

Biomonitoring in the Anthropocene:

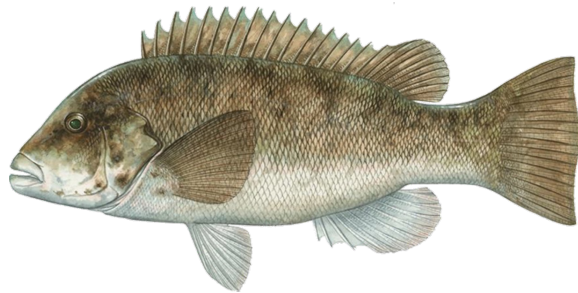
East River environmental DNA (eDNA) tracks marine fish, terrestrial wildlife, and human diet



East River, New York City



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Local marine fish



eDNA top species rocky, estuarine habitat specialists

- Consistent w rocky, estuarine E River habitat

	Ave copies/L	% fish eDNA	Habitat type
Abundant			
Common			
Uncommon			
Rare			
Tautog	6863	38.5	R
Cunner	1948	10.9	R
Skilletfish	1262	7.1	R
Atl menhaden, river herrings	893	5.0	E
Feather blenny	845	4.7	R
Bay anchovy	758	4.3	E
Black drum, spot	712	4.0	R
Seaboard goby	613	3.4	R
Black sea bass	612	3.4	R
Oyster toadfish	610	3.4	R
Striped bass	607	3.4	R
Atl silverside	504	2.8	E
American eel	401	2.3	R
Bluefish	184	1.0	E
Tomcod	182	1.0	E
Scup	181	1.0	R
Total	17175	96.4	



Tautog



Cunner



Skilletfish



Menhaden, +



Feather blenny



Bay anchovy



Spot, bl drum



Seaboard goby



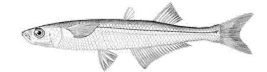
Black sea bass



Oyster toadfish



Striped bass



Atl silverside



Amer eel



Bluefish



Tomcod



Scup

Habitat preference

- (R) rocky incl other structure
- (E) estuary



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Images not to scale

Other vertebrate eDNA



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Estuary eDNA tracks urban wildlife, pets

- eDNA relative abundance consistent w informal estimates
- Potential utility monitoring rat populations, other pests

Top mammals	eDNA copies/L	NYC census est
Norway rat	609	3 M
Raccoon	19	?
Gray squirrel	18	?
House mouse	13	

Top household pets	eDNA	NYC est
Dog	196	600,000
Cat	104	500,000

Top land birds	eDNA copies/L	NYC census est
Pigeon	151	2 M
Starling	15	?
House sparrow	7	?

Abundant
Common
Uncommon
Rare



Other vertebrate eDNA



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Estuary eDNA finds additional wildlife

- Most species resident NYC (i.e., eDNA consistent w local origin)
- eDNA relatively uncommon, uncommonly detected (most <10 copies/L, <10% PCRs)
- Potential more robust monitoring w diff sampling sites, strategy
- Potential utility re environmental restoration



White-tailed deer



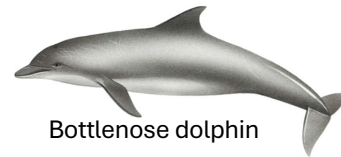
Deer mouse



Amer beaver



Harbor seal



Bottlenose dolphin



Opossum



Amer bison*



Short tailed shrew



Muskrat



E cottontail



Meadow vole



Striped skunk



Porcupine*



Red squirrel*

- (*) Not resident NYC
 - possible sources incl pet food, local zoos, distant

Other vertebrate eDNA



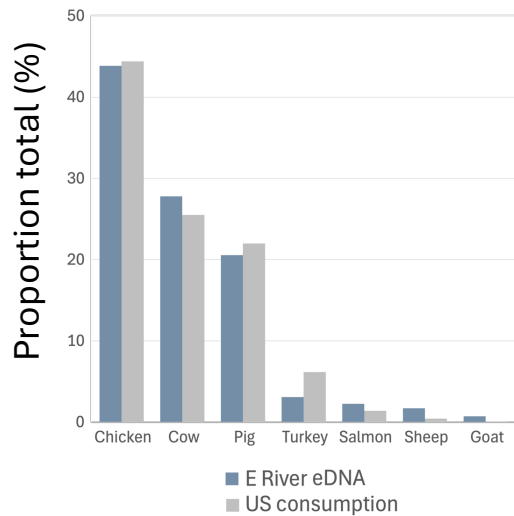
Estuary eDNA tracks human diet

- Compare to national sales figures, compiled from multiple sources
 - Reports consumption, at local scale
 - Reports on all commonly-consumed vertebrates



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Poultry, red meat, salmon



Fresh fish

