

## Species Status Assessment

**Class:** Actinopterygii  
**Family:** Gadidae  
**Scientific Name:** *Microgadus tomcod*  
**Common Name:** Atlantic tomcod

### Species synopsis:

Atlantic tomcod is a small anadromous Gadiform fish, which ranges from Labrador to Chesapeake Bay, more commonly being found in the northern portion of its range (Page and Burr 1991). The population of Atlantic tomcod is the southernmost population to spawn (Dew and Hecht 1976, Stewart and Auster 1987, Daniels et al. 2005). The Atlantic tomcod favors colder water and produces an antifreeze protein at 10 degrees Celsius on Long Island (Bigelow and Schroeder 1953). They migrate up rivers to spawn from November to February. This species is an inshore species and frequently inhabits the mouth of rivers in tidal estuaries and salt creeks (Bigelow and Schroeder 1953, Booth 1967, Lambert and Fitzgerald 1979). The Atlantic tomcod is a bottom dwelling species dependent on benthic prey and tends to remain within its natal estuary. Tomcod from highly polluted systems tend to accumulate unusually high concentrations of contaminants. In the Hudson River, these include PCDDs, PCDFs, and PCBs (Courtenay et al. 1999). However, tomcod have developed mutations which reduce, but do not eliminate, their susceptibility to the negative effects of dioxins and PCBs (Wirgin et al. 2011). Throughout its range the trend for tomcod is uncertain but is likely stable or slowly declining (NatureServe 2013).

**I. Status**

**a. Current and Legal Protected Status**

i. Federal Not listed Candidate? No

ii. New York Not listed; SGCN

**b. Natural Heritage Program Rank**

i. Global G5

ii. New York S3 Tracked by NYNHP? No

**Other Rank:**

United States and Canada National Status: N5 (5 December 1996)

IUCN Redlist: Least Concern

New York Natural Heritage Program: Watch List

**Status Discussion:**

In the 20<sup>th</sup> century, Commercial fisheries for Atlantic tomcod had steadily declined and were closed by the mid-20<sup>th</sup> century. The last reported commercial catch was in 1985 from New York (Fried and Shultz 2006). IUCN Redlist says populations are likely stable or only declining very slowly.

**II. Abundance and Distribution Trends**

**a. North America**

**i. Abundance**

X declining \_\_\_ increasing \_\_\_ stable \_\_\_ unknown

**ii. Distribution:**

\_\_\_ declining \_\_\_ increasing X stable \_\_\_ unknown

Time frame considered: 1980s-present (slow decline or stable)

**b. Regional**

**i. Abundance**

declining  increasing  stable  unknown

**ii. Distribution:**

declining  increasing  stable  unknown

Regional Unit Considered: Northeast (severe decline)

Time Frame Considered: 1980s-present

**c. Adjacent States and Provinces**

**CONNECTICUT** Not Present  No data

**i. Abundance**

declining  increasing  stable  unknown

**ii. Distribution:**

declining  increasing  stable  unknown

Time frame considered: Severe decline from 1985-present

Listing Status: Not listed SGCN? Yes

**MASSACHUSETTS** Not Present  No data

**i. Abundance**

declining  increasing  stable  unknown

**ii. Distribution:**

declining  increasing  stable  unknown

Time frame considered: Not specified

Listing Status: Not listed SGCN? No

**NEW JERSEY**                      Not Present \_\_\_\_\_                      No data  X

**i. Abundance**

\_\_\_\_ declining    \_\_\_\_ increasing            \_\_\_\_ stable            \_\_\_\_ unknown

**ii. Distribution:**

\_\_\_\_ declining    \_\_\_\_ increasing            \_\_\_\_ stable            \_\_\_\_ unknown

Time frame considered:  Not specified

Listing Status:  Not listed                       SGCN?  No

**ONTARIO**                      Not Present  X                       No data \_\_\_\_\_

**PENNSYLVANIA**                      Not Present  X                       No data \_\_\_\_\_

**QUEBEC**                      Not Present  X                       No data \_\_\_\_\_

**VERMONT**                      Not Present  X                       No data \_\_\_\_\_

**d. NEW YORK**                      No data \_\_\_\_\_

**i. Abundance**

X  declining    \_\_\_\_ increasing            \_\_\_\_ stable            \_\_\_\_ unknown

**ii. Distribution:**

X  declining    \_\_\_\_ increasing            \_\_\_\_ stable            \_\_\_\_ unknown

Time frame considered:  Severe decline from 1980s-present

**Monitoring in New York.**

Annual surveys are conducted by the Hudson River Estuary Monitoring Program.

**Trends Discussion:**

Tomcod historically ranged from Labrador south to Virginia, however, that are no recent records of spawning occurring in any drainages south of the Hudson River (Scott and Crossman 1973, Dew

and Hecht 1976). Monitoring programs for the Atlantic tomcod indicate that it is scarce and/or declining throughout its range (Gottschall and Pacileo 2004, Molnar 2004, Millstone Environmental Laboratory 2005, ASA Analysis and Communication 2005). Recent surveys show populations to be declining in the Hudson River (Daniels et al. 2005).

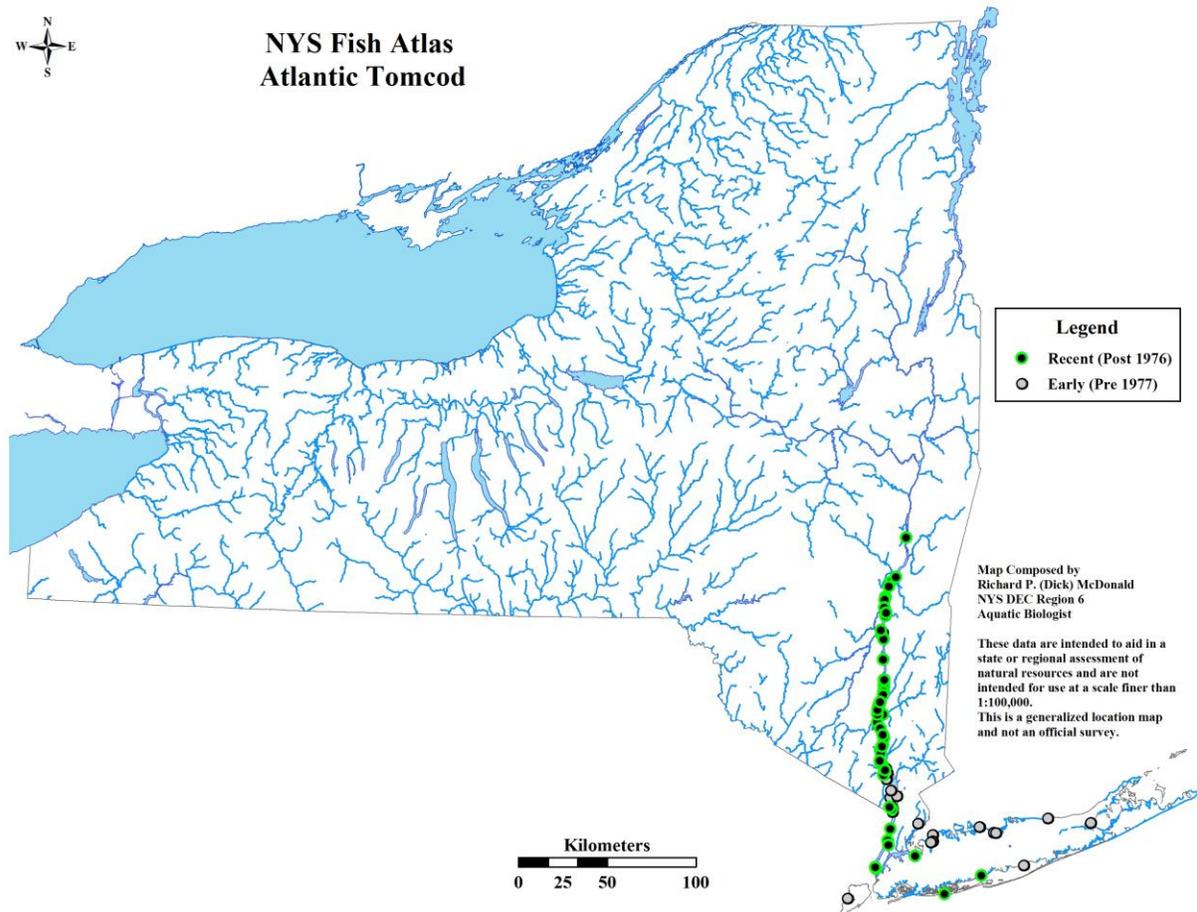


Figure 1. Atlantic tomcod lives in the Lower Hudson Estuary and this is the only place with spawning and a sustained population. Most of their records come from brackish waters but some are from farther upstream. It has declined in abundance in the last 30 years (D. Carlson, personal communication). Map created by Carlson and Daniels, NYSDEC

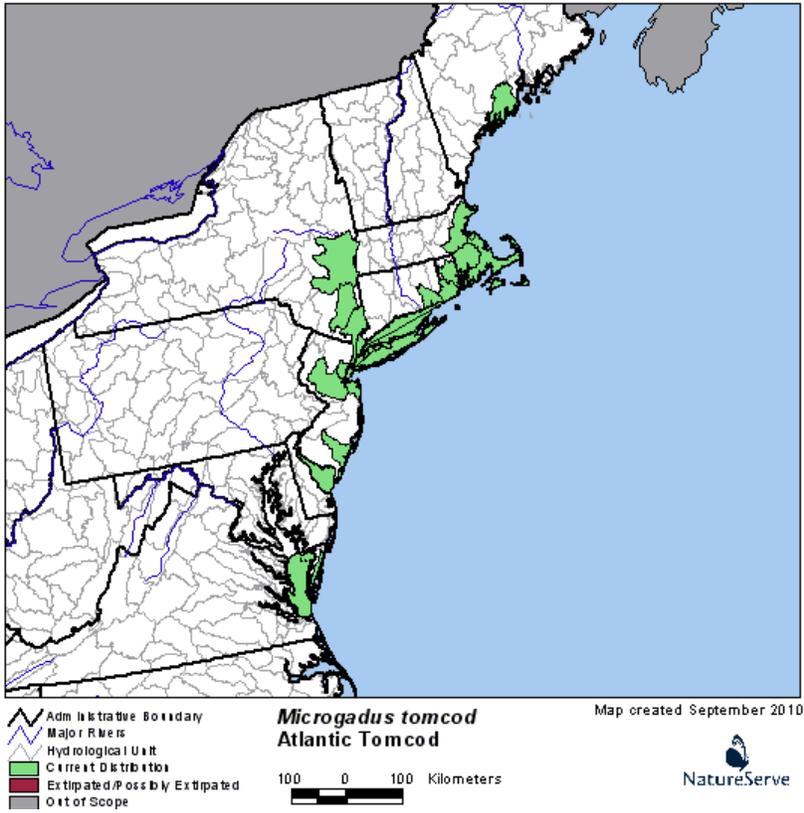


Figure 2: Distribution of Atlantic tomcod by watershed (NatureServe 2013).

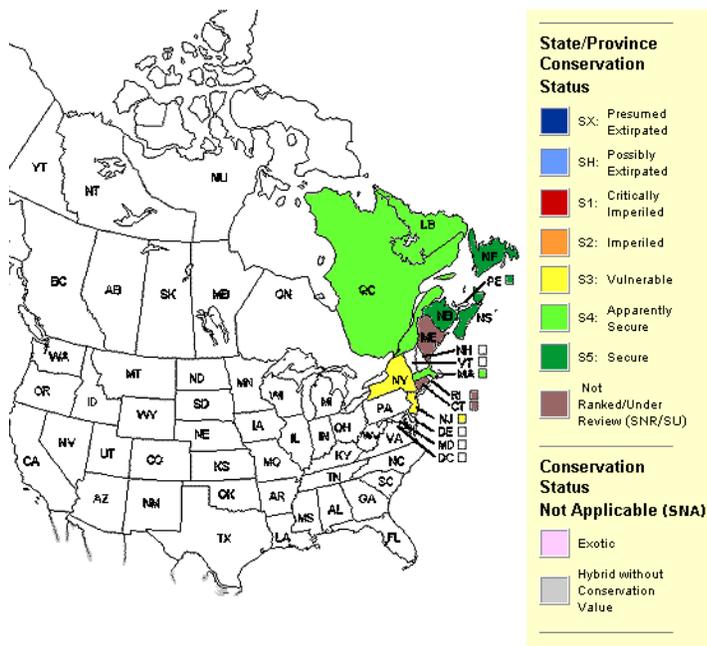


Figure 3: Conservation status of Atlantic tomcod in North America (NatureServe 2013)

**III. New York Rarity, if known:**

<b>Historic</b>	<b><u># of Animals</u></b>	<b><u># of Locations</u></b>	<b><u>% of State</u></b>
<b>prior to 1970</b>	_____	_____	_____
<b>prior to 1980</b>	_____	_____	_____
<b>prior to 1990</b>	_____	_____	_____

**Details of historic occurrence:**

Atlantic tomcod historically occurred in bays surrounding Long Island and within the Hudson River (M. Richards and D. Carlson, personal communication). See locations in Table 1.

<b>Current</b>	<b><u># of Animals</u></b>	<b><u># of Locations</u></b>	<b><u>% of State</u></b>
	_____	_____	_____

**Details of current occurrence:**

Atlantic tomcod occur in bays surrounding Long Island and within the Hudson River (M. Richards and D. Carlson, personal communication). See locations in Table 1.

Table 1: Data from the Western Long Island Seine Survey (1984-2012), Crustaceans WLIS Lobster Trawl Survey (2004), and the Peconic Bay Small Mesh Trawl Survey (2007-2012). Years listed below only represent years with Atlantic tomcod occurrences, not necessarily the total duration of the surveys.

<b>Waterbody</b>	<b>Years Present</b>
Cold Spring Harbor	2001,2003-2010
Flanders Bay	2011
Great Peconic Bay	2007,2009,2011
Great South Bay Brookhaven	1985,1988,1989,1990
Great South Bay Islip	2001
Hempstead Harbor	1984-1986,1988,1990,2006-2011
Jamaica Bay	1984,1985,1987-1991,1994,1996,1997,2000,2001,2003-2005,2008,2010,2011
Little Neck Bay	1984-2011
Little Peconic Bay	2007,2009-2011
Long Island Sound West	1990,2004
Manhasset Bay	1984-1991,1994-2001,2003,2005,2007-2011
Noyack Bay	2009,2011
Oyster Bay Harbor	2004-2006,2010
Port Jefferson Harbor	1988,1994,1996,1997,2001,2003-2005
Shelter Island Sound	2009,2011
Shinecock Bay	1987
Staten Island	1984,1986,1988,1989
Stony Brook Harbor	1993

**New York's Contribution to Species North American Range:**

<b>% of NA Range in New York</b>	<b>Classification of New York Range</b>
<input type="checkbox"/> 100 (endemic)	<input type="checkbox"/> Core
<input type="checkbox"/> 76-99	<input checked="" type="checkbox"/> Peripheral
<input type="checkbox"/> 51-75	<input type="checkbox"/> Disjunct
<input type="checkbox"/> 26-50	<b>Distance to core population:</b>
<input checked="" type="checkbox"/> 1-25	_____

**IV. Primary Habitat or Community Type:**

1. Estuarine, Brackish Shallow Subtidal
2. Estuarine Subtidal, Tidal River
3. Estuarine, Brackish Intertidal, Benthic Geomorphology, Tidal Creek

**Habitat or Community Type Trend in New York:**

Declining       Stable       Increasing       Unknown

Time frame of decline/increase: Not specified

Habitat Specialist?                       Yes       No

Indicator Species?                       Yes       No

**Habitat Discussion:**

Tomcod are found around the mouth of rivers in tidal estuaries, salt creeks and as far upstream as the head of tide in tributary streams (Bigelow and Schroeder 1953, Booth 1967, Lambert and Fitzgerald 1979). Atlantic tomcod prefer cold water and avoid the warm waters of small streams and shallow coastal areas. Tomcod spawn on substrates of ledge, boulders and cobble or near shore in shallow water full of ice and slush (Booth 1967, Peterson et al. 1980). There are no recordings of individuals in waters greater than 26°C (Howe 1971).

**V. New York Species Demographics and Life History**

- Breeder in New York**
  - Summer Resident**
  - Winter Resident**
  - Anadromous**
- Non-breeder in New York**
  - Summer Resident**
  - Winter Resident**
  - Catadromous**
- Migratory only**
- Unknown**

**Species Demographics and Life History Discussion:**

Atlantic tomcod are a short lived, winter-spawning, anadromous species. The average lifespan is 4 years (Salinas and McLaren 1983). In the Hudson, tomcod have only 3 age classes and individuals older than 1 are rare (Waldman 2006). Atlantic tomcod spawn from November to February, with a peak in January (Howe 1971). Females ranging 170-340 mm in length produce an average of 20,000 benthic eggs. Adult tomcod feed on crustaceans, polychaete worms, small mollusks and fish, with juveniles mostly feeding on copepods and small amphipods (Howe 1971). Juvenile growth rates slow during warm summer months (Fried and Shultz 2006). Adults mature at 9 months and are capable of spawning at 11 months (Waldman 2006). Between April to November juveniles are most abundant in the Tappan Zee and West Point regions and south to Manhattan (Dew and Hecht 1994). During the summer, distributions advance upriver with the salt front (Klauda et al. 1988).

**VI. Threats:**

High water temperatures during summer subject Atlantic tomcod to stress and will become a more acute problem should the region's temperatures increase with global warming. Predation from rebounding piscivorous fish species, particularly striped bass, may also negatively affect local populations. Liver cancer, possibly related to chemical contamination, is a common problem for tomcod in the Hudson River (Fried and Shultz 2006). This species is threatened by sewage and areas with low/depleted dissolved oxygen (NYSDEC 2005).

**Are there regulatory mechanisms that protect the species or its habitat in New York?**

No       Unknown  
 Yes

Commercial take of Atlantic tomcod in the Hudson River is allowed from 1 November through 1 March using fyke nets. The take of tomcod using gill nets is limited from 1 November through 30 November (NYSDEC 2012).

The Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Conservation Law.

**Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:**

Management needs identified in the Comprehensive Wildlife Conservation Strategy (CWCS) in New York are:

- Identify factors (environmental or otherwise) that affect population size
- Maintain Hudson stock at stable or increasing abundance
- Maintain optimum water quality in spawning, nursery and congregating habitats
- Conduct periodic estimate of adult population size.

## VII. References

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