The Marine Living Resources of the Piscataqua River

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Outline

- Why the Piscataqua River is important to New Hampshire coastal resources
- What do we know about Piscataqua River resources
- Federal and State Listed Species
- Marine Mammals
- Diadromous Fish
- Resident and Seasonal Fish
- Essential Fish Habitat
- Important Invertebrate Species
- Primary Producers
- Selected Great Bay/Piscataqua References

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Selected Great Bay/Piscataqua River References

- Wilcox, W.A. 1887. The Fisheries of New Hampshire in The Fisheries and Fishing Industries of the United States. G.B. Goode, Washington G.P.O.
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- Jones, S.H. (ed) 2000. A Technical Characterization of Estuarine and Coastal New Hampshire. New Hampshire Estuaries Project. Portsmouth, N.H.
- NAI. 1971-1980 Piscataqua River Ecological Study. Rpts 1-10.
- NAI. 1974 Preliminary Study for Proposed Refinery, Durham, N.H.
- Nelson, J.I. 1981 Inventory of the Natural Resources of Great Bay Estuarine System. NHF&G.
- Short, F.T. (ed) 1992. The Ecology of the Great Bay Estuary N.H. and ME. An Estuarine Profile and Bibliography.

Federal and State Listed Species

- ✓ Both federal and state law identify various species that are threatened and endangered and provide for their protection.

State:	**Federal (Endangered Species Act)**:
•Grasshopper Sparrow (*threatened*) •Common Tern (*endangered*) •Bald Eagle (*endangered*)	•Bald Eagle (*threatened*) •New England Cottontail (*proposed*) •American Eel (*proposed*) •Shortnosed Sturgeon* *Range includes the Piscataqua River, but there is no reliable record of its presence.

Marine Mammals

✓ Federal Marine Mammal Protection Act of 1972

Seals:	**Cetaceans:**
•Harbor (*most abundant*) •Gray •Hooded	•Harbor Porpoise (*most abundant*) •Atlantic Bottlenose •Atlantic White-Sided •Offshore species (some reports of their atypical presence in the river)

Diadromous Fish

- ✓ Cyclical movement into and out of Piscataqua River (i.e. anadromous, catadromous)
- ✓ Piscataqua acts as conduit between fresh and saltwater
- ✓ Any impediment to natural movement may effect their reproductivity

Diadromous Fish

- ✓ New Hampshire's Diadromous Species:
  - Alewife
  - Blueback Herring
  - American Shad
  - Sea Lamprey
  - American Eel
- ✓ NHF&G operated fish ladders indicate a limited number of sea run:
  - Brown Trout ("*salters*")
  - Brook Trout
  - Rainbow Trout ("*steelhead*")
  - Atlantic Salmon

Resident and Seasonal Fish

- ✓ C.F. Jackson 1922
  - 27 species
  - Added 3 more in 1944 report
- ✓ Normandeau/PSNH fish collections 1970
  - 27 species
- ✓ NHF&G inventory study 1980's
  - 32 species
- ✓ Short's monograph
  - 39 species

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C.F. Jackson - 1922

6. Checklist of the Fish of Great Bay

The following is a checklist of the fish of Great Bay known to have occurred within the five-year period from 1915 to 1920:

1. **Petromyzon marinus** Linne. Lamprey.
   Occasionally common in the spring below dams at head of brackish water.
2. **Raja erinacea** Mitchill. Little skate.
   Fairly common.
3. **Anguilla rostrata** Le Sueur. Common eel.
   Very abundant at the head of brackish water. The only species of fish caught for commercial purposes.
4. **Clupea harengus** Linne. Labrador herring.
   Usually common in the colder months.
5. **Pomolobus pseudoharengus** (Wilson). Alewife.
   Very common in the spring at head of tide water.
6. **Brevoortia tyrannus** (Latrobe). Menhaden.
   Very rare.
7. **Osmerus mordax** (Mitchill). Smelt.
   Very common throughout the colder months at the head of tide water.
8. **Fundulus heteroclitus** (Linne). Killifish.
   Very abundant throughout the year.
9. **Pungitius pungitius** (Linne). Nine spined stickleback.
   Fairly common.
10. **Gasterosteus bispinosus** Walbaum. Two-spined stickleback.
    Fairly common.
11. **Apeltes quadracus** (Mitchill). Four-spined stickleback.
    Common.
12. **Syngnathus fuscus** Storer. Pipefish.
    Common along the shore.
13. **Poronotus triacanthus** (Peck). Butterfish.
    Fairly common in the spring.
14. **Tautagolabrus adspersus** (Walbaum). Cunner.
    Exceedingly abundant in summer around rocky ledges.
15. **Tautoga onitis** (Linne). Tautog.
    Very rare.
16. **Myoxocephalus aeneus** (Mitchill). Pygmy sculpin.
    Rare.
17. **Myoxocephalus groenlandicus** (Cuv.). Black sculpin.
    Very common.
18. **Myoxocephalus octodecimspinosus** (Mitchill). Long-spined sculpin.
    Very common.
19. **Hemitripterus americanus** (Gmelin). Sea raven.
    Uncommon.
20. **Merluccius bilinearis** (Mitchill). Silver hake.
    Occasional.
21. **Pollachius virens** (Linne). Pollock.
    Occasionally common.
22. **Microgadus tomcod** (Walbaum). Tomcod.
    Very common in the fall.
23. **Gadus callarias** Linne. Cod.
    Locally common in the spring and fall.
24. **Urophycis tenuis** (Mitchill). Squirrel hake.
    Found occasionally.
25. **Pseudopleuronectes americanus** (Walbaum). Winter flounder.
    Very common.
26. **Liopsetta putnami** (Gill). Smooth-back flounder.
    Common near head of tide water.
27. **Lophius piscatorius** Linne. Fishing frog.
    Very rare.

Normandeau/PSNH Collections-1970

TABLE XVI

FINFISH COLLECTIONS - 1970

SPECIES Scientific Name*	Common Name*	1st Collection Phase I May 19 - July 1 TOTAL	AREA	SCHILLER-SIMPLEX	2nd Collection Phase II July 21 - Aug.11 TOTAL	AREA	SCHILLER-SIMPLEX	3rd Collection Phase III Aug. 24 - Nov. 12 TOTAL	AREA	SCHILLER-SIMPLEX
Raja sp.	Skate							X		
Anguilla rostrata	American eel	X		X	X		X	X		
Alosa pseudoharengus	Alewife	X		X						
Oncorhynchus kisutch	Coho salmon							X		X
Salmo trutta	Brown trout							X		X
Osmerus mordax	Rainbow smelt	X		X	X		X	X		X
Lophius americanus	Goosefish							X		
Gadus morhua	Atlantic cod	X		X						
Microgadus tomcod	Atlantic tomcod	X		X	X		X	X		X
Pollachius virens	Pollock	X		X	X		X	X		X
Urophycis sp.	Hake	X		X						
Fundulus heteroclitus	Mummichog	X		X	X		X	X		X
Menidia menidia	Atlantic silverside	X			X		X	X		X
Apeltes quadracus	Fourspine stickleback	X		X	X		X	X		X
Gasterosteus aculeatus	Threespine stickleback	X		X	X		X	X		X
Pungitius pungitius	Ninespine stickleback	X		X	X		X	X		X
Syngnathus fuscus	Northern pipefish	X			X			X		
Morone saxatilis	Striped bass				X		X	X		X
Tautoga onitis	Tautog	X								
Tautogolabrus adspersus	Cunner	X		X	X			X		X
Pholis gunnellus	Rock gunnel	X		X	X		X			
Scomber scombrus	Atlantic mackerel				X		X	X		X
Myoxocephalus aenaeus	Grubby	X		X	X		X	X		X
Cyclopterus lumpus	Lumpfish	X			X			X		
Liopsetta putnami	Smooth Flounder	X		X	X		X	X		X
Pseudopleuronectes americanus	Winter Flounder	X		X	X		X	X		X
Sphoeroides maculatus	Northern puffer				X					

*Scientific and common names of species are taken from the American Fisheries Society, Special Publication No. 6, "A List of Common and Scientific Names of Fishes from the United States and Canada", Third Edition, 1970.

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NHF&G Inventory Study 1981-1982

Table 9.3-1 Occurrence of Finfish Captured in Great Bay Estuary September 1981 through July 1982. Great Bay Estuary Monitoring Survey, 1981-1982.

Common Name	Scientifice Name	Seine	Trawl
Sea lamprey	*Petromyzon marinus*	X	X
Little skate	*Raja erinacea*		X
Winter skate	*Raja ocellata*		X
American eel	*Anguilla rostrata*	X	X
Blueback herring	*Alosa aestivalis*	X	X
Alewife	*Alosa pseudoharengus*	X	
Atlantic herring	*Clupea harengus*	X	X
Coho salmon	*Oncorhynchus kisutch*	X	
Rainbow smelt	*Osmerus mordax*	X	X
Atlantic cod	*Gadus morhua*	X	X
Atlantic tomcod	*Microgadus tomcod*	X	X
Pollock	*Pollachius virens*	X	X
Ocean pout	*Macrozoarces americanus*		X
Squirrel hake	*Urophycis chuss*	X	X
White hake	*Urophycis tenuis*	X	X
Common killifish	*Fundulus heteroclitus*	X	
Striped killifish	*Fundulus majalis*	X	
Atlantic silverside	*Menidia menidia*	X	X
Fourspine stickleback	*Apeltes quadracus*	X	X
Threespine stickleback	*Gasterosteus aculeatus*	X	X
Ninespine stickleback	*Pungitius pungitius*	X	X
Northern pipefish	*Syngnathus fuscus*	X	X
White perch	*Morone americana*	X	X
Pumpkinseed	*Lepomis gibbosus*	X	
Cunner	*Tautoglabrus adspersus*	X	X
Sea raven	*Hemitripterus americanus*		X
Grubby	*Myoxocephalus aenaeus*	X	X
Longhorn sculpin	*Myoxocephalus octodecemspinosus*		X
Summer flounder	*Paralichthys dentatus*		X
Windowpane	*Scophthalmus aquosus*		X
Smooth flounder	*Liopsetta putnami*	X	X
Winter flounder	*Pseudopleuronectes americanus*	X	X
Total 32 species		25	26

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Newington Power Facility Collections

Table 1. Species of fish eggs (E) and larvae (L) in 2000-2003 collections from the Newington Power Facility. EFH species are listed in bold. MRI

Species	Common name	2000*	2001	2002	2003
Anguilla rostrata	American eel		L	L	
Alosa spp.	River herring		L	L	
Brevoortia tyrannus	Atlantic menhaden		E	E/L	E/L
Clupea harengus	**Atlantic herring**	**L**	**L**	**E/L**	**E/L**
Anchoa spp.	Anchovies			E	
Osmerus mordax	Rainbow smelt		L	L	L
Brosme brosme	Cusk		E/L	E/L	E/L
Enchelyopus cimbrius	Fourbeard rockling		E/L	E/L	E/L
Gadus morhua	**Atlantic cod**	**E/L**	**E/L**	**E/L**	**E/L**
Melanogrammus aeglefinus	**Haddock**			**L**	
Merluccius bilinearis	**Silver hake**		**E/L**	**E/L**	**E/L**
Microgadus tomcod	Atlantic tomcod		L	L	L
Pollachius virens	**Pollock**		**L**	**L**	**E/L**
Urophycis spp.	**Hakes**		**E/L**	**E/L**	**E/L**
Lophius americanus	Goosefish		E/L	E	L
Strongylura marina	Atlantic needlefish				L
Menidia spp.	Silversides		L		L
Pungitius pungitius	Ninespine stickleback		L		
Syngnathus fuscus	Northern pipefish		L	L	L
Sebastes norvegicus	Golden redfish			L	L
Prionotus spp.	Searobins		E/L	E	E
Hemitripterus americanus	Sea raven		L	L	L
Myoxocephalus spp.	Sculpins			L	
Myoxocephalus aenaus	Grubby		E/L	L	L
M. octodecemspinosus	Longhorn sculpin		L	L	L
M. scorpius	Shorthorn sculpin		L	L	L
Aspidophoroides monopterygius	Alligatorfish		L	L	L

Species	Common name	2000*	2001	2002	2003
Cyclopterus lumpus	Lumpfish		L	L	L
Liparis atlanticus	Seasnail		L	L	L
Liparis coheni	Gulf seasnail		L		L
Centropristis striata	Black sea bass			L	
Stenotomus chrysops	Scup			E	
Cynoscion regalis	Weakfish				L
Tautoa onitis	Tautog		E/L	E/L	E/L
Tautogolabrus adspersus	Cunner		E/L	E/L	E/L
Lumpenus lumpretaeformis	Snakeblenny		L		
Ulvaria subbifurcata	Radiated shanny		L	L	L
Pholis gunnellus	Rock gunnel		L	L	L
Cryptacanthodes maculatus	Wrymouth		L	L	L
Ammodytes spp.	Sand lance		E/L	L	E/L
Gobiosoma ginsburgi	Seaboard goby — New record	E/L			E
Scomber scombrus	**Atlantic mackerel**		**E/L**	**E/L**	**E/L**
Peprilus triacanthus	Butterfish		E/L	E/L	L
Etropus microstomus	Smallmouth flounder — New record?			E	
Paralichthys oblongus	Fourspot flounder		E/L		E/L
Scophthalmus aquosus	**Windowpane**		**E/L**	**E/L**	**E/L**
Glyptocephalus cynoglossus	Witch flounder		E/L	E/L	E/L
Hippoglossoides platessoides	**American plaice**		**E/L**	**E/L**	**E/L**
Pleuronectes americanus	**Winter flounder**		**E/L**	**E/L**	**E/L**
Pleuronectes ferrugineus	**Yellowtail flounder**		**E/L**	**E/L**	**E/L**
Pleuronectes putnami	Smooth flounder		L		
Total number of species		3*	41	42	40

* - Sampling in November, December only

NMFS-Essential Fish Habitat (EFH) Designation

Great Bay Estuary EFH Species and Stages

Species	Eggs	Larvae	Juveniles	Adults
American plaice *(Hippoglossoides platessoides)*				X
Atlantic cod *(Gadus morhua)*	X	X	X	X
Atlantic halibut *(Hippoglossus hippoglossus)*	X	X	X	X
Atlantic mackerel *(Scomber scombrus)*	X	X	X	
Atlantic salmon *(Salmo salar)*			X	X
Atlantic sea scallop *(Placopecten magellanicus)*	X	X	X	X
Atlantic sea herring *(Clupea harengus)*		X	X	X
Bluefin tuna *(Thunnus thynnus)*				X
Bluefish *(Pomatomus saltatrix)*			X	X
Haddock *(Melanogrammus aeglefinus)*	X	X		
Pollock *(Pollachius virens)*	X	X	X	X
Red hake *(Urophycis chuss)*	X	X	X	X
Yellowtail flounder *(Pleuronectes ferruginea)*		X		X
Whiting *(Merluccius bilinearis)*			X	X
White hake *(Urophycis tenuis)*	X	X	X	X
Windowpane flounder *(Scopthalmus aquosus)*	X	X	X	X
Winter flounder *(Pleuronectes Americanus)*	X	X	X	X

Source: National Marine Fisheries Service. "Summary of Essential Fish Habitat (EFH) Designation" posted on the internet at http://www.nero.noaa.gov/ro/STATES4/Gulf_of_Maine_3_western_part/43007040.html

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