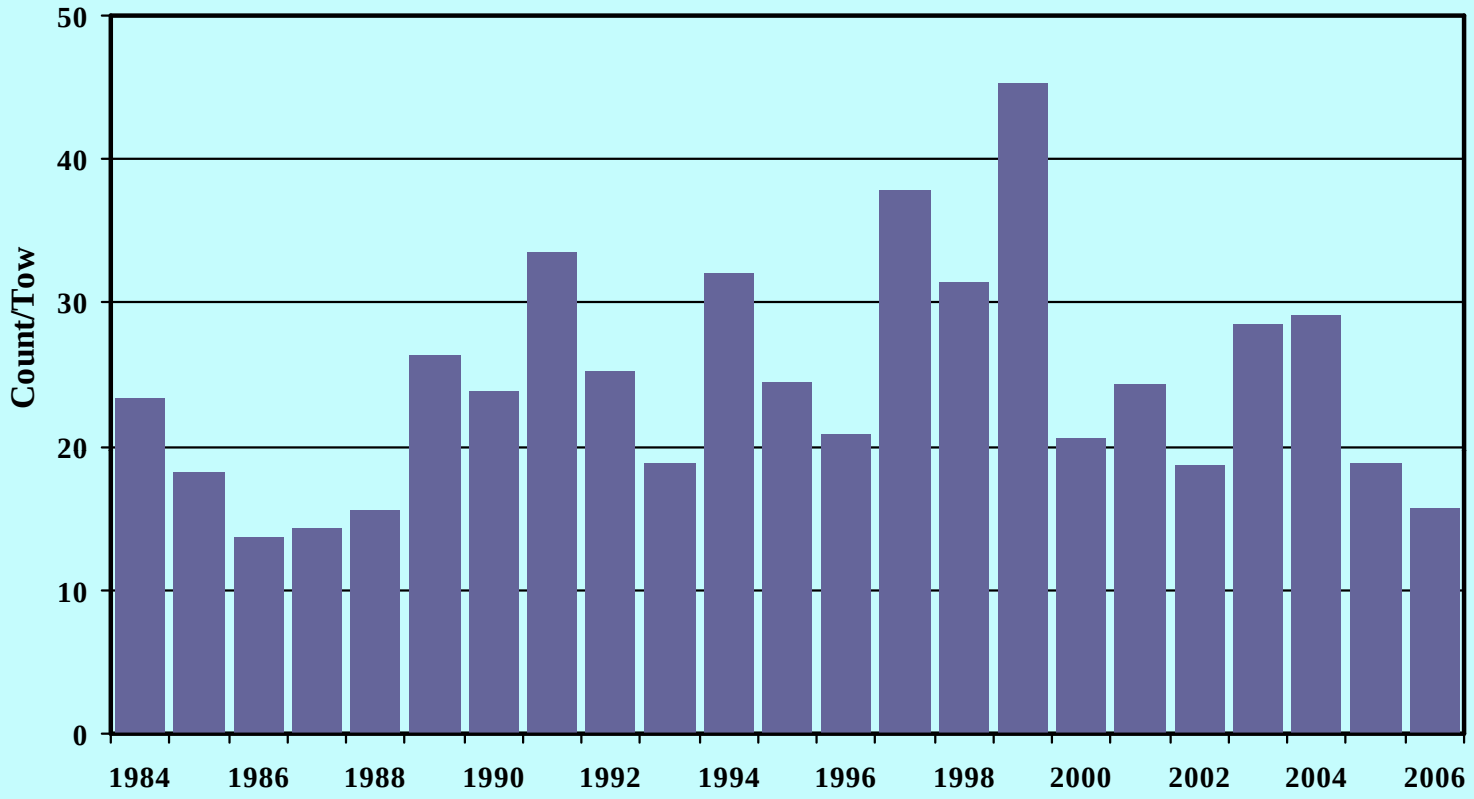
# LIS Fish Trawl Survey

Photo by Richard Howard

Managing a fishery starts with assessing the abundance and types of fish in the sea. For more than 20 years, the CT DEP has conducted a Trawl Survey throughout the Sound to track the size of fish populations. On each trawl, the crew of the research vessel *John Dempsey* counts, weighs, and measures finfish and invertebrates before returning them to the water and moving on to the next site. The samples enable resource managers to compare year to year the relative abundance of dozens of species living in the Sound's varied habitats.

# Bluefish Abundance



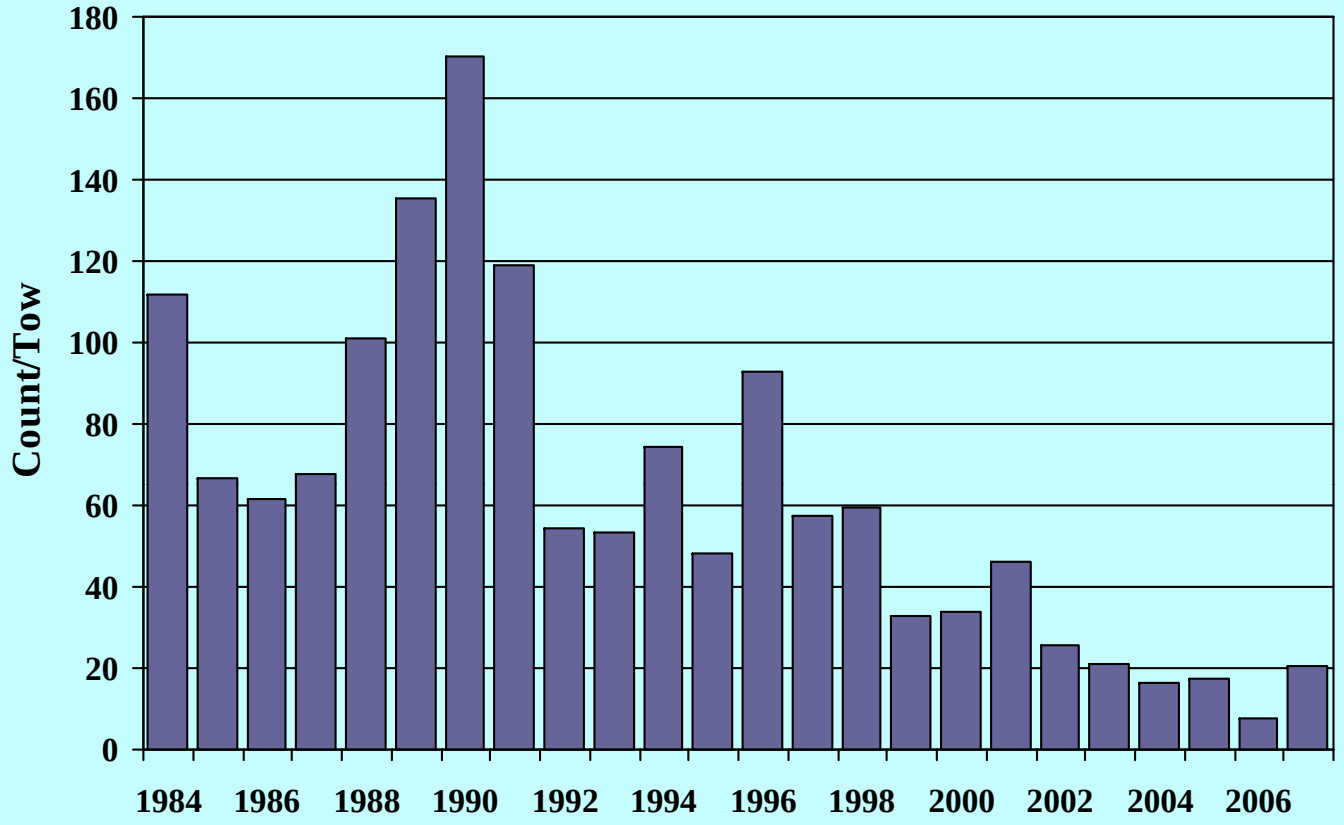

CT DEP, Fisheries Division, LIS Fish Trawl Survey

Young bluefish (snappers) migrate into the Sound in the late spring and are common near the shore and rivers, while the larger bluefish are common offshore. The size of the population migrating into the Sound, the availability of prey in the Sound, competition from other predatory fish in the same niche (such as striped bass) all have a substantial effect on the abundance and distribution of bluefish in the Sound. In 2006, bluefish was the third most caught fish in the Sound by recreational anglers (2.18 million caught; 918,000 harvested).

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Winter Flounder Abundance



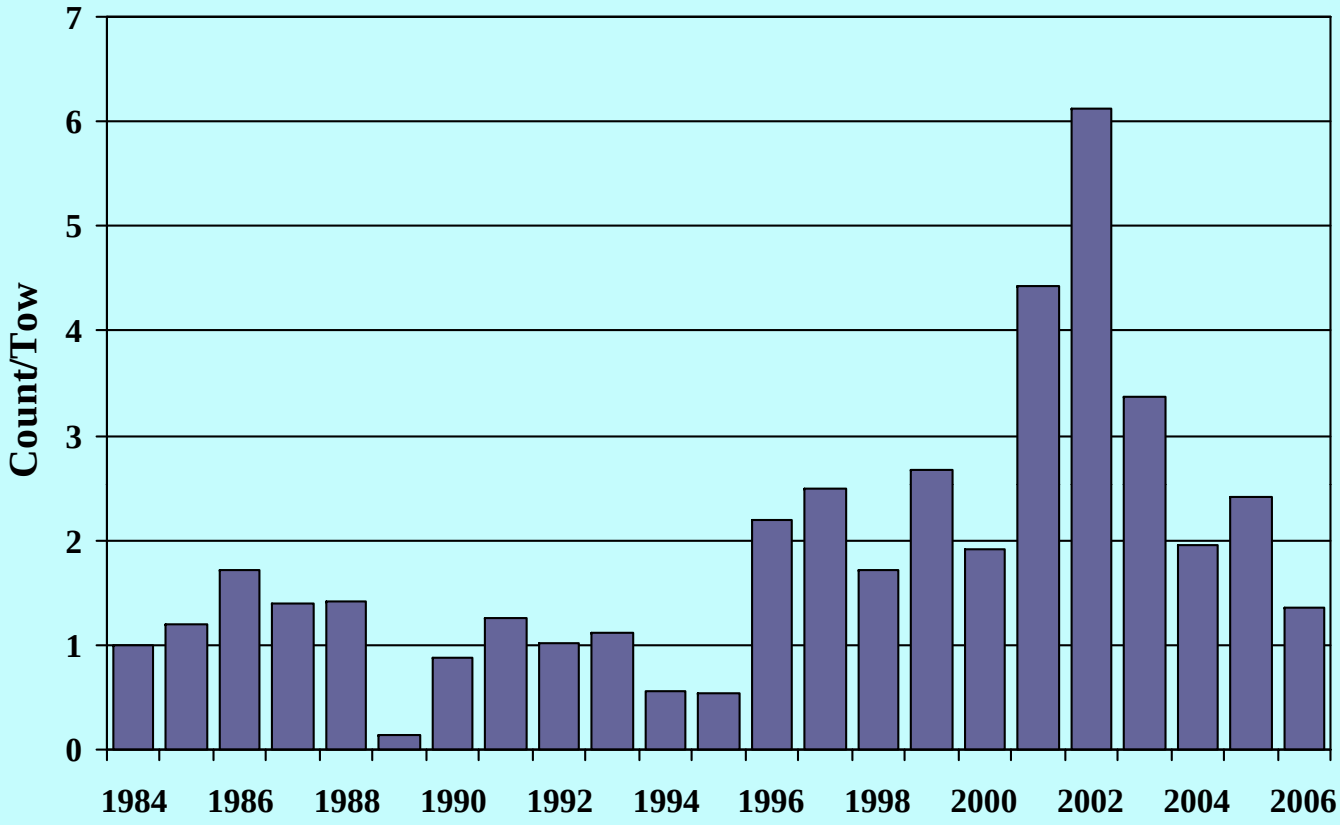

CT DEP, Fisheries Division

Winter flounder are flat fish that live year-round in the Sound. They live in the bottom waters, and prefer colder temperatures. As recently as the 1980s, Winter flounder was an important commercially harvested fish in Long Island Sound. But stocks have since dropped significantly; only 31,756 fish were caught in 2006, and 7,804 harvested. Fishery resource managers believe that warmer temperatures may be a factor with young flounder and eggs being eaten by warm-water predators migrating into the Sound such as striped bass and summer flounder. An increasing number of cormorants may also be preying on flounder.

**Indicator Type: Impact—ecological**

**SH 2008: Living Marine Resources (3.2)**

# Summer Flounder Abundance



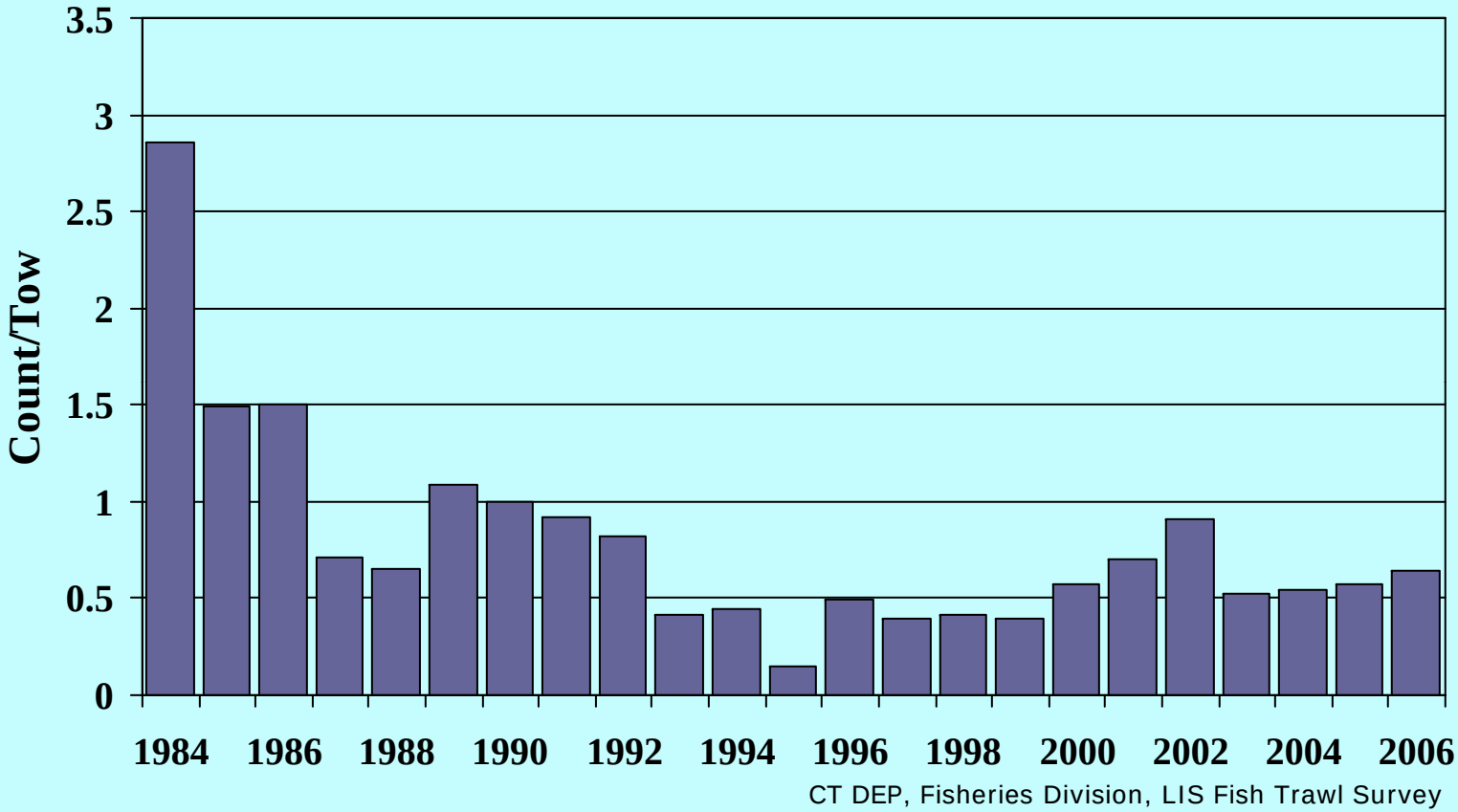

CT DEP, Fisheries Division, LIS Fish Trawl Survey

Summer flounder (fluke) move into the Sound during June as water temperatures warm up they migrate out in late fall as water temperatures drop. Beginning in the mid-1990s this valued recreational and commercial fish started to recover in response to restrictive fisheries management measures. In recent years, fewer young fish are growing into adults, and it is uncertain why. Still, summer flounder were the fourth largest number of fish caught by recreational anglers in the Sound in 2006 (1,796,000 caught; 248,000 harvested). A large number of fish were released by anglers in part due to an increase in the minimum size restrictions in April 2006 from 17.5 to 18 inches.

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Tautog Abundance



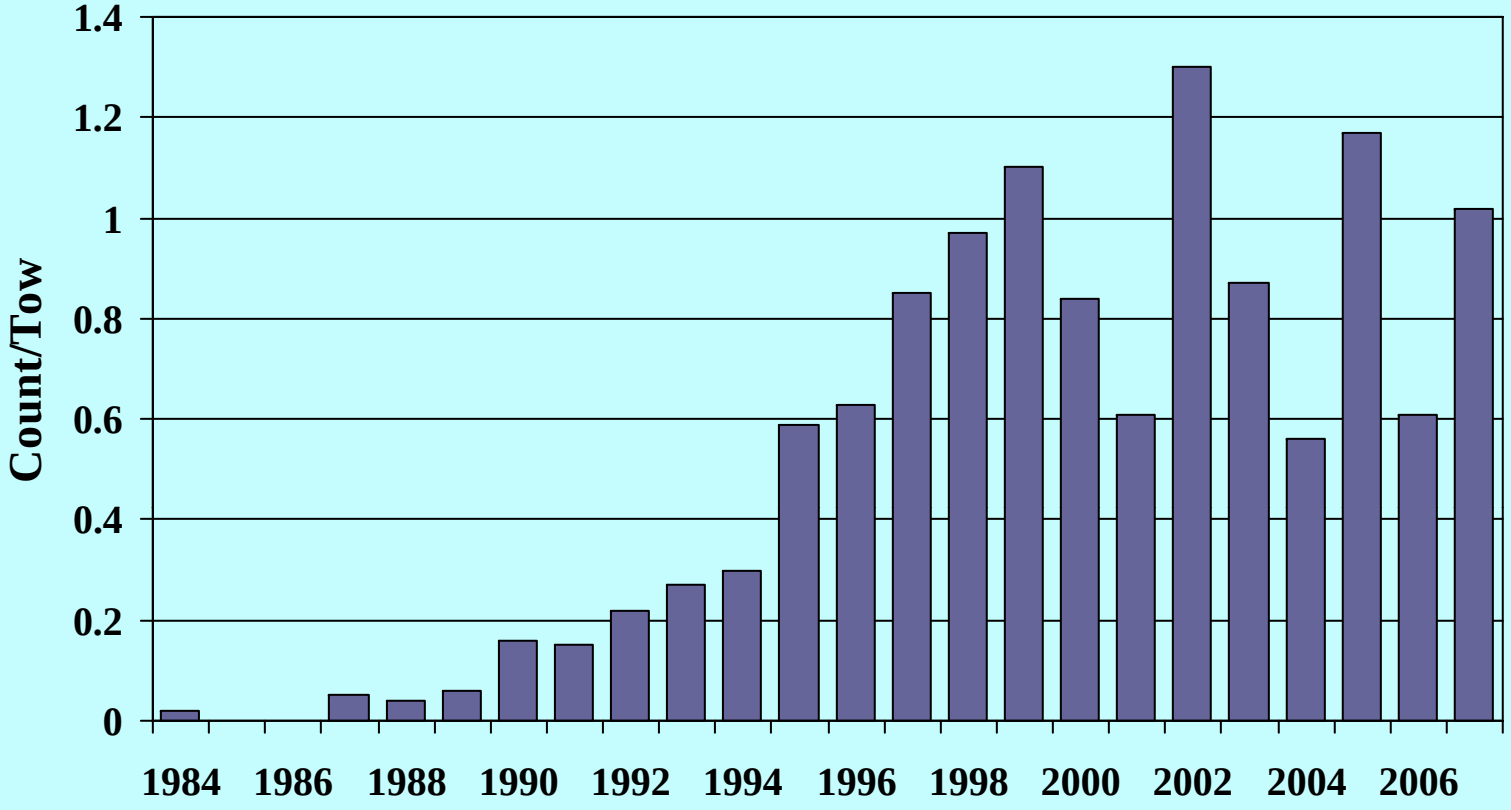

CT DEP, Fisheries Division, LIS Fish Trawl Survey

Tautog, or blackfish, live year round in the Sound near rocks and boulders left by glacial deposition. While numbers declined in 2003, the population is increasing again. In recent years, fishery managers have shortened the recreational season and implemented harvest limits in order to help rebuild the stock. In 2006, tautog was the fifth most caught fish in the Sound by recreational anglers (1.08 million caught; 332,000 harvested).

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Striped Bass Abundance



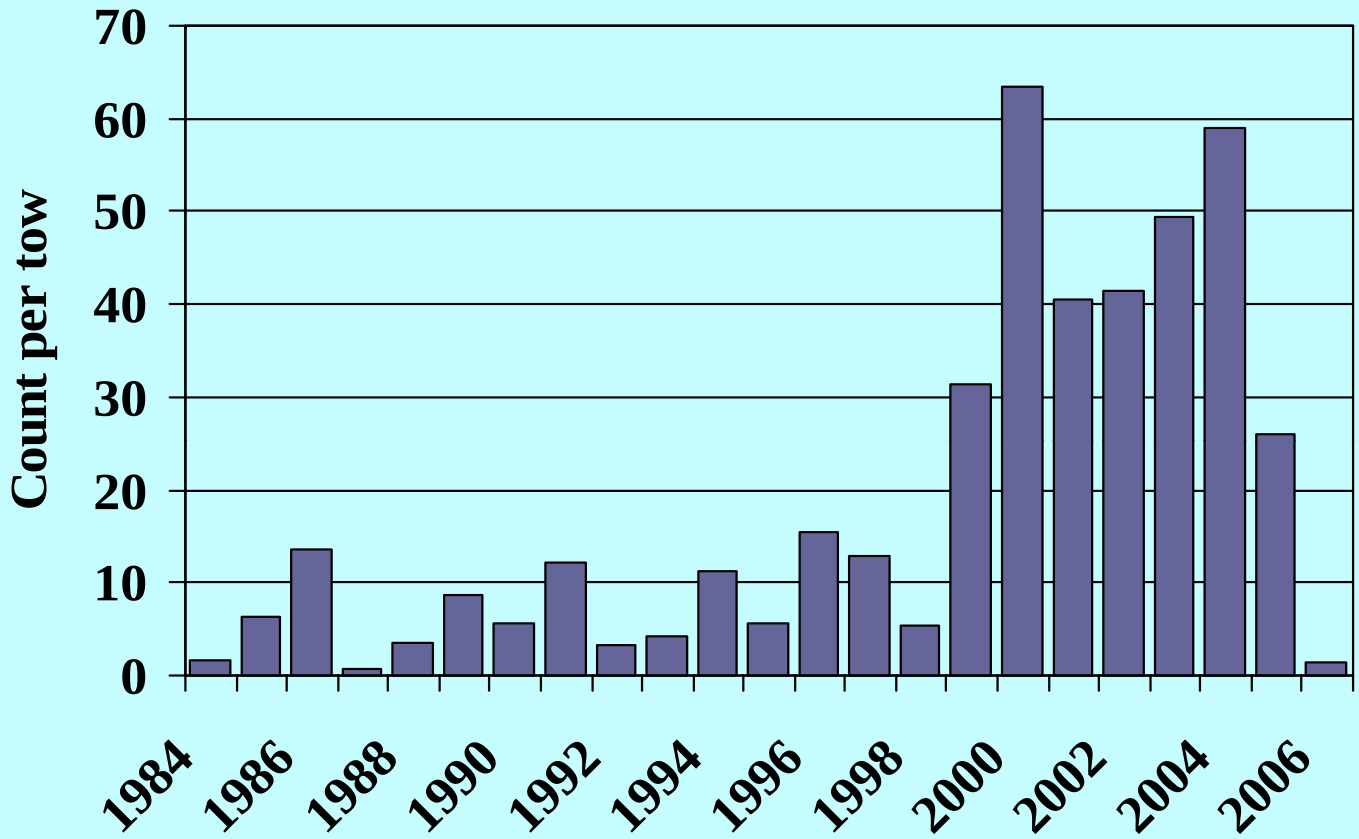

CTDEP, Fisheries Division, LIS Fish Trawl Survey

Striped bass abundance had been severely depleted by overfishing in the 1980s. It became the first species to be targeted for stock rebuilding, beginning in 1984. Restrictive harvest limits and larger minimum size restrictions have allowed the stock to grow to unprecedented levels. In 1995, the striped bass was declared "officially recovered" and no longer overfished. Striped bass was the second most caught fish by recreational anglers in 2006; harvest restrictions of 1-2 striped bass per trip keep harvest numbers low (2.2 million caught; 116,000 harvested).

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Weakfish Abundance



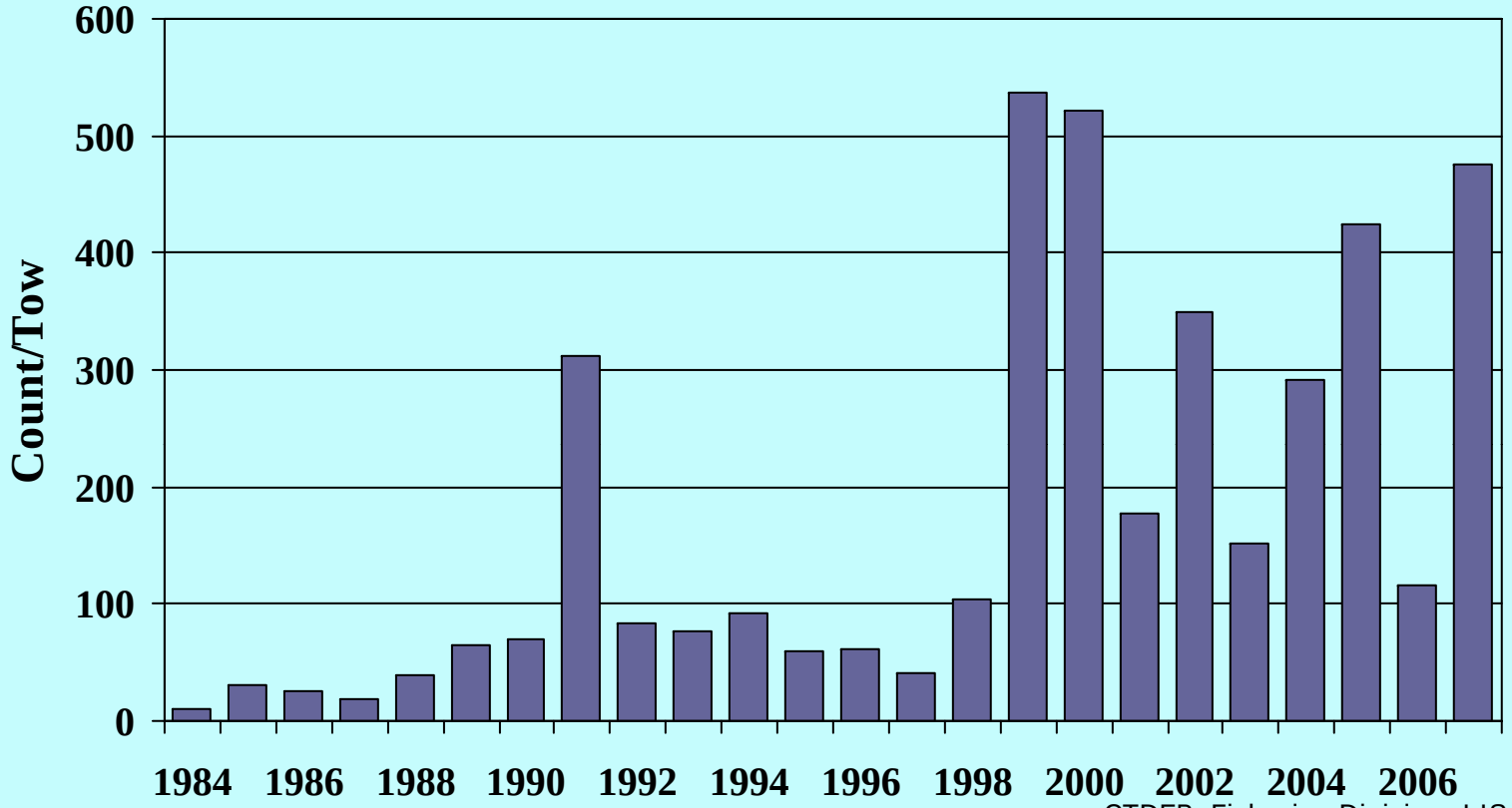

CTDEP, Fisheries Division, LIS Fish Trawl Survey

Also known as sea trout, weakfish occupy some of the same habitat as striped bass and summer flounder near the mouth of rivers. Young 1-and 2-year-old stocks had seen dramatic growth until 2004, only to find their numbers plummet again. It's believed that larger fish such as striped bass may be preying on the juveniles before they have a chance to mature.

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Scup Abundance



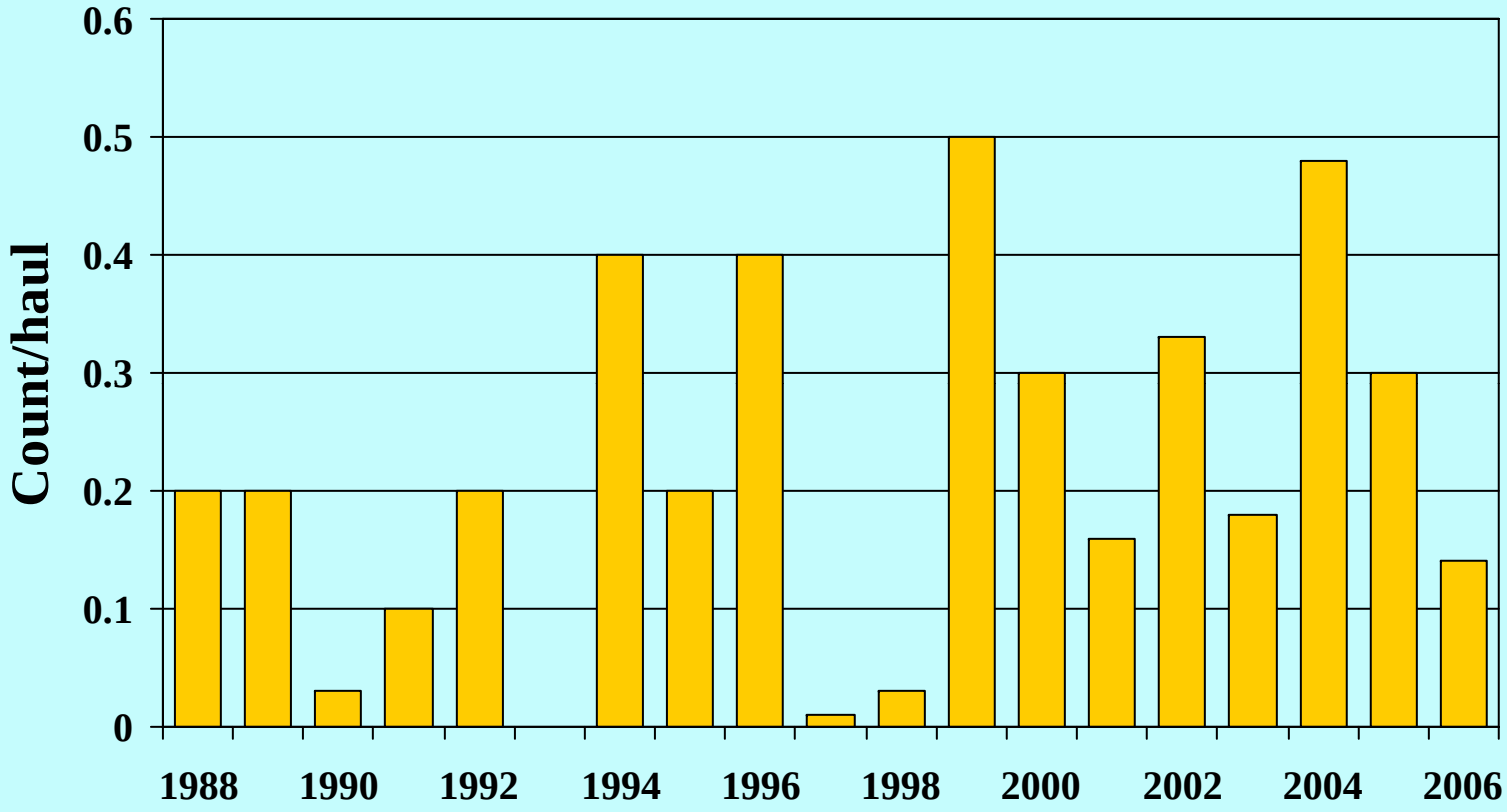

CTDEP, Fisheries Division, LIS Fish Trawl Survey

Scup, also known as “porgy,” is another economically important species of finfish that was at lower abundance in the mid 1980s. This species has shown the most dramatic increase in numbers and size in the Sound. Many fisheries managers believe that fisheries management regulations, including harvest limits restrictions over the last 10 years, have allowed the stock to grow to unprecedented levels. While the count declined in 2006, the overall average in the last 10 years is significantly higher than the average from 1984 to 1994. In 2006, scup was the most caught fish in the Sound (3.2 million caught; 960,000 harvested).

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Cunner Abundance



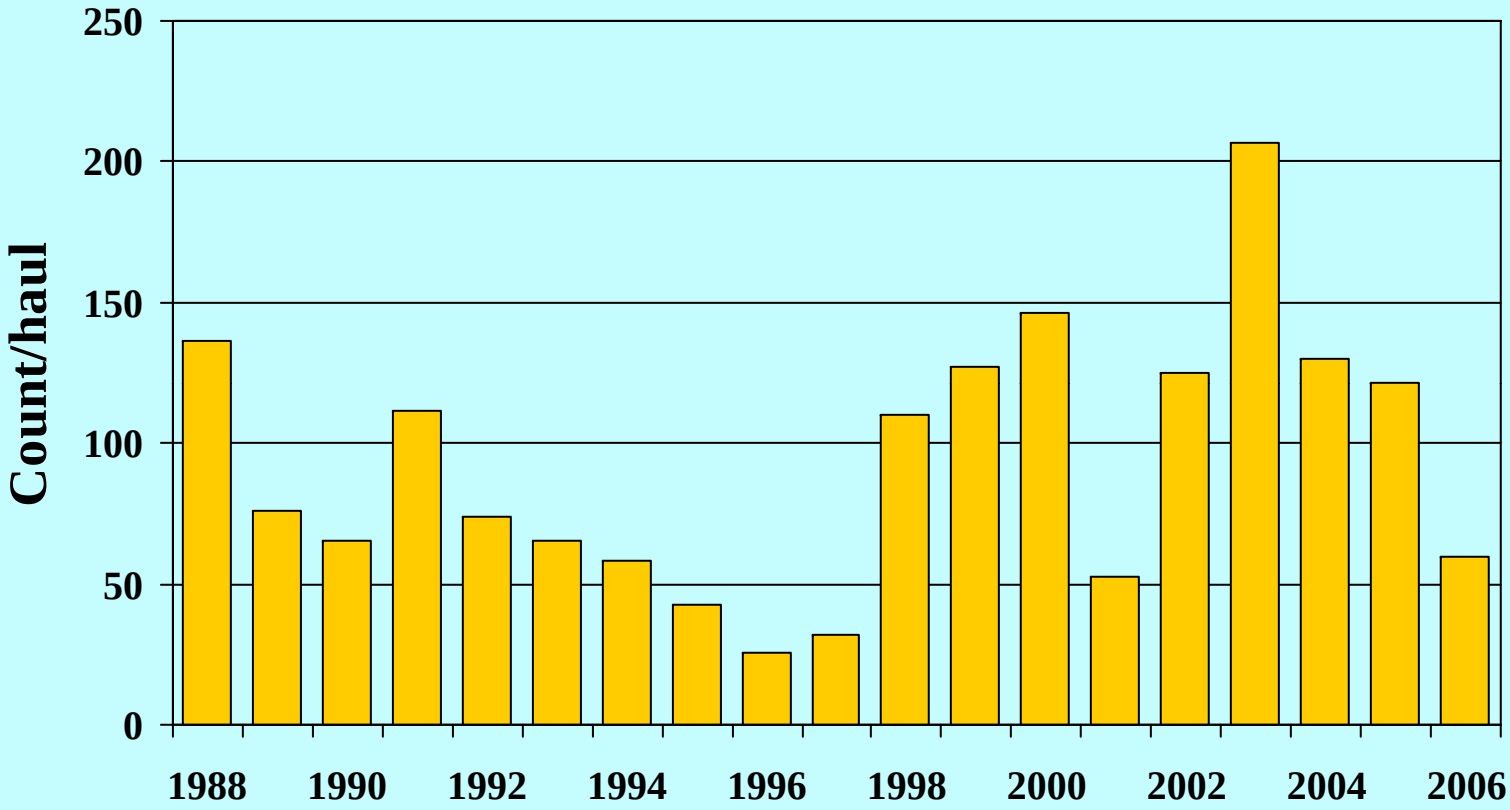

CT DEP, Fisheries Division, Estuarine Seine Survey

Cunner, also known as bergall, live year round in the Sound near rocky habitats as well as near pilings and piers and eelgrass. They feed on mollusks and barnacles, but in turn are prey fish for top predators such as bluefish. Cunner abundance is collected through the CT DEP Estuarine Seine Survey at several sites that are close to shore and the natural habitats that cunner are usually found in. Cunner abundance in recent years is generally higher than the late 1980s.

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Forage Fish Survey



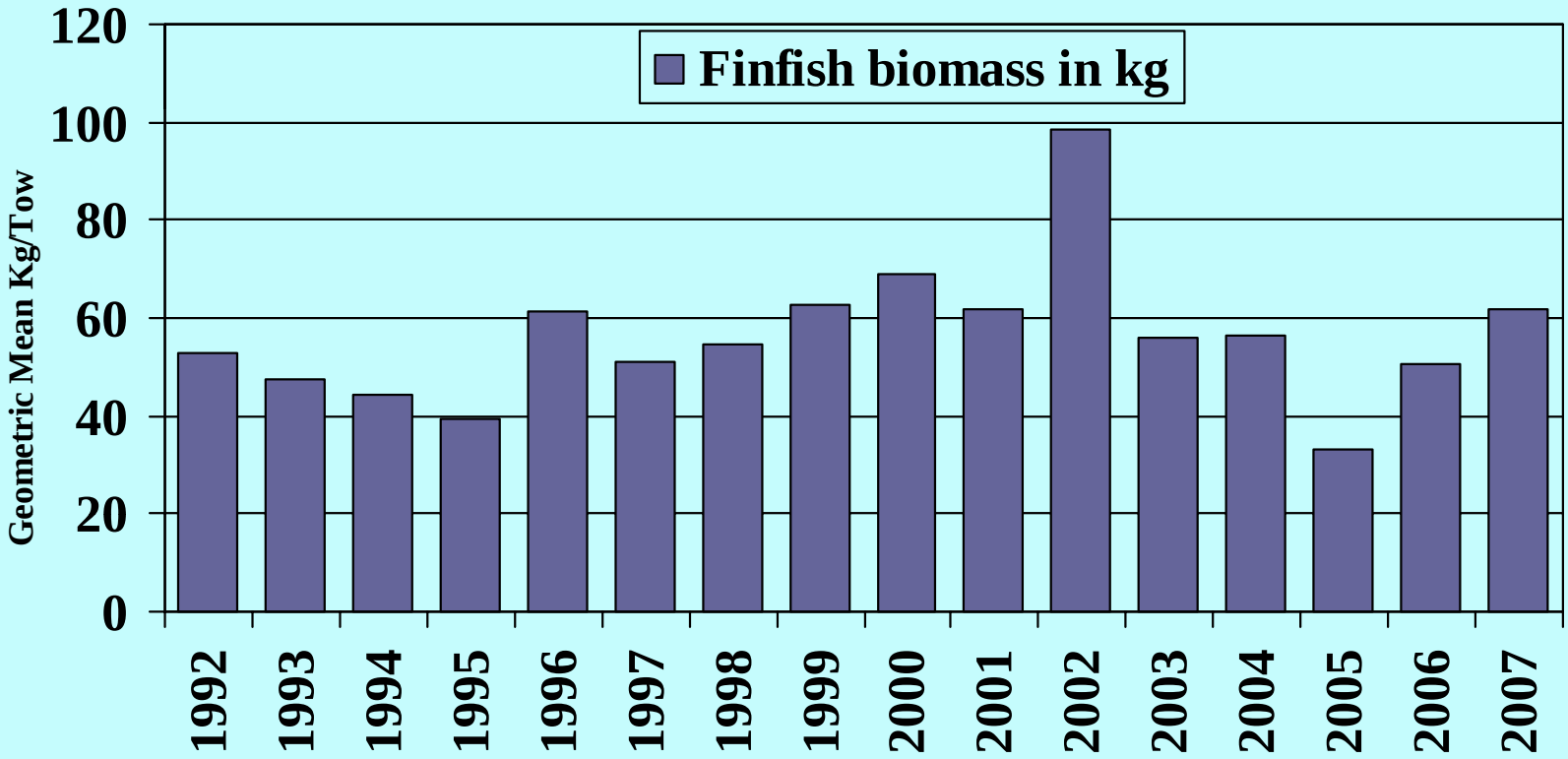

CT DEP, Fisheries Division, Estuarine Seine Survey

The low marsh areas of the shoreline is home to many small fish that are prey organisms, or forage fish, for larger fish, birds, reptiles, crabs, and mammals. The forage species index of 59 in 2006 was the sixth lowest of the time series, and well below the time series average of 93/haul. Atlantic Silversides dominate the index. Other abundant species include striped killifish, mummichog, and sheepshead minnow.

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Fish Biomass Index



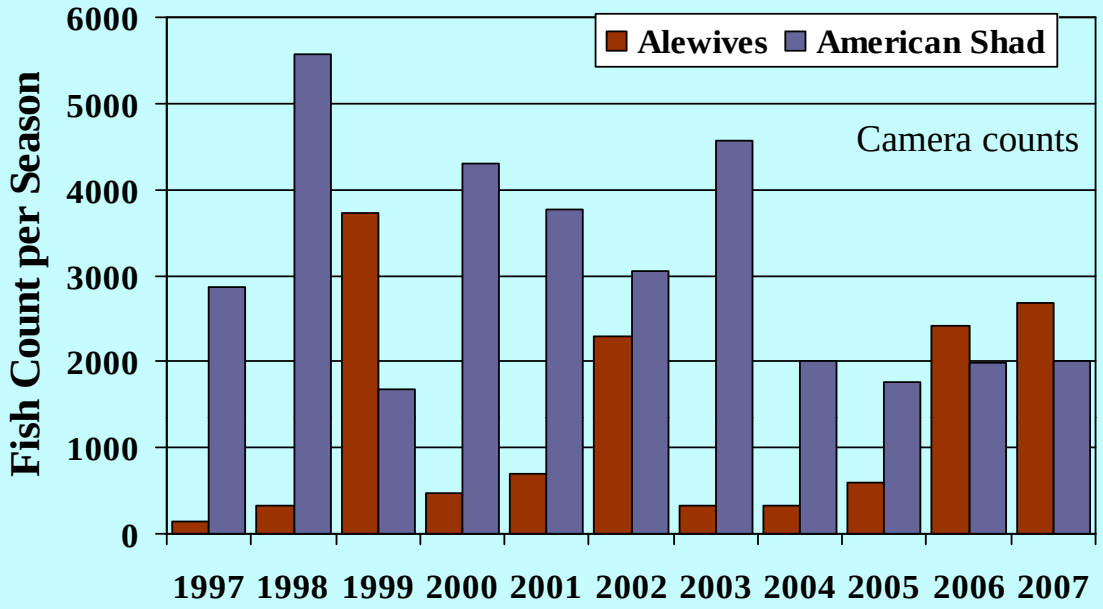

CT DEP, Fisheries Division, LIS Fish Trawl Survey

In 2006, the trawl survey collected 100,592 finfish, lobster and squid weighing 11,024 kg (24,253 lbs). A total of 49 finfish and 38 invertebrate species were collected from 120 tows. The finfish count was below the average of 58 species per year, and the lowest observed in 23 years. While species count as well as diversity have varied through the years, the finfish biomass has remained relatively stable. Biomass stability in the Sound is consistent with other northeast coastal waterbodies. The index was unusually high in 2002 when the Sound experience a large number of scup.

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Alewife & Shad Fishway Trends
## Greenville Dam, Norwich

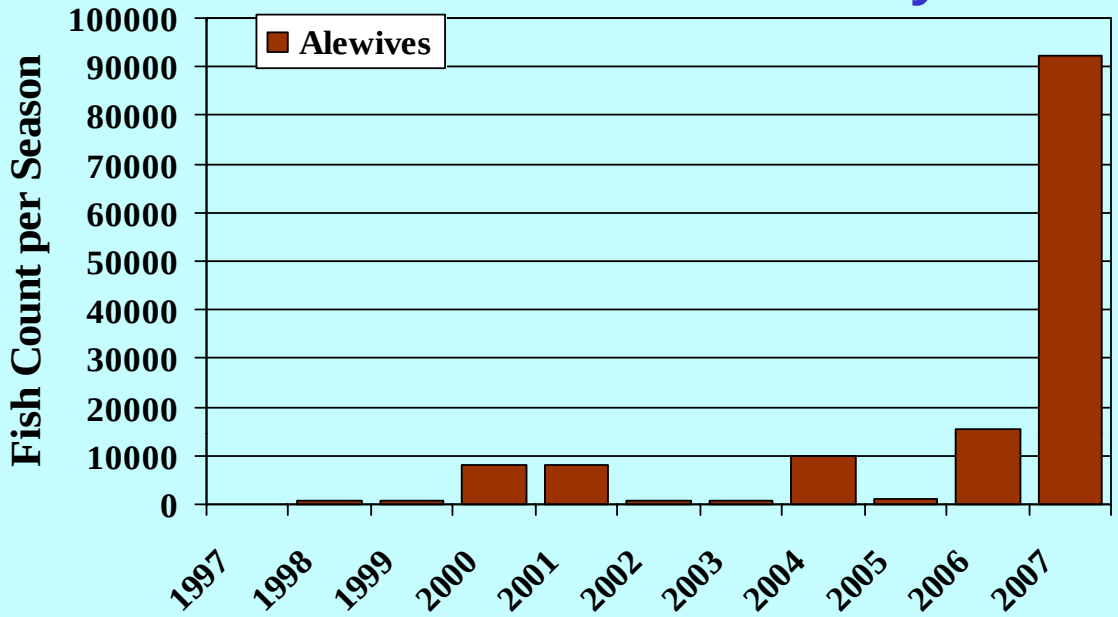



Data courtesy of DEP/Inland Fisheries Division and the fishway owners

The reopening of historic fish runs in the rivers and streams of Connecticut by installing fish ladders or removing dams is a management tool in recovering habitat lost in the past due to the industrialization of New England in the 1800s. Tracking the response and usage of newly opened fishways by alewives and shad show the success of these river modifications and assist in planning for additional fishway installations in the future.

**Indicator Type: Impact-ecological**

# Alewife Trends
# Mianus Pond Fishway, Greenwich



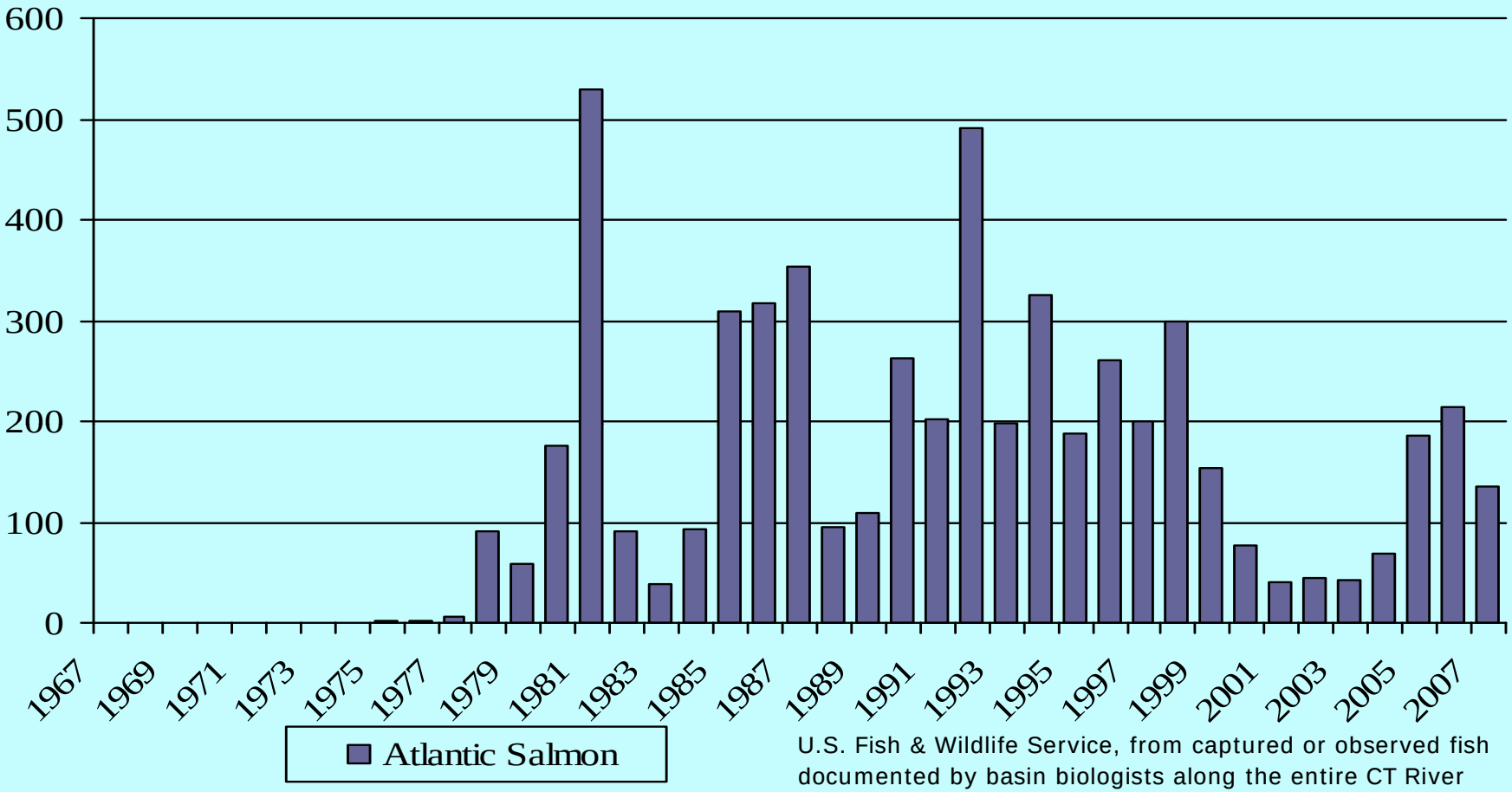

The Mianus Pond Fishway, installed in 1997 and owned by the Town of Greenwich, is located on the Mianus River in Greenwich. The fishway was installed in 1997. Qualitative observations were used during the first seven years by volunteers visually observing and estimating counts. An electronic counter was installed in 2005 giving more accurate counts.

Data courtesy of DEP/Inland Fisheries Division and the fishway owners. 1997-2004 are estimates.

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Atlantic Salmon Trends in the CT River



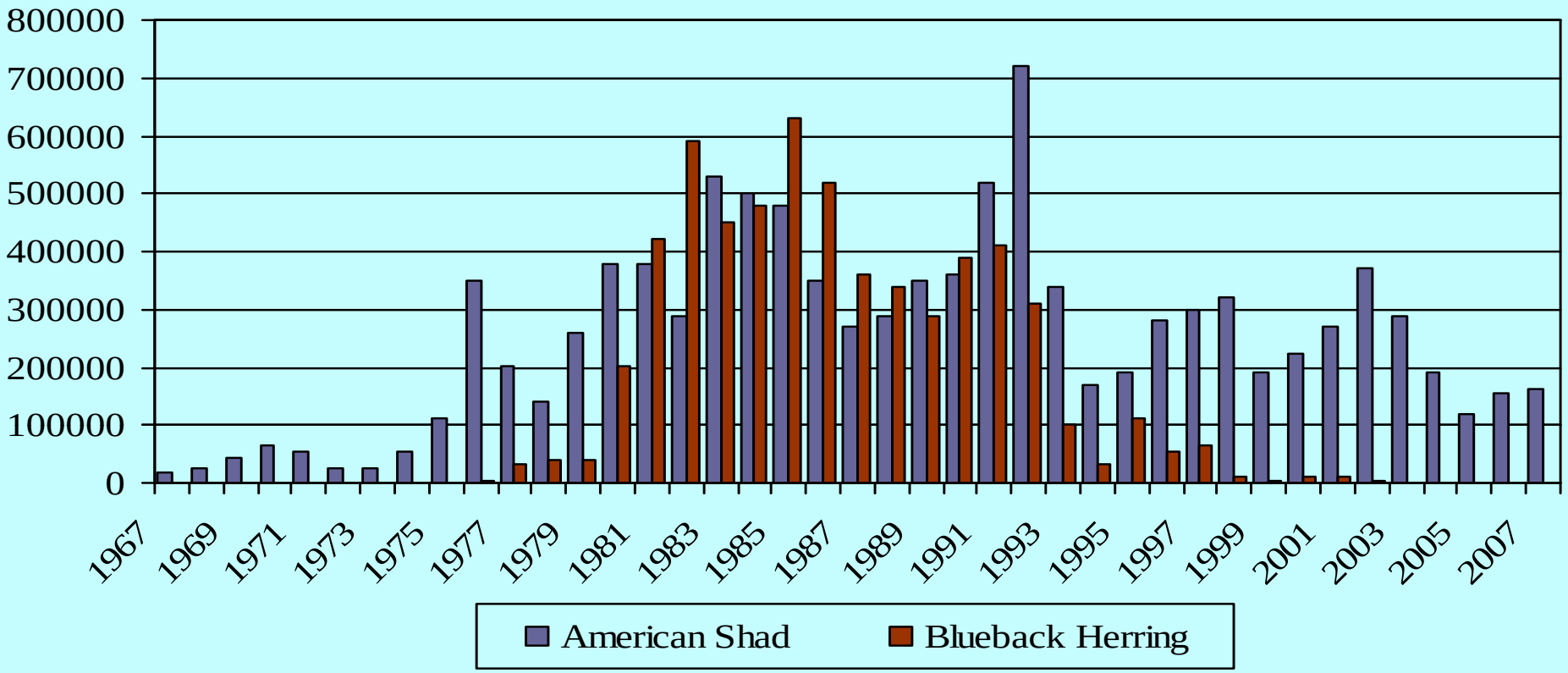

U.S. Fish & Wildlife Service, from captured or observed fish documented by basin biologists along the entire CT River

Sea-run populations of Atlantic salmon into the CT River disappeared by the mid 1800s because of dam construction, overfishing, and pollution. Restoration was first attempted in the 1800s, but did not succeed. In 1967, a government, private organization, and industry partnership attempted a new restoration program that included restocking streams with salmon fry (young salmon) and providing access to habitat by building fish passageways. While numbers are not high, salmon are once again migrating to the ocean, and returning as adults to spawn.

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Shad and Herring in the CT River



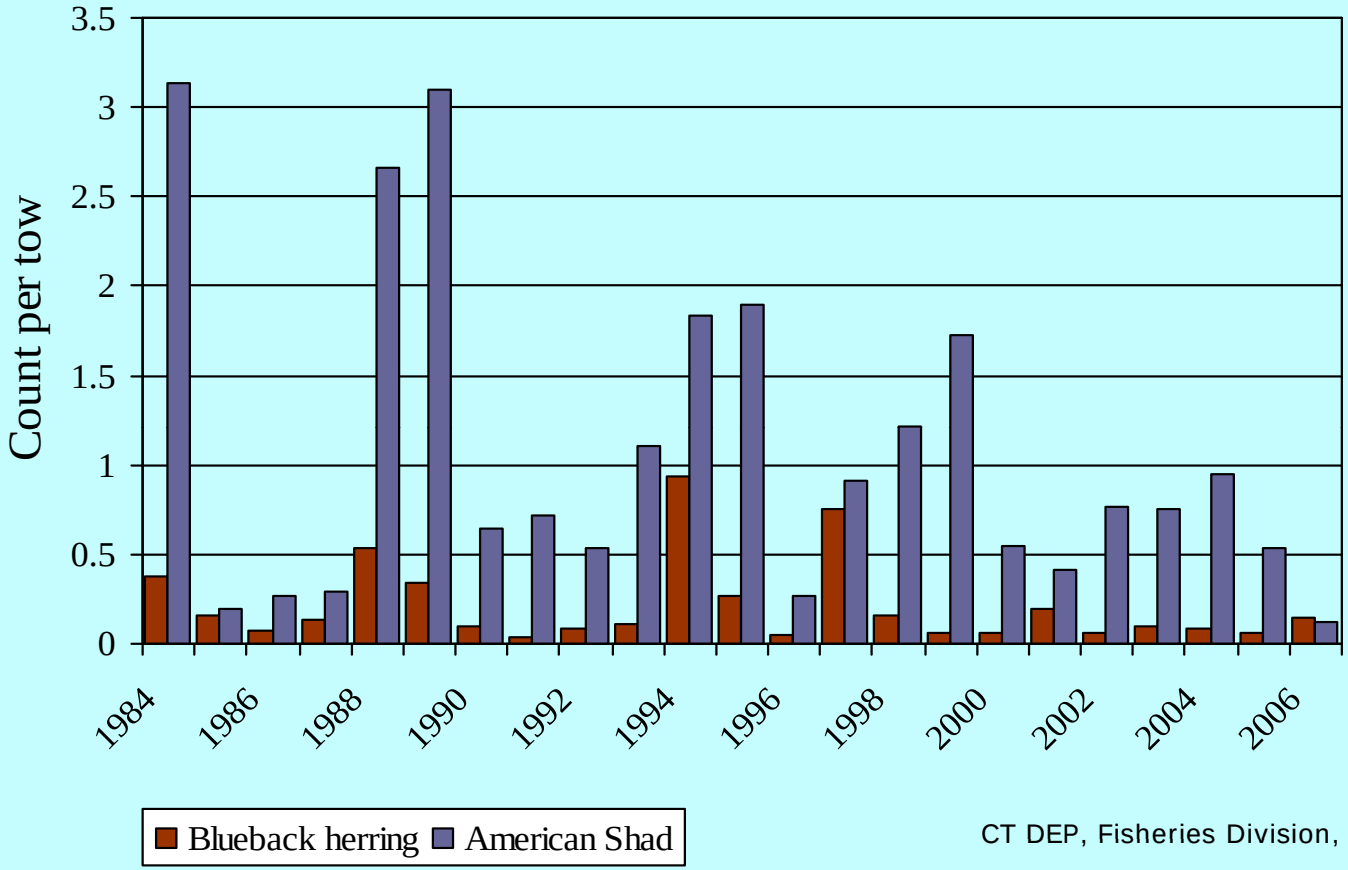

U.S. Fish & Wildlife Service, CT River Coordinator, from fish counted at Holyoke Dam facility

American shad migrate from the ocean to rivers to spawn. Their year to year populations in the CT River vary, often depending on differences in recruitment of individual year classes. Blueback herring has declined dramatically in recent years, and is now down to less than a hundred spotted at the U.S. FWS fish by-pass observation station at Holyoke Dam site in Massachusetts. Resource managers are not certain of the cause. In Connecticut waters a moratorium on the taking of blueback herring has been in place since 2001.

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Shad & Herring in Long Island Sound



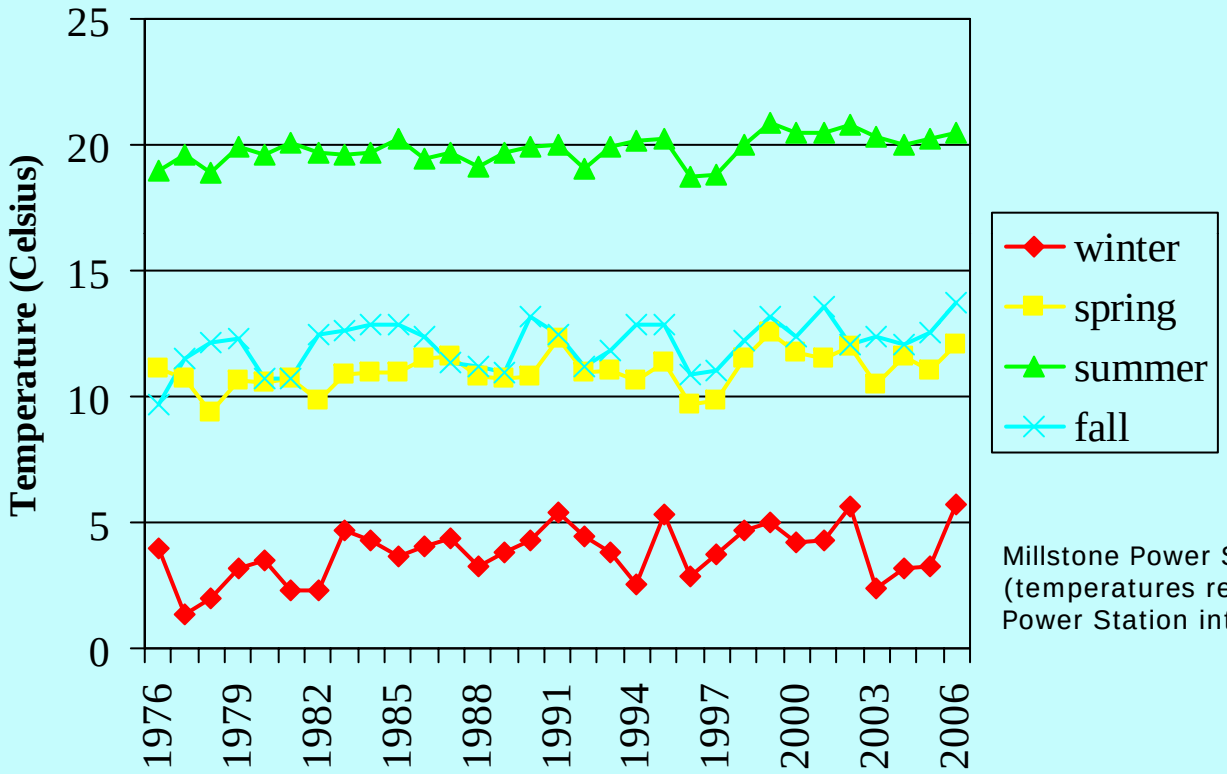

CT DEP, Fisheries Division, LIS Fish Trawl Survey

American shad migrate from the ocean to rivers to spawn. Their year to year populations vary, often depending on differences in recruitment of individual year classes. Blueback herring has declined dramatically in recent years. Striped bass predation may be a factor in declining populations for both species. In Connecticut waters a moratorium on the taking of blueback herring has been in place since 2001.

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Surface Water Temperature in LIS



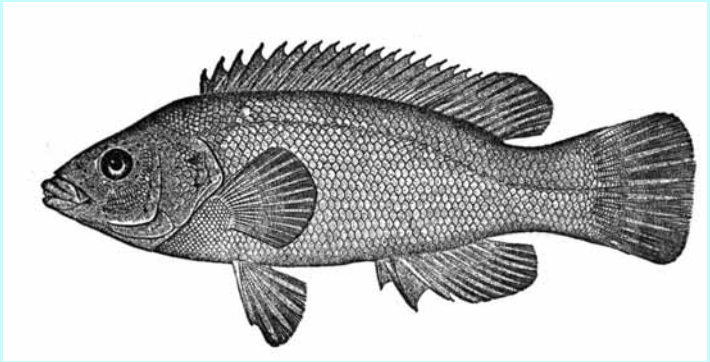

Millstone Power Station
(temperatures recorded at Millstone Power Station intake units)

Yearly seasonal temperatures as measured at Millstone Power Station in New London, CT. On average, temperatures have increased over the past 30 years.

**Indicator Type: Pressure**

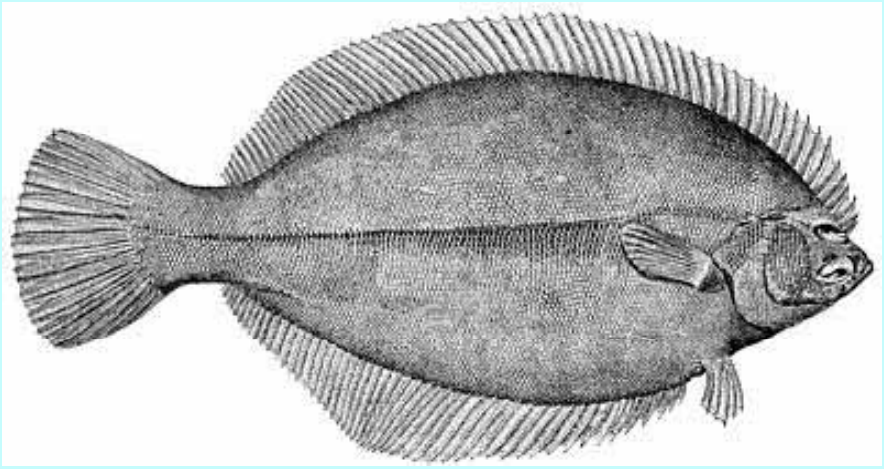
# Cold Temperate Species

Fishermen in the western Sound have reported a decline in cunner, known locally as bergal.

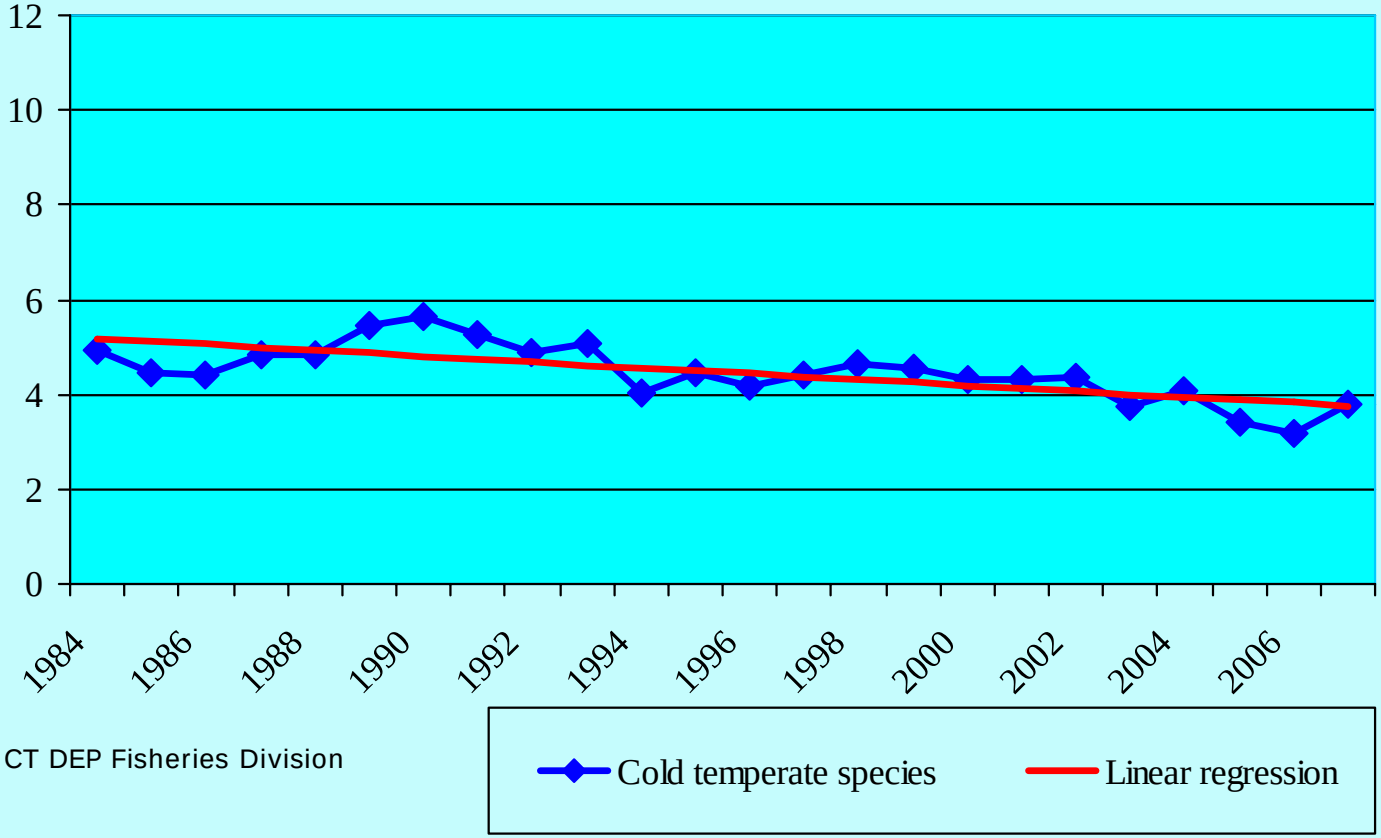


Some cold temperate species have not readily responded to Fisheries management actions and are sorely missed by recreational anglers.

Winter flounder in LIS have declined over the last 20 years.



# LIS Spring Trawl Survey
# Cold-water Species Richness Trend




The average number of these cold-water species has decreased over the past 23 years from about 5 species per tow to about 4 (a statistically significant decrease). Of the eight "cold temperates" exhibiting significant declines in abundance, winter flounder is the most widely known and conspicuous example. This species once supported a robust recreational fishery in the spring with landings of over 1 million fish in the early 1980s. Landings of under 5,000 fish were estimated last year. Other cold temperates in decline include the longhorn sculpin, sea raven, cunner—species with no recreational or commercial value.

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

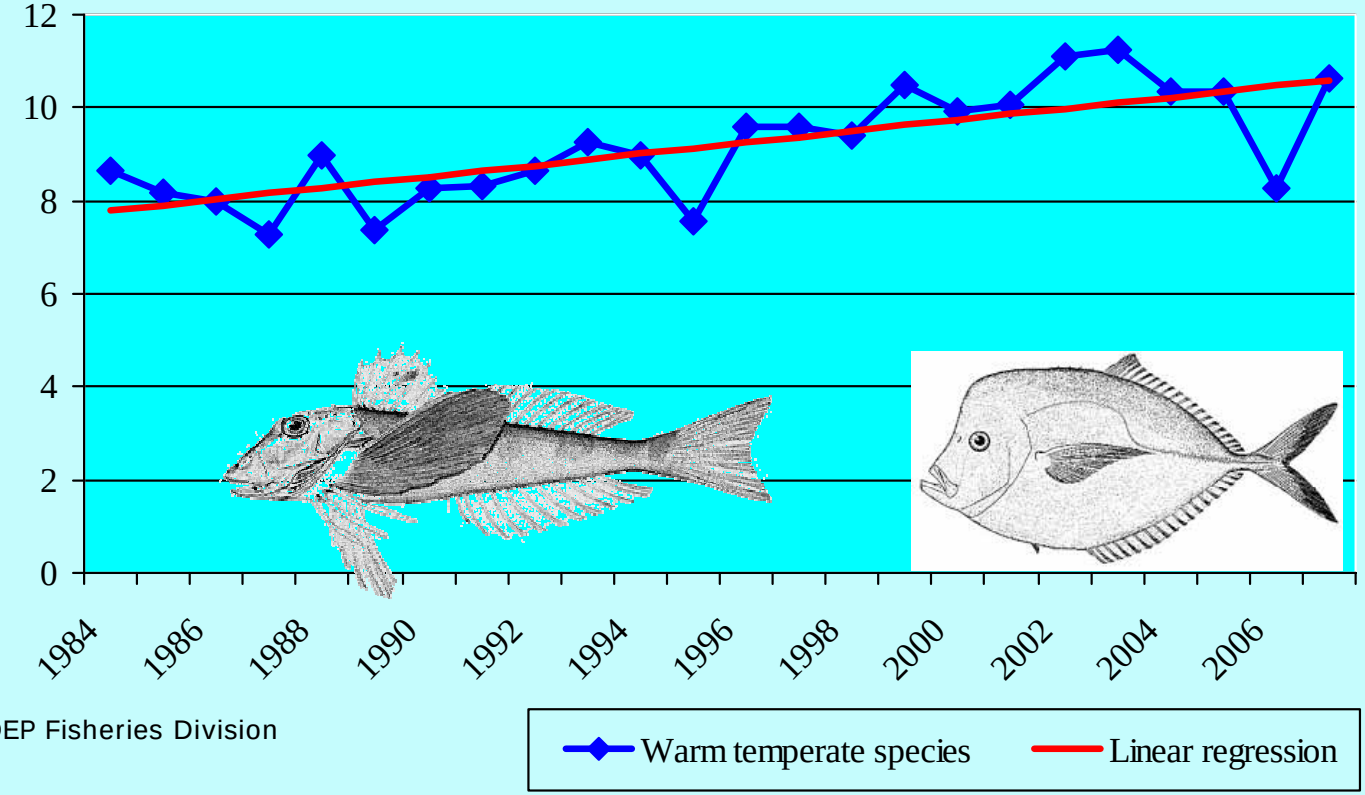
# Warm Temperate Species

2005 New CT State record
Black Seabass

Some of the warm temperate species have responded positively to fisheries management measures and are a welcome sight to recreational anglers.

2005 Central Sound 52” Striped bass

# LIS Fall Trawl Survey—Warm-water Species Richness Trend



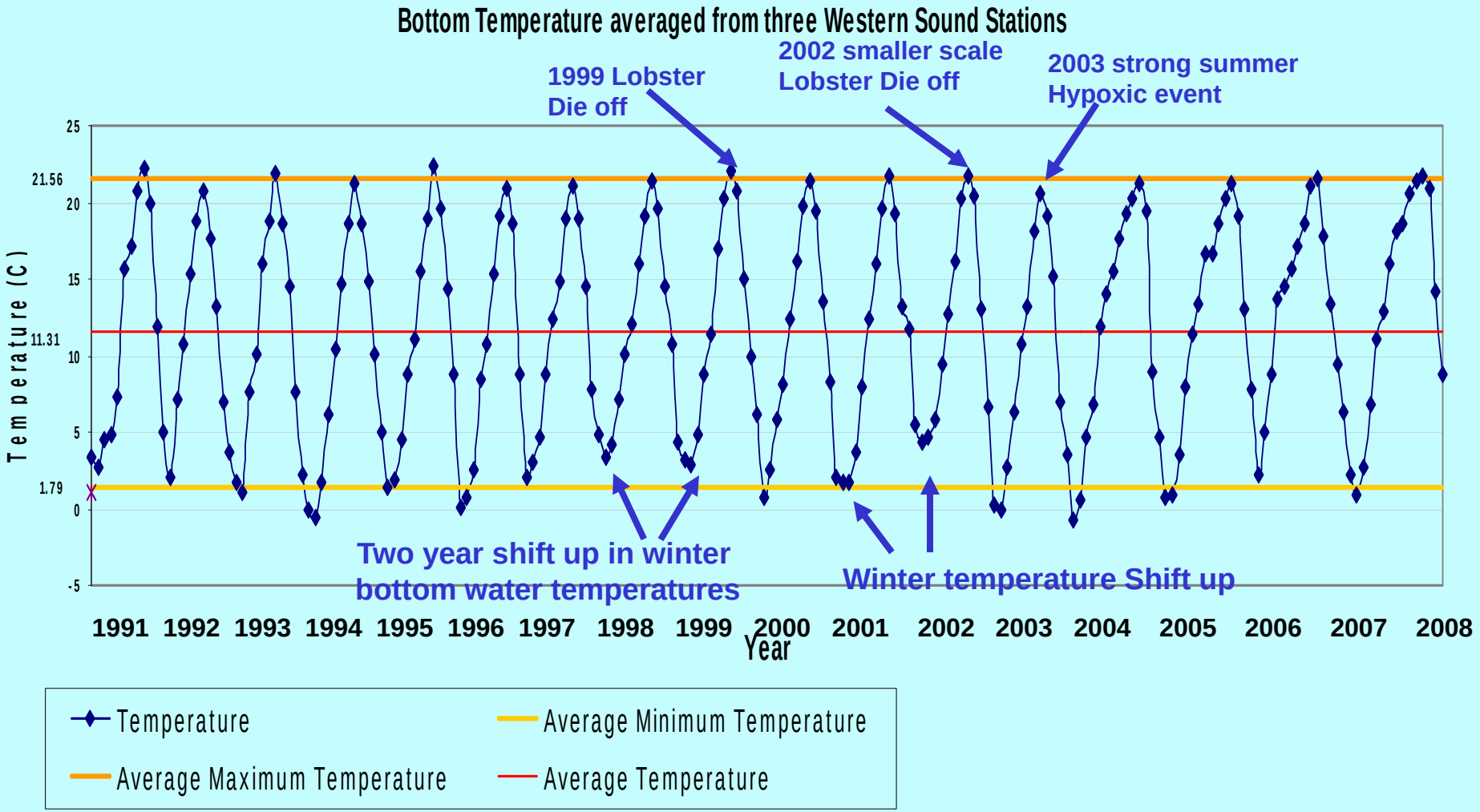

CT DEP Fisheries Division

The average number of warm-water species has increased over the past 23 years from about 8 species per tow to about 11 (a statistically significant increase). Some of this increase can be attributed to improvements in fishery management, notably the increased frequency of striped bass, summer flounder and black sea bass. But the increased frequency of species such as the moonfish, hickory shad, northern sea robin and smallmouth flounder cannot be explained readily by changes in fishery management. Regional warming of water temperatures could be a contributing factor to these other non-game fish species. In all 19 "warm temperate" species have exhibited a significant increase in occurrence in the fall trawl survey.

**Indicator Type: Impact-ecological**

**SH 2008: Living Marine Resources (3.2)**

# Water Temperature Impacts the Sound's Living Marine Resources




Warming temperatures in winter months that continued into the summer may have been a factor in lobster dieoffs in the Sound. Scientists believe that the American lobster becomes stressed when temperatures reach beyond 20 degrees Celsius.

**Indicator Type: Pressure**