 1979: 45). The eggs ranked second in abundance (14,057 eggs, or 4.8% of total) and larvae were present in the plankton from the end of April through October, ranking 10th in abundance and comprising 1.9% of the total. Eggs and larvae were found at temperatures of 4-22°C. Common at BIOME stations in Massachusetts Bay, 803 specimens taken at 30 stations at depths of 34-84 m (Table 1).

MCZ - 25483 (1, 345) Nahant; L. Agassiz. 56697 (6, 185-325) 42°34'N, 70°35'W; 49 m; R/V Albatross IV, 79-12, Sta. 614; 7 Nov. 1979.

UMMZ - 146281 (1, 188) Browns' Bank; J. Peckwell; Nov. 1940. 187305 (2 skeletons, 270-316) 10 mi E of Gloucester; K.F. Lagler; Oct. 1967

MSI - 2 lots (3, 95-225) Nahant; 1973-74.

132. Liopsetta putnami (Gill 1864) Smooth flounder

First reported from Massachusetts Bay by Storer (1843d) under the name Platessa glabra Rathke, a European species of flounder. Later described by Gill (1864) as a new genus and species, Euchalarodus putnami, based on specimens from Salem (USNM 5368). Goode & Bean (1877: 476) reported both E. putnami and Pleuronectes glaber from Salem. Bean (1879) pointed out that Storer's description was based on a female and Gill's on a male of the same species. Reported to appear in Salem Harbor in abundance in late December and early January, moving into shallow water to spawn (Goode & Bean 1879a: 6). According to Bigelow & Schroeder (1953a: 285), the smooth flounder is to be found in estuaries, river mouths and harbors along the northern side of Massachusetts Bay, with definite records from Salem and Boston harbors. A specimen from Salem was used for fig. 145 in Bigelow & Schroeder (1953a).

USNM - 5368 (2, 125-188) Salem; C.F. Putnam; syntypes of Euchalarodus putnami. 20920 (female, 261) Salem; C.F. Putnam.

MCZ - 11082-4 (3, 146-164) Salem Harbor; C.F. Putnam. 11316 (1, 164) Boston. 56446 (5, 54-86) Neponset R., 3.5 km upriver of mouth; K.E. Hartel et al., KEH 79-45; 1 Oct. 1979. 58270 (1, 127) Boston Harbor, Columbia Point Inlet; L. Kaufman; 29 Apr. 1981.

133. Pseudopleuronectes americanus  
(Walbaum 1792)

Winter flounder

The winter flounder is the commonest shoal water flounder in the Gulf of Maine. It was the most abundant fish taken in 3 offshore stations in Quincy Bay (Jerome et al. 1966: 27-34), where the bulk of the sport fishing effort in Quincy Bay is expended on the excellent winter flounder fishery which begins in April and continues into the fall. Ranked first to third in abundance in the four marine stations at the mouth of the North River (Fiske et al. 1966: 17-19). Salinities at these stations were 0.0-30.0 ‰, temperatures 39.2-60.8°F. This species also forms one of the most important commercial and sport fisheries in this area. Winter flounder were taken at 3 of 6 shore stations in Beverly-Salem Harbor where it was by far the most abundant species (1,724 fish of a total of 1,977) taken at 3 regular offshore stations (Jerome et al. 1967: 29-36). The sport fishery in the Beverly-Salem area is also primarily dependent on the winter flounder which abounds in the area throughout most of the year (Jerome et al. 1967: 37). In the Annisquam River-Gloucester area, winter flounder were taken at all 5 shore stations (Jerome et al. 1969: 26-29), and ranked first in overall abundance (1,775 of 3,108 fish). A length-frequency graph for 1,370 winter flounder, 25-525 mm total length, from the Annisquam River-Gloucester area was presented by Jerome et al. (1967: fig. 6). Winter flounder was the most abundant of 32 species of fishes taken in Lynn-Saugus Harbor, 1,502 of 4,211 fish (Chesmore et al. 1972: 20). Chesmore et al. (1972: fig. 8) presented a length-frequency graph for 1,502 fish, 25-440 mm total length, from the area. Immature flounder were largely taken in the Pines-Saugus River salt marsh complex, 89% less than 250 mm total length, while 69% of the fish taken in open water exceeded 250 mm. Ranked first in numerical abundance (52% of total specimens) and in biomass (89% of total weight) in a survey of the lower Mystic River (Haedrich & Haedrich 1974: 66). Also ranked first in abundance of 40 species taken in Salem Harbor; 23,235 of 66,965 fish (Anderson et al. 1975: 17). Winter flounder comprised 70% of the fish taken by sports fishermen in Salem Harbor in 1972, 65% in 1973 (Anderson et al. 1975: 25-26). Winter flounder eggs are demersal, but the larvae were abundant in Beverly-Salem Harbor, ranking third in abundance (2,246 eggs) and comprising 14.4% of the total (Elliot et al. 1979: 8, 45). Larvae were taken from March through mid-July with the peak in May. Water temperatures were 2-20°C in this period. Common at Massachusetts Bay BIOME stations, 100 specimens taken at 11 stations at depths of 34-86 m (Table 1).

MCZ - 11131, 11150, 11169 (6, 188-195) Nahant; L. Agassiz; 1858-63. 11247 (1, 131) Massachusetts Bay; 1859. 11521 (1, 260) Cohasset; J.W. Sovering; 1859.

UMMZ - 140523 (1, 169) Saugus River mouth; C.L. & L.C. Hubbs 28-25; 8 June 1928. 140547 (1, 57) Scituate; C.L. & L.C. Hubbs 28-32; 17 June 1928. 140652 (61, 18-153) Lynn Harbor at Nahant, C.L. & L.C. Hubbs 28-55; Aug. 1928. 160252 (1, 179) Massachusetts Bay; W.J. Beal; 1862.

MSI - 9 lots (48, 63-310) Beverly and Nahant; 1967-1981.

#### Soleidae

134. Trinectes maculatus (Bloch & Schneider 1801) Hogchoker

The first record from Massachusetts Bay, as Achirus mollis (Mitchill), was based on a 6-in specimen taken in 1840 from Nahant (Storer 1842). Two additional specimens were reported from the Charles River in 1847 (Storer 1863). Bigelow & Schroeder (1953a: 297) mentioned the above records and then noted that there were several specimens from Boston Harbor at the MCZ, "all caught long ago." Juveniles were taken in a stream tributary to Cape Cod Bay, Orleans in 1980. No longer recorded in any numbers from Massachusetts Bay. Listed by Lawton et al. (1984: 201) from near the Pilgrim Nuclear Power Station at Plymouth in western Cape Cod Bay.

MCZ - 11351, 11352, 11354, 11359 (4, 75-102) Boston; L. Agassiz. The MCZ catalog records 10 specimens as MCZ 11351-11360, but we found only the four noted. 57139 (1, 17) Rock Creek, Orleans; K.E. Hartel; 16 Oct. 1980.

ANSP 8675 (unmeasured) Charles R.; mid 1800's.

#### Balistidae

135. Balistes capriscus Gmelin 1789 Gray triggerfish

One specimen was taken in the "Squam River" at Annisquam near Gloucester many years ago, and one was picked up at Plymouth in Sept. 1932 (Bigelow & Schroeder 1953a: 521). Two additional specimens were taken in the Anisquam River during the early 1980's (pers. comm., J. Kaylor, 1985).

MCZ - 35799 (1, 260) Annisquam, Squam R., R. Hyatt; ex. BSNH 1835. 35800 (1, 255) Plymouth; C.L. Hauthaway; 5 Sept. 1932; ex. BSNH 2011.

Monacanthidae

136. Monacanthus hispidus (Linnaeus 1766) Planehead filefish

Specimens were reported from Hingham, Lynn, Nahant, and Boston as M. massachusettsensis Storer 1839, M. brocchus Mitchill, and M. signifer by Storer (1863). Goode & Bean (1879a: 4) noted that it was "occasionally seen in summer in protected bays." Bigelow & Schroeder (1953a: 523) noted that it was likely that a "filefish" taken in Beverly in 1933 was of this species. Never common north of Cape Cod. Lawton et al. (1984: 202-203) reported 20 specimens from near the Pilgrim Nuclear Power Station at Plymouth in western Cape Cod Bay.

MCZ 37150 (1, 83) Provincetown trap; F. Mather; 6 Oct. 1950.

137. Aluterus schoepfi (Walbaum 1792) Orange filefish

The first Massachusetts Bay record was a specimen taken in Salem in Aug. 1845 reported by Storer (1845b) as Balistes aurantiacus. Bigelow & Schroeder (1953a: 525) reported only 3 Gulf of Maine records, 1 from Portland, Maine and 2 from Salem, "all of them many years ago." Listed by Lawton et al. (1984: 202) from near the Pilgrim Nuclear Power Station at Plymouth in western Cape Cod Bay.

MCZ 41267 (2, 110-126) "Massachusetts Bay;" D.H. Storer; ex. BSNH 450.

Tetraodontidae

138. Sphoeroides maculatus Northern puffer  
(Bloch & Schneider 1801)

A specimen was reported from Salem Harbor by Wheatland (1852: 124) and this specimen was believed to be the one found in the Essex Institute (Goode & Bean 1879a: 3). A specimen from Cohasset Narrows (USNM 21444) was listed, as Tetraodon turgidus Mitchill, as being distributed as a duplicate by Bean (1880: 76). Another specimen was caught at Gloucester in August 1920 (MacCoy 1933: 9) and this was the only other record known from Essex County by Bigelow & Schroeder (1953a: 527). One (MCZ 57903) was dropped by a gull at Nahant in 1980. Lawton et al. (1984: 202-203) reported one specimen from near the Pilgrim Nuclear Power Station at Plymouth in western Cape Cod Bay.

USNM 134206 (1, 172) Gloucester; W.A. Wilcox; June 1885.

MCZ - 12213 (1, 171) Massachusetts Bay. 12274 (1, 200) Boston.  
36543 (1, 164) Gloucester; A.D. Hodsdon; 24 Aug. 1920. 57903  
(1, 88) Nahant, Lowell's Beach; dropped by a gull; 20 Oct.  
1980.

#### Diodontidae

139. Chilomycterus schoepfi (Walbaum 1792) Striped burrfish

The only record of this southern fish north of Cape Cod is based on a specimen taken in Massachusetts Bay (Kendall 1908; 118) as noted by Bigelow & Schroeder (1953a: 528).

USNM, MCZ, ANSP, UMMZ & MSI - 0

#### Molidae

140. Mola mola (Linnaeus 1758) Ocean sunfish

First reported from Massachusetts Bay by Storer (1839, 1844a) based on specimens from Boston. Binney (1844) noted reports of 10 or 12 animals per day in Boston Harbor in 1841 and mentioned parasites and food habits. Goode & Bean (1879a: 3) reported that it was "frequently seen on warm summer days, floating on its side at the surface." They noted that a 4-ft individual was taken off Gloucester 31 July 1860 and that the Essex Institute had a mounted specimen that came from Salem Harbor in the summer of 1863. Bigelow & Schroeder (1953a: 530-531) noted that they have been seen in Boston Harbor; a 4 1/2-ft specimen was killed in a creek at Quincy in 1918, another 5-ft, 3-in fish was caught on the north side of Massachusetts Bay, off Bakers Island, Beverly in 1940. An ocean sunfish washed ashore near a sampling station at the mouth of the North River in 1964-65 was photographed (Fiske et al. 1966: 23).

USNM, MCZ, ANSP, UMMZ & MSI - 0.

141. Mola lanceolata Lienard 1840 Sharptail mola

The only record from Massachusetts Bay is of four 2-in fry originally reported as young of the ocean sunfish by Putnam (1871b: 255-256, fig. 3) but these have been shown by subsequent workers to be M. lanceolata (Bigelow & Schroeder 1953a: 531-532; Martin & Drewry 1978: 318-328, fig. 168b).

USNM, MCZ, ANSP, UMMZ & MSI - 0.

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## LITERATURE CITED

- Able, K.W. 1976. A new cyclopterid fish Liparis coheni from the western North Atlantic with notes on life history. *Copeia* 1976(3): 515-521.
- Anonymous. 1959. 1000-lb man-eating shark caught off Graves Light. *Boston Daily Record*, Aug. 5, 1959, pp. 1 and 40.
- . 1972. 9 ft. shark gaffed at Lynn Marina. *Herald Trawler*, Aug. 28, 1972, p. 3.
- . 1980. Could this be Revere's shark? *Lynn Daily Evening Item*, Aug. 7, 1980, p. 9.
- . 1981. Not even Tiger knew. *Swampscott Reporter*, July 23, 1981, p. 1.
- Anderson, C.O., Jr., D.J. Brown, B.A. Ketschke, E.M. Elliott, and P.L. Rule. 1975. The effects of the addition of a fourth generating unit at the Salem Harbor Electric Generating Station on the marine ecosystem of Salem Harbor. *Mass. Div. Mar. Fish.*, 47 pp.
- Atwood, N.E. 1859. [Remarks on Naucrates at Provincetown, and on the habits of the cod]. *Proc. Boston Soc. Nat. Hist.* 7: 4.
- Bean, T.H. 1879. On the identity of Euchalarodus putnami Gill, with Pleuronectes glaber, (Storer) Gill, with notes on the habits of the species. *Proc. U.S. Nat. Mus.* 1: 345-348.
- . 1880. Check-list of duplicates of North American fishes distributed by the Smithsonian Institution in behalf of the U.S. National Museum, 1877-1880. *Proc. U.S. Nat. Mus.* 3: 75-116.
- Belding, D.L. 1921. A report on the alewife fisheries of Massachusetts. *Marine Fish. Ser. No. 1.*, Mass. Div. Fish. and Game, 135 pp.
- Bigelow, H.B. and W.C. Schroeder. 1936. Supplemental notes on fishes of the Gulf of Maine. *Bull. Bur. Fish.* 48, No. 20: 319-343.
- . 1948. Sharks. *In: Fishes of the western North Atlantic.* *Mem. Sears Found.*, part 1: 59-546.
- . 1953a. Fishes of the Gulf of Maine. *U.S. Fish Wild. Serv. Fish. Bull.* 53: 1-577.
- . 1953b. Sawfishes, guitarfishes, skates and rays. *Fishes of the western North Atlantic.* *Mem. Sears Found.*, No. 1, part 2: 1-514.

- . 1958. A large white shark, Carcharodon carcharias, taken in Massachusetts Bay. Copeia 1958 (1): 54-55.
- Binney, A. 1844. On the habits of the Orthogoriscus mola, or short sunfish. Proc. Boston Soc. Nat. Hist. 1: 93.
- Cabot, S. 1846. Attendance of horse mackerel (Temnodon saltator) in Beverly Harbor. Proc. Boston Soc. Nat. Hist. 2: 179.
- . 1849. Capture of a nurse or sleeper shark, Somniosus brevipinna at Nahant. Proc. Boston Soc. Nat. Hist. 3: 97.
- Casey, J.G. and H.L. Pratt, Jr. 1985. Distribution of the white shark, Carcharodon carcharias, in the Western North Atlantic. Mem. Cal. Acad. Sci. 9: (2-14).
- Chamberlain, T. 1980. It's a year for halibut stories. Boston Sunday Globe, Sept. 14, 1980, p. 9.
- Chesmore, A.P., D.J. Brown, and R.D. Anderson. 1972. A study of the marine resources of Lynn-Saugus Harbor. Mass. Div. Mar. Fish. Monogr. No. 11, 38 pp.
- Clayton, G., C. Cole, S. Murawski and J. Parrish. 1976. Common marine fishes of Massachusetts coastal zone: a literature review. Pub. No. R-76-16. Inst. Man. Environment, Amherst, MA, 287 pp.
- Collette, B.B. 1986. Resilience of the fish assemblage in New England tidepools. Fish Bull., U.S. 84(1): 200-204.
- Collette, B.B. and J.A. MacPhee, Jr. 1969. First Massachusetts Bay record of the Arctic shanny Stichaeus punctatus. J. Fish. Res. Bd. Canada 26: 1375-1377.
- Collette, B.B. and J.L. Russo. 1985. Morphology, systematics, and biology of the Spanish mackerels (Scomberomorus, Scombridae). Fish. Bull., U.S. 82(4): 545-692.
- Elliott, E.M., D. Jimenez, C.O. Anderson, Jr., and D.J. Brown. 1979. Ichthyoplankton abundance and distribution in Beverly-Salem Harbor, March 1975 through February 1977. Mass. Div. Mar. Fish., 174 pp.
- Fairbanks, R.B. and R.P. Lawton. 1977. Occurrence of large striped mullet, Mugil cephalus, in Cape Cod Bay, Massachusetts. Chesapeake Sci. 18(3): 309-310.
- Fiske, J.D., C.E. Wetson, and P.G. Coates. 1966. A study of the marine resources of the North River. Mass. Div. Mar. Fish. Monogr., No. 3, 53 pp.

- Garman, S. 1874. On the skates of the eastern coast of the United States. Proc. Boston Soc. Nat. Hist. 17: 170-181.
- . 1892. The Discoboli, Cyclopteridae, Liparopsidae, and Liparidae. Mem. Museum Comparative Zool. 14(2), 96 pp.
- . 1913. The Plagiostomata. Mem. Museum Comparative Zool. 36, 515 pp.
- Gill, T. 1863. Note on some recent additions to the ichthyological fauna of Massachusetts. Proc. Acad. Nat. Sci. Phil. 1863: 332-333.
- . 1864. Synopsis of the pleuronectoids of the eastern coast of North America. Proc. Acad. Nat. Sci. Philadelphia 1864: 214-224.
- . 1905. State ichthyology of Massachusetts. Rept. Comm. Fish., 1904: 163-188.
- Girard, C.F. 1850. On the genus Cottus Auct. Proc. Boston Soc. Nat. Hist. 3: 183-190.
- Goode, G. B. 1884. The fisheries and fish industries of the United States. Section I: 169-682. U.S. Comm. Fish. Fisheries.
- Goode, G.B. and T.H. Bean. 1877. Descriptions of two new species of fishes (Macrurus bairdii and Lycodes verrillii) recently discovered by the U.S. Fish Commission, with notes on the occurrence of several unusual forms. Amer. J. Sci. Art. 14: 470-478.
- . 1879a. A list of the fishes of Essex County, including those of Massachusetts Bay. Bull. Essex Inst. 11:1-38.
- . 1879b. Discoveries of the United States Fish Commission: Notices of fifty species of east-coast fishes, many of which are new to the fauna. Amer. J. Sci. Art. 17: 39-48.
- . 1895. Oceanic ichthyology. Smithsonian Contrib. Knowl. 30(25): 553 pp, also U.S. Nat. Mus. Spec. Bull. 2 and Mem. Museum Comp. Zool. 22(1896).
- Grey, M. 1964. Family Gonostomatidae. In: Fishes of the western North Atlantic; Part 4: 78-240.
- Haedrich, R.L. and S.O. Haedrich. 1974. A seasonal survey of the fishes in the Mystic River, a polluted estuary in downtown Boston, Massachusetts. Estuar. Coast. Mar. Sci. 2: 59-73.

- Hoff, J.G. 1980. Review of the present status of the stocks of the Atlantic sturgeon Acipenser oxyrhynchus Mitchill. Rept. NMFS, Gloucester (mimeo), 136 pp.
- Hubbs, C.L. 1953. Identification and relationships of the anchovy described from California as Anchovia scitula. Copeia 1953 (3): 193-194.
- Jackson, C.T. 1852. [Capture of a thresher shark in Boston Harbor.] Proc. Boston Soc. Nat. Hist. 4: 205-206.
- Jackson, J.B.S. 1847. Bluefish at Nahant. Proc. Boston Soc. Nat. Hist. 2: 248.
- Jerome, W.C., Jr., A.P. Chesmore, and C.O. Anderson, Jr. 1966. A study of the marine resources of Quincy Bay. Mass. Div. Mar. Fish. Monogr. No. 2, 62 pp.
- 1967. A study of the marine resources of Beverly-Salem Harbor. Mass. Div. Mar. Fish. Monogr. No. 4, 74 pp.
- 1968. A study of the marine resources of the Parker River-Plum Island Sound Estuary. Mass. Div. Mar. Fish. Monogr. No. 6, 79 pp.
- 1969. A study of the marine resources of the Annisquam River-Gloucester Harbor coastal system. Mass. Div. Marine Fish. Monogr. No. 8, 62 pp.
- Kendall, W.C. 1908. Fauna of New England. List of Pisces. Occ. Pap. Boston Soc. Nat. Hist. 7(8), 152 pp.
- Lawton, R.P., R.D. Anderson, P. Brady, C. Sheehan, W. Sides, E. Kouloheras, M. Borgatti, and V. Malkoski. 1984. Fishes of western inshore Cape Cod Bay: studies in the vicinity of the Rocky Point Shoreline, pp. 191-230 in: J.D. Davis and D. Merriman, eds., Observations on the ecology and biology of western Cape Cod Bay, Massachusetts. Lecture notes on coastal and estuarine studies. Springer-Verlag, New York.
- Leslie, A.J., Jr. and D.J. Stewart. 1986. Systematics and distributional ecology of Etropus (Pisces, Bothidae) on the Atlantic coast of the United States with description of a new species. Copeia 1986(1): 140-156.
- LeSueur, C.A. 1817. A short description of five (supposed) new species of the genus Muraena discovered by Mr. LeSueur, in the year 1816. J. Acad. Nat. Sci. Phil. 1(1): 81-83.
- 1818. Descriptions of several new species of North American fishes. Proc. Acad. Nat. Sci. Phila. 1: 222-235.

- Lux, F.E. and G.F. Kelly. 1978. Fisheries resources of the Cape Cod and Massachusetts Bay Region. Environmental Assessment Report 5-7. NMFS Lab. Ref. No. 78-15, 23 pp.
- MacCoy, C.V. 1933. Museum notes, fishes. Bull. Boston Soc. Nat. Hist. No. 67: 9.
- Markle, D.F., W.B. Scott and A.C. Kohler. 1980. New and rare records of Canadian fishes and the influence of hydrography on resident and nonresident Scotian Shelf ichthyofauna. Canad. J. Fish. Aquatic Sci. 37(1): 49-65.
- Martin, F.D. and G.E. Drewry. 1978. Development of the fishes of the Mid-Atlantic Bight. An atlas of egg, larval and juvenile stages. Vol. VI. Stromateidae through Ogcocephalidae. U.S. Fish. Wild. Serv. Biol. Serv. Prog. FWS/OBS-78/12.
- Morin, R.P. and K.W. Able. 1983. Patterns of geographic variation in the egg morphology of the fundulid fish, Fundulus heteroclitus. Copeia 1983(3): 726-740.
- Moring, J.R. and M.E. Moring. 1986. A late leptocephalus stage of a conger eel, Conger oceanicus found in a tidepool. Copeia 1986(1): 222-223.
- Ni, I.H. 1981. Numerical classification of sharp-beaked redfishes, Sebastes mentella and S. fasciatus, from northeastern Grand Banks. Canadian J. Fish. Aquat. Sci. 38(8): 873-879.
- Norton, S.F. 1980. Feeding ecology of a benthic predator, Myoxocephalus aeneus (Pisces: Scorpaeniformes). Honor's thesis, Harvard Univ., 77 pp.
- Putnam, F.W. 1856a. [Fishes of Essex County, Mass.] Proc. Essex Inst. 1: 144.
- 1856b. [Fishes of Essex Co., Mass., cont.] Proc. Essex Inst. 1: 148.
- 1856c. [Fishes of Essex Co., Mass., cont.] Proc. Essex Inst. 1: 201.
- 1866a. [Description of Gasterosteus wheatlandi from Nahant, Mass.] Proc. Essex Inst. 5: 4.
- 1866b. [Occurrence of Leptocephalus glacilis at Nahant, 1858.] Proc. Boston Soc. Nat. Hist. 10: 373.
- 1870. [Addition of two species of fishes to Essex County.] Bull. Essex Inst. 2(7): 111.
- 1871a. Note on Hemirhamphus from Danvers Mill Pond, 1870. Bull. Essex Inst. 2: 171.

- . 1871b. On the young of Orthogoriscus mola.  
Proc. Amer. Assoc. Adv. Sci. 19: 255-260.
- . 1874a. Rare fishes taken in Marblehead, Salem,  
and Beverly Harbors. Bull. Essex Inst. 6(1): 11-13.
- . 1874b. Liparis lineatus and L. montaquii in  
Salem Harbor. Proc. Boston Soc. Nat. Hist. 16: 114.
- . 1874c. Notes on Liparis, Cyclopterus and their  
allies. Proc. Amer. Assoc. Adv. Sci. (1873): 335-340.
- Robins, C.R., R.M. Bailey, C.E. Bond, J.R. Brooker, E.A. Lachner,  
R.N. Lea and W.B. Scott. 1980. Common and scientific  
names of fishes from the United States and Canada, 4th ed.  
Spec. Publ. American Fish. Soc. No. 12, 174 pp.
- Scattergood, L.W. 1959. New records of Gulf of Maine fishes.  
Maine Field Nat. 15(4): 107-109.
- Scherer, M.D. 1984. The ichthyoplankton of Cape Cod Bay, pp.  
151-190 in: J.D. Davis and D. Merriman, eds. Observations  
on the ecology and biology of western Cape Cod Bay,  
Massachusetts. Lecture notes on coastal and estuarine  
studies. Springer-Verlag, New York.
- Schroeder, W.C. 1937. Records of Pseudopriacanthus altus (Gill)  
and Fundulus majalis (Walbaum) from the Gulf of Maine.  
Copeia 1937 (4): 238.
- . 1938. Records of Carcharodon carcharias  
(Linnaeus) and Pseudopriacanthus altus (Gill) from the Gulf  
of Maine, summer of 1937. Copeia 1938 (1): 46.
- Smith, H.M. and R.A. Goffin. 1937. A fish new to Massachusetts  
Bay. Copeia 1937(4): 236.
- Storer, D.H. 1836. An examination of the "Catalogue of the  
marine and fresh water fishes of Massachusetts, by J.V.C.  
Smith, M.D.," contained in Professor Hitchcock's "Report on  
the Geology, Minerology, etc. of Massachusetts. Boston J.  
Nat. Hist. 1(3): 347-356.
- . 1839. Reports on the ichthyology and  
herpetology of Massachusetts, with supplement. In:  
Commissioners Report on the Zoological and Botanical Survey  
of the State. Reports on fishes, reptiles, and birds of  
Massachusetts. Boston, Dutton and Wentworth, 426 pp.
- . 1842. Additional descriptions of, and  
observations on, the fishes of Massachusetts. Boston J.  
Nat. Hist. 4(1): 175-190.
- . 1843a. Description of a new species of the  
torpedo. Amer. J. Sci. Arts. 45: 165-170.

- 1843b. [Trichiurus lepturus, Tetradon mathematicus, and Zygaena malleus new to Massachusetts with a description of Promotis rubri-cauda.] Proc. Boston Soc. Nat. Hist. 1: 36-37.
- 1843c. [First record of Cybium maculatus at Lynn.] Proc. Boston Soc. Nat. Hist. 1: 40.
- 1843d. [Description of Platessa glabra from Boston Harbor.] Proc. Boston Soc. Nat. Hist. 1: 130-131.
- 1844a. [Orthogoriscus mola from upper south bridge, Boston.] Proc. Boston Soc. Nat. Hist. 1: 195.
- 1844b. [Scomber zonatus from Wellfleet.] Proc. Boston Soc. Nat. Hist. 1: 197.
- 1845a. [Note on Prionotus tribulus from north of Cape Cod.] Proc. Boston Soc. Nat. Hist. 2: 51.
- 1845b. [Notes on Balistes aurantiacus from Salem.] Proc. Boston Soc. Nat. Hist. 2: 71-72.
- 1845c. [Notes on Prionotus, with a description of P. pileatus from Massachusetts Bay.] Proc. Boston Soc. Nat. Hist. 2: 77-78.
- 1846. [Palinurus perciformis from Boston Harbor.] Proc. Boston Soc. Nat. Hist. 2: 180.
- 1847. [Descriptions of Alosa cyanonoton, A. lineata and Platessa quadrocellata from Provincetown.] Proc. Boston Soc. Nat. Hist. 2: 242-243.
- 1848a. [Description of Motella caudacuta.] Proc. Boston Soc. Nat. Hist. 3: 5.
- 1848b. [Exhibition of a figure and mention of the description of Blennius serpentinus.] Proc. Boston Soc. Nat. Hist. 3: 31.
- 1848c. [Description of Zygaena subarcuata from Provincetown.] Proc. Boston Soc. Nat. Hist. 3: 70-71.
- 1848d. [Description of Carcharias atwoodi from Provincetown.] Proc. Boston Soc. Nat. Hist. 3: 71-72.
- 1853a. A history of the fishes of Massachusetts. Mem. Amer. Acad. Arts. Sci., 5 (new series) Art. 4: 49-92, plates 1-8.
- 1853b. A history of the fishes of Massachusetts. Mem. Amer. Acad. Arts. Sci., 5 (new series) Art. 8: 122-168, plates 9-16.

- 1854. [Description of Sebastes fasciatus.] Proc. Boston Soc. Nat. Hist. 5-31.
- 1855. A history of the fishes of Massachusetts. Mem. Amer. Acad. Arts. Sci., 5(new series) Art. 12: 257-296, plates 17-23.
- 1858a. A history of the fishes of Massachusetts. Mem. Amer. Acad. Arts. Sci., 6(new series) Art. 7: 309-372, plates 24-29.
- 1858b. [Description of Zeus ocellatus.] Proc. Boston Soc. Nat. Hist. 6: 385-386.
- 1863. A history of the fishes of Massachusetts. Mem. Amer. Acad. Arts. Sci., 8 (new series) Art. 15: 389-434, plates 30-35.
- 1867a. A history of the fishes of Massachusetts. Mem. Amer. Acad. Arts. Sci., 9 (new series) Art. 10: 217-263, plates 36-39.
- 1867b. A history of the fishes of Massachusetts. Cambridge and Boston, Welch & Bigelow and Dakin & Metcalf. 287 pp. 39 pls. [reprinted from Mem. Amer. Acad. 1853-1867 as follows]:

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Storer, H.R. 1850. Observations on the fishes of Nova Scotia, with descriptions of new species. J. Boston Soc. Nat. Hist. 6: 261.

Taylor, C.C., H.B. Bigelow, and H.W. Graham. 1957. Climatic trends and the distribution of marine animals in New England. U.S. Fish Wild. Serv. Fish. Bull. 57: 291-345.

Van Guelpen, L. 1986. Hookear sculpins (genus Arteidiellus) of the North American Atlantic: taxonomy, morphological variability, distribution, and aspects of life history. Can. J. Zool. 64: 677-690.

Wheatland, R.H. 1852. Notice of several fishes of rare occurrence. J. Essex Co. Nat. Hist. Soc. 1(1): 122-125.

----- 1862. [Sticklebacks at Nahant and notes on color changes in fishes]. Proc. Essex Inst. 2: 364-366.