

# ATLANTIC STATES MARINE FISHERIES COMMISSION

## **Winter Flounder Abundance and Biomass Indices from State Fishery-Independent Surveys**

Technical Committee Report to the Winter Flounder Management Board  
February 4, 2014

### **Summary**

This report compiles the winter flounder abundance and biomass indices from the state fishery-independent surveys through fishing year 2012 (May 2012 through April 2013). Overall, the trends remain flat and low for both GOM and SNE/MA winter flounder stocks; adult and juvenile indices tend to be below the time series average. Based on state monitoring survey indices, the Gulf of Maine (GOM) and Southern New England/Mid-Atlantic (SNE/MA) stocks have not improved enough to support less restrictive management measures.

It is important to note that the state survey indices vary in length of time series, and some use an average abundance as a reference, while others use a median for reference. Relative abundance indices may be influenced by pre-recruit fish and may indicate an increase in exploitable abundance or biomass.

## **Gulf of Maine**

### **Summary of Winter Flounder Survey Indices in the GOM Region**

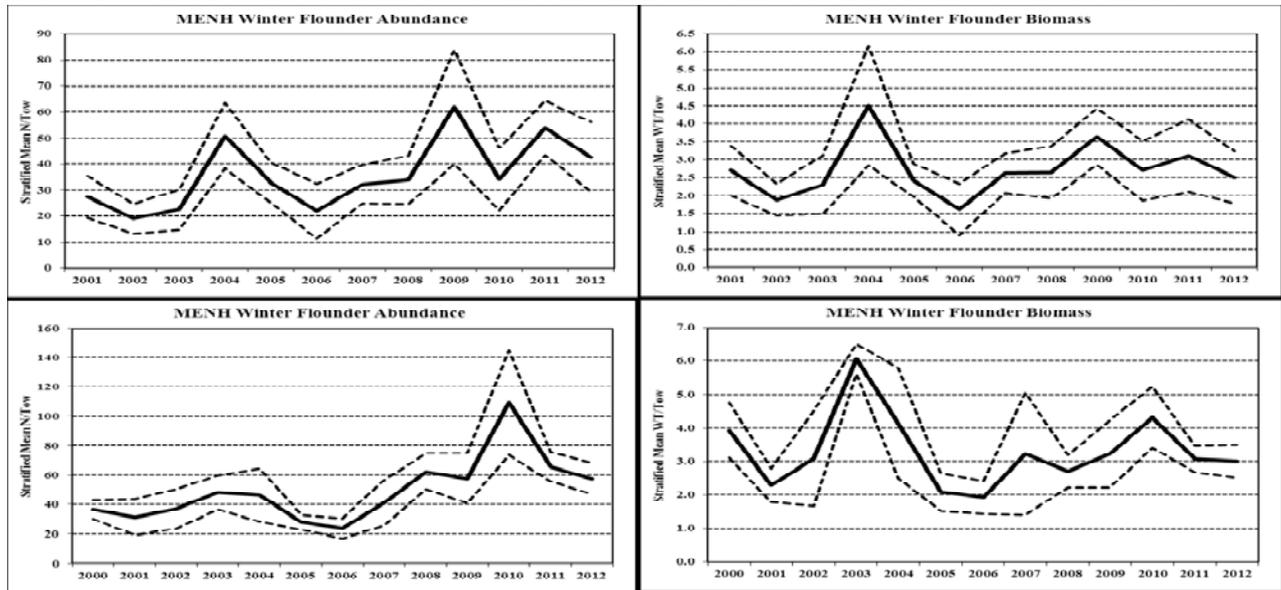
Abundance indices have high variance from year-to-year. There is a slight positive trend from the past decade in the northern areas of the GOM (ME-NH), but is important to note the short time series scale. Off of Massachusetts, the biomass index in 2013 is one of the lowest in the past 37 years. The GOM population is not recovering based on the survey results from MA, ME, and NH.

### **Maine and New Hampshire**

**Time Series Trend = since 2000, overall slightly positive trends in abundance and biomass, but decline in 2012**

The New Hampshire Fish and Game Department (NHFG) has worked with Maine Department of Marine Resources (MEDMR) since the fall of 2000 to conduct an inshore trawl survey off of Maine and New Hampshire. Winter flounder are regularly caught in this survey (Figure 1). NHFG conducts an annual seine survey of juvenile fish in its estuaries from June through November. Winter flounder encountered in the survey ranged in size from 2.9 to 38.1 cm total length with a mean of 6.9 cm total length. The survey produces an index of relative abundance for each species encountered using a geometric mean catch per seine haul. In 2012, the biomass was 2.5 kg/tow (stratified mean weight) in the spring trawl survey and 3.0 kg./tow in the fall. These numbers are both down from a series high of 4.5 kg./tow in spring 2004 and 6.1 kg./tow in fall 2003. The index value (0.57) for winter flounder increased from 2011 and remains below the average (1.50) since 2000, but the index has been highly variable. Numeric indices show a positive trend since 2000 in both seasons, but stratified mean numbers were down in sampling year 2012.

Figure 1. Maine and New Hampshire spring (top) and fall (bottom) Gulf of Maine Winter flounder survey indices 2000-2012. Solid black line is stratified index. Dashed lines are  $\pm 2$  stratified standard errors.

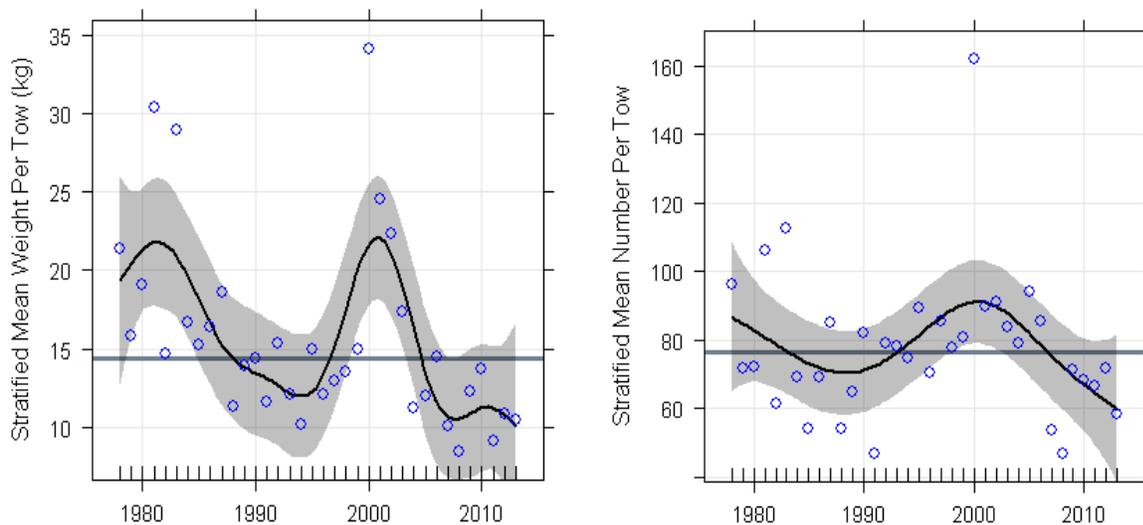


### Massachusetts

**Time Series Trend = overall flat and low, slight drop in abundance (the 2013 biomass index is the 5th lowest in the 37 year survey, is below the 25th quantile, and is near the 12th quantile. No evidence of a recovery for GOM winter flounder in Mass waters.**

Massachusetts Division of Marine Fisheries (MADMF) completed spring (May) and fall (September) trawl surveys covering its territorial waters through 2013. Trends in relative abundance and relative biomass are shown in Figures 2 and 3. Relative biomass is used as a proxy for spawning stock biomass.

Figure 2. MADMF spring survey indices for GOM stock. Left panel: stratified mean biomass per tow. Right panel: stratified mean number per tow. Solid gray line is time series median. Black line is time series GAM fit. Solid gray shaded area is approximate 95% confidence limits for GAM fit.



# Southern New England/ Mid-Atlantic

## Summary of Winter Flounder Survey Indices in the SNE/MA Region

Adult biomass indices tend to be flat or declining, and consistently below time-series averages or medians. MA, RI, CT, and NY surveyed for YOY and juvenile winter flounder; results indicate that abundance of young fish declined in recent years, with some states catching the lowest in 2012 and 2013. The SNE/MA population is not recovering based on monitoring by MA, RI, CT, NY, and NJ.

## Massachusetts

**Time Series Trend = low, no change in biomass and abundance. YOY is slightly up in recent years and back to the time-series median.**

MADMF also completed the annual young of the year (YOY) winter flounder seine survey in June, 2013. This YOY survey indexes recruitment for the SNE-MA stock. The time series of stratified mean density is shown in Figure 4.

Figure 3. MADMF spring survey indices for SNE-MA stock (Regions 1, 2 and 3). Left panel: stratified mean biomass per tow. Right panel: stratified mean number per tow. Solid gray line is time series median. Black line is time series GAM fit. Solid shaded area is approximate 95% confidence limits for GAM fit.

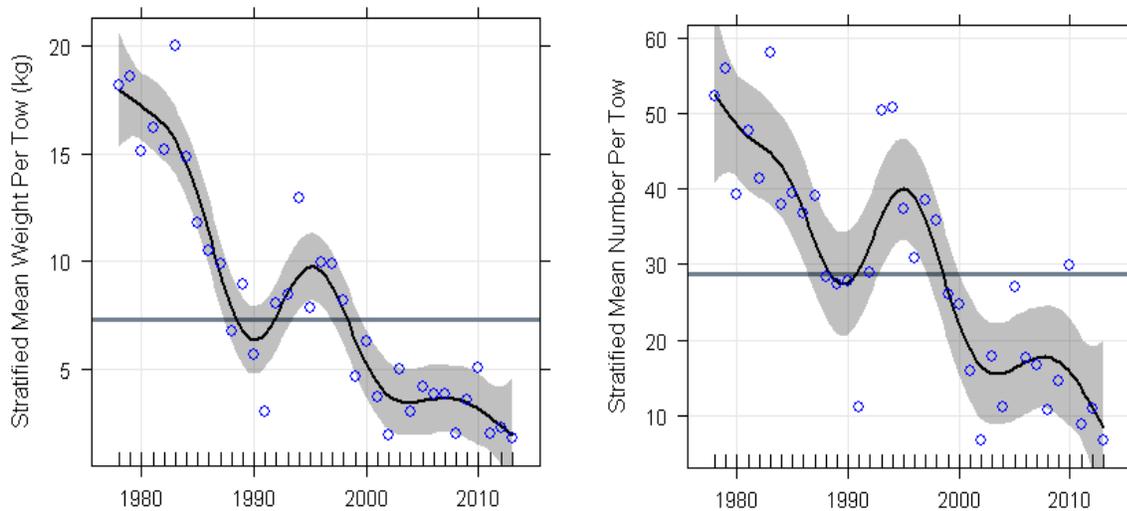
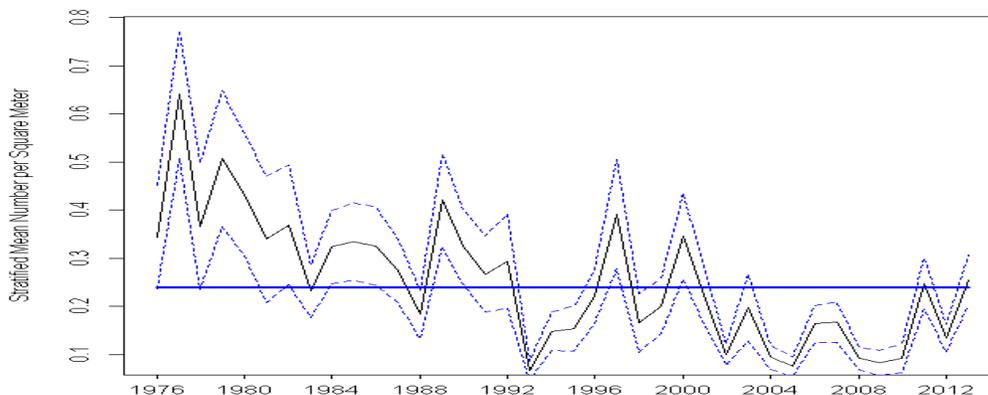


Figure 4. Stratified mean density of young of year winter flounder from the MA DMF Seine survey, 1976-2013. Solid black line is mean number per square meter. Dashed lines represent the 95% confidence limits. Blue line is time series median.



## Rhode Island

### Time Series Trend = flat, adult and juvenile abundance remains low

Rhode Island Division of Fish & Wildlife (RIDFW) conducted the following studies in 2012 (Figures 5 and 6).

- 1) Seasonal Trawl Survey: 42 fixed and random stratified stations sampled in spring and fall.
- 2) Monthly Trawl Survey: 13 fixed stations per month.
- 3) Narragansett Bay Juvenile Finfish Survey: 18 stations sampled once a month from June through October.
- 4) Coastal Pond Seine Survey: May thru October at 24 stations in 8 coastal ponds.
- 5) Coastal Pond Spawning Stock Survey: 6 stations sampled with fyke nets from January to May in Point Judith and Charlestown ponds. Charlestown pond is done in cooperation with EPA AED Narragansett Staff.

Figure 5. Winter flounder abundance trend (CPUE) for three RIDFW monitoring programs (NBS = Narragansett Bay Juvenile Survey, Trawl = Spring Seasonal Trawl Survey, CPS = Coastal Pond Juvenile Survey).

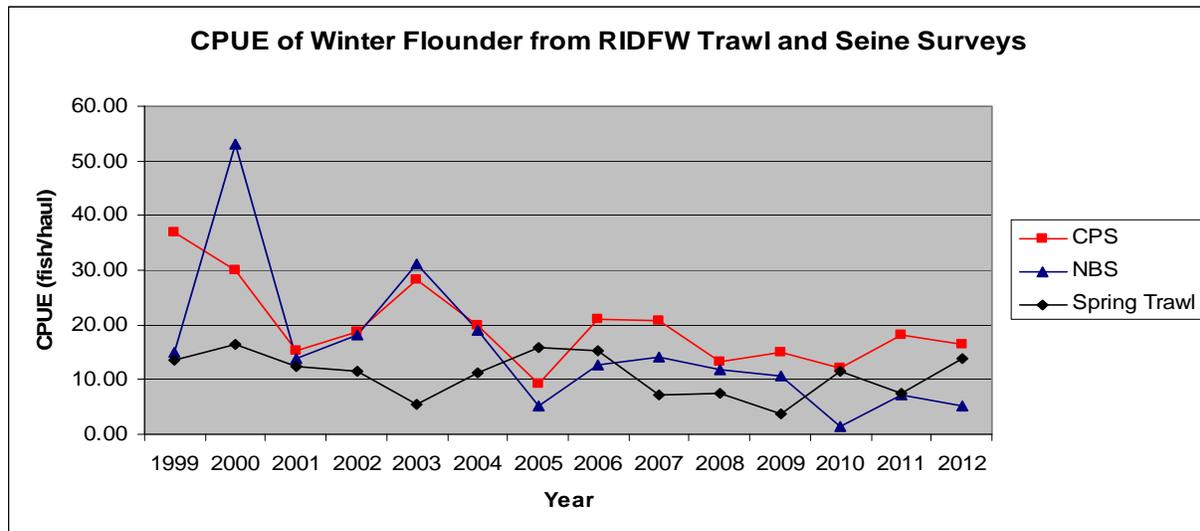
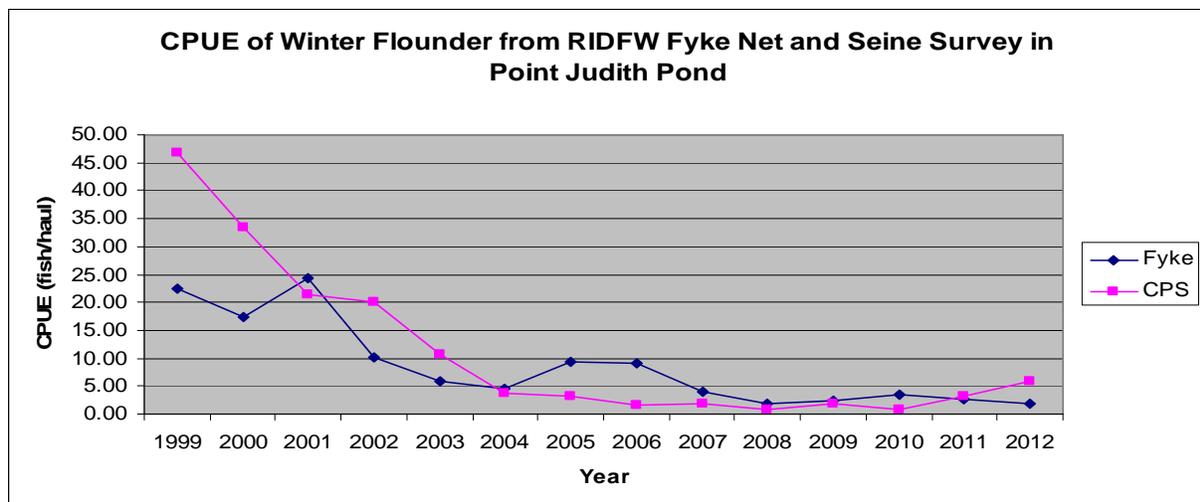


Figure 6. CPUE of winter flounder from the fyke net Winter Flounder Spawning Stock Survey conducted in Point Judith Pond, RI with the corresponding CPUE from the Coastal Pond Juvenile Survey in Point Judith Pond.



## Connecticut

**Time Series Trend = overall declining, consistently below time series average for over a decade**

Winter flounder have been monitored through the Connecticut Department of Energy & Environmental Protection (DEEP) Long Island Sound Trawl Survey (LISTS) since 1984, and Estuarine Seine Survey since 1988. (Figure 7A & B).

The 2012 spring (April-June) trawl index (geometric mean fish/tow) for all ages of winter flounder was 12.02, ranking 28th in the 29 year time series, and the 14th consecutive year below the time series average of 53.07fish/tow. The lowest value in the time series is the 2006 spring index of 7.50fish/tow.

The April-May index used to develop abundance indices at age was 15.80fish/tow for all ages, well below the average for the time series was 67.56fish/tow. The index for mature fish ages 4-13 show a similar decline.

The 2012 YOY Seine index (geometric mean fish/haul) was 0.3, lowest in the 25-year time series. Mortality from YOY to Age 2 increased substantially with the 2003-2004 year classes (Figure 7B).

Figure 7A. Winter flounder abundance in Long Island Sound.

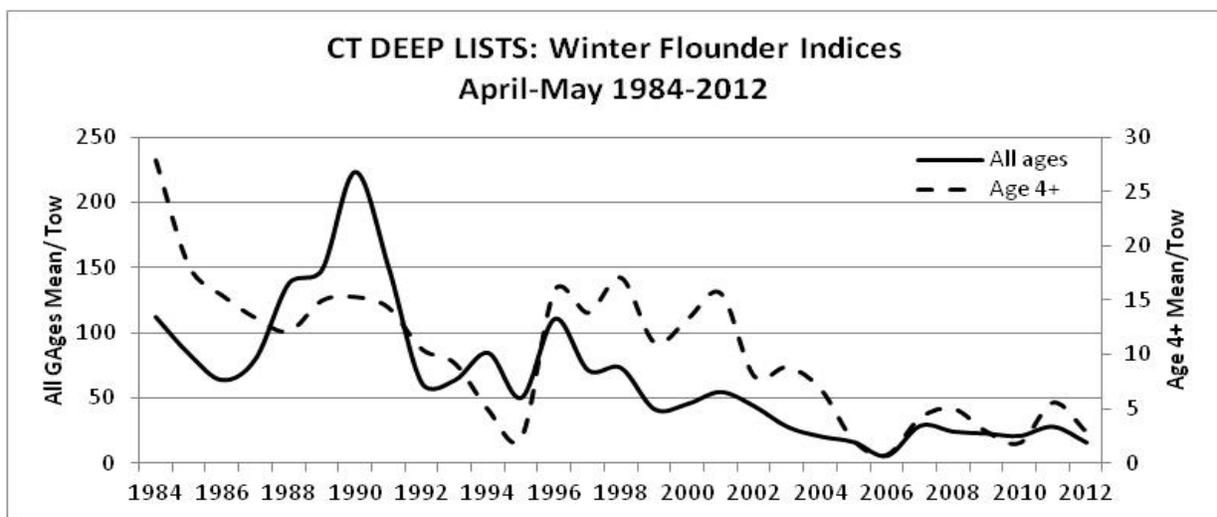
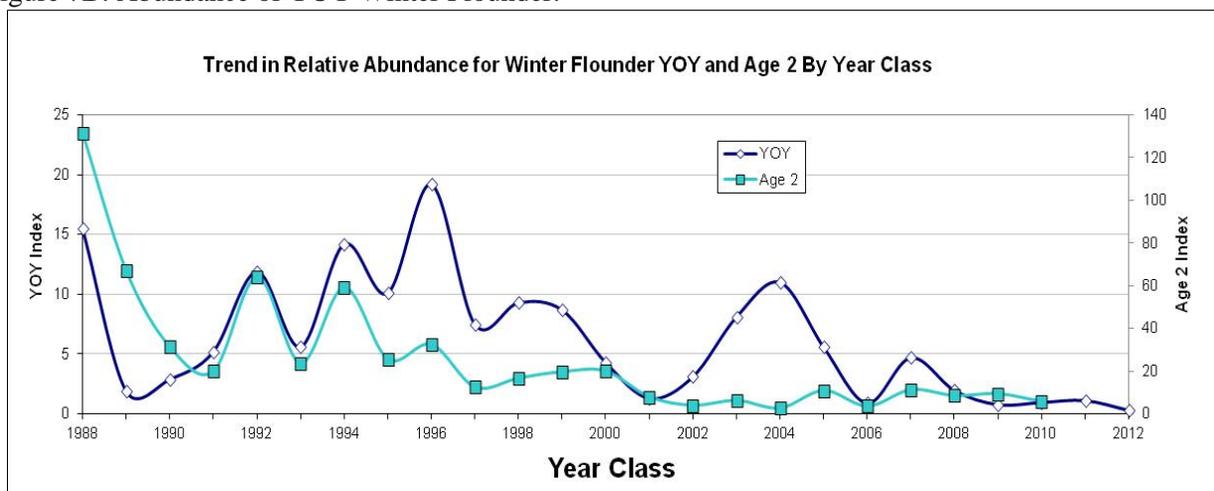


Figure 7B: Abundance of YOY Winter Flounder.



## New York

**Time Series Trend = flat and lower in recent years. YOY has been low and catch declined in 2012 relative to 2011.**

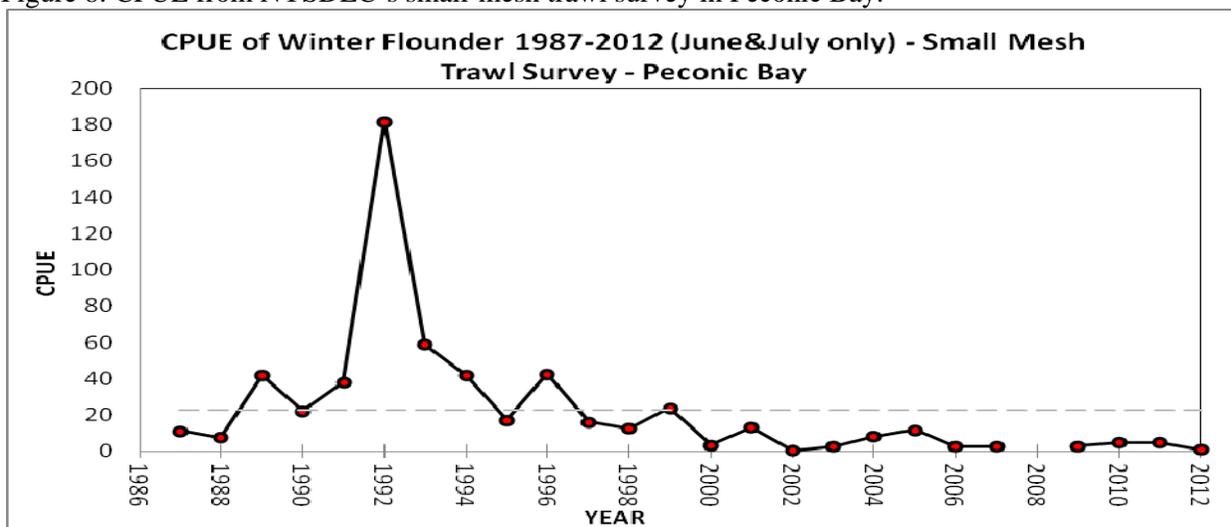
New York State Department of Environmental Conservation's (NYSDEC) fishery independent monitoring is conducted through its Peconic Bay Small Mesh Trawl Survey and Western Long Island Seine Survey.

The NYSDEC has been conducting a small mesh trawl survey targeting juvenile finfish since 1987. The survey runs from May through October in Peconic Bay. A total of 144 randomly chosen stations were sampled during June and July 2012 (time series average = 138.2 tows). Environmental data (temperature, salinity, dissolved oxygen) was recorded at each station at both the surface and bottom. A total of 125 winter flounder were caught in June and July of 2012, up from the survey's low in 2002 when only 83 winter flounder were captured, but considerably lower than the survey max (25,782) in 1992 and the survey average of 3,541 fish.

The lengths ranged from a minimum of 29 mm to a maximum of 335 mm for 2012 and the length-frequency distribution indicates several year classes are present in the bay at the time of sampling. The winter flounder catch per tow (CPUE, expressed as an arithmetic mean) in June & July 2012 was 0.87, the second lowest value in the time series (Figure 8, min.0.6 in 2002, max 181.6 in 1992, avg. 23.0). The proportion of YOY in the 2012 catch is lower than the previous year.

The survey CPUE has been below the time series average consistently since 2000. Sampling was partial in 2005, 2006 and 2008 (Figure 9).

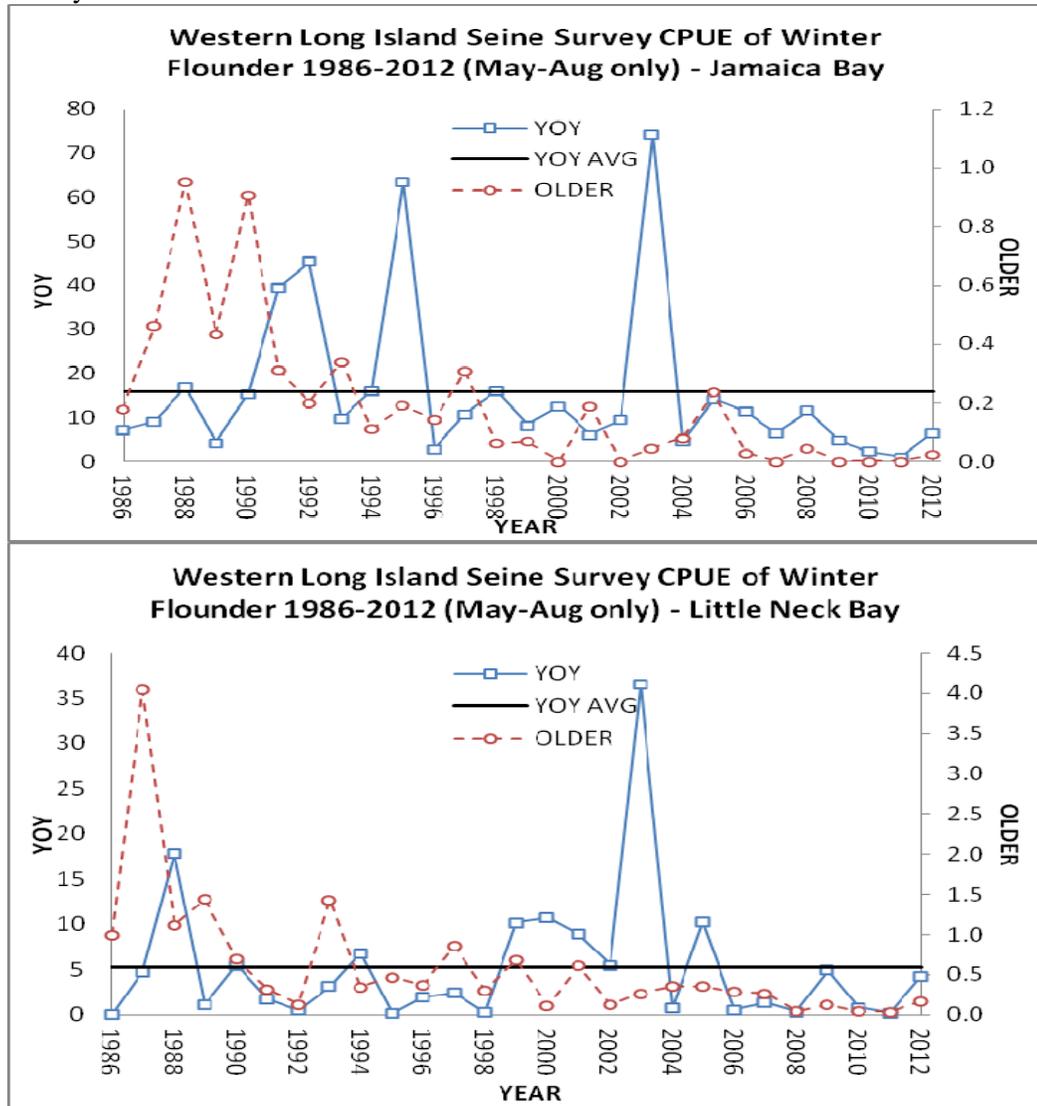
Figure 8: CPUE from NYSDEC's small-mesh trawl survey in Peconic Bay.

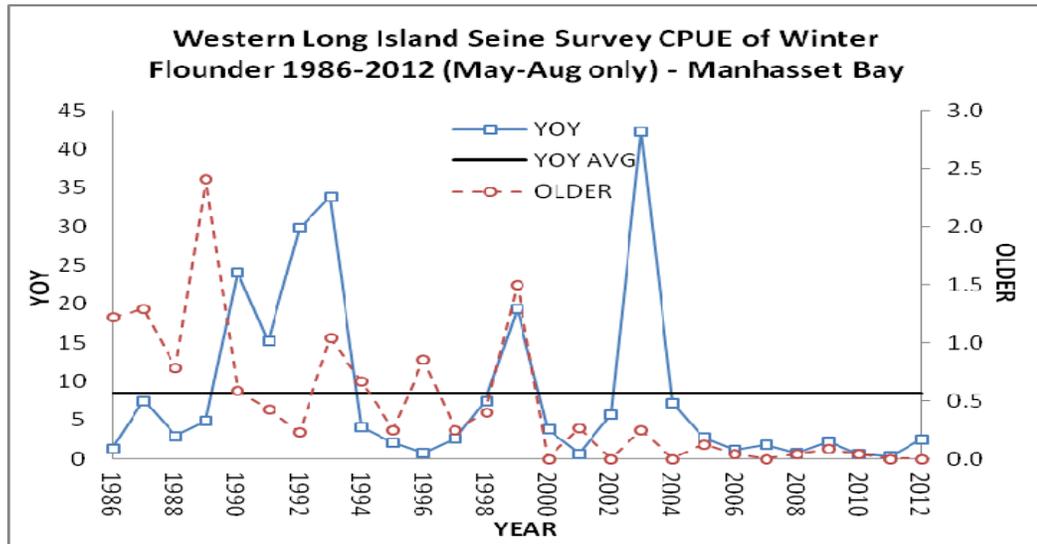


The Department has conducted a seine survey in the western Long Island bays since 1986. The net is a 200 foot ¼ inch mesh seine, with ten foot height in the wings and 12 foot height in the bag. Sampling is conducted at multiple stations twice a month within each bay from May through October, although only data from May-Aug is presented here. On average, 35 tows occur in Jamaica Bay each year during this period, and 20 tows each in Manhasset Bay and Little Neck Bay. Jamaica Bay is a large system located on the South Shore of Long Island that drains into the Atlantic Ocean while the other two bays are smaller systems that drain into the Long Island Sound. The mean catch per seine (CPUE) for winter flounder for each bay are presented

below (Figure 9). All three bays show peak catches of YOY flounder in 2003 and below average CPUE since. CPUE of older winter flounder have generally declined over the course of the time series.

Figure 9: CPUE from NYSDEC's Western Long Island Seine Survey in Jamaica Bay, Little Neck Bay, and Manhasset Bay.





## New Jersey

**Time Series Trend = flat, slightly lower and continues to be below the time series average. Biomass indices from 2013 were lowest in the past 21 years.**

The Bureau of Marine Fisheries has conducted an Ocean Trawl program in nearshore ocean waters since 1988. Since 1989, the survey has been conducted five times per year in January, April, June, August and October. Winter flounder are most abundant during April, and data from this cruise have been used to develop an index of abundance for winter flounder in New Jersey waters. For each tow, information is collected on total number, total weight, and individual lengths.

Stratified catch per tow (numbers) in 2012 yielded an arithmetic mean of 11.00 (27% higher than the previous year's mean of 8.67) and a geometric mean of 3.29 (slightly lower than the 2011 mean of 3.32.) Both the arithmetic and geometric means are more than 35% lower than their respective time-series averages of 17.15 and 6.11 (Figures 10 and 11). Biomass indices for 2012 were an arithmetic mean of 5.04 kg/tow, (slightly higher than 2011's index of 4.91) and a geometric mean of 1.74 kg/tow (slightly lower than 2011's index of 1.90.) As with the numeric indices, both biomass indices were lower than their respective time series averages of 5.62 and 2.35. Preliminary results from the 2013 April survey cruise indicated a sharp decrease for all the indices, yielding time series lows for the numeric means: 6.90 arithmetic and 2.20 geometric. The biomass indices were the lowest in the last 21 years of the survey: 3.68 kg/tow arithmetic and 1.38 kg/tow geometric.

Figure 10. New Jersey Ocean Trawl (stratified) and Spawning Survey arithmetic mean CPUE.

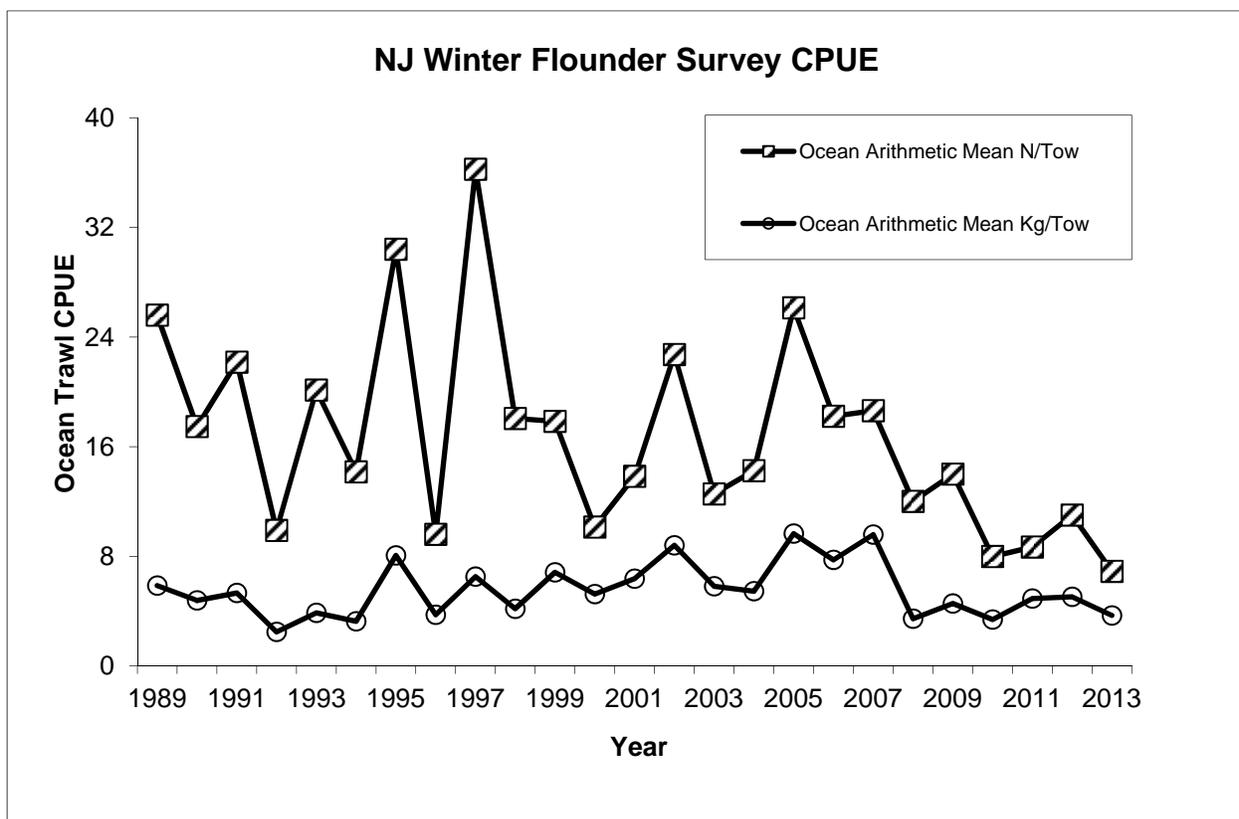


Figure 11. New Jersey Ocean Trawl Survey stratified geometric mean CPUE.

